

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Catawba Nuclear Station would like to offer comments on the following 2016 NRC Written exam questions for review:

Question 17

Recommendation: Facility recommends that two correct answers ("A" and "B") be accepted for this this question as both answers are correct based on conflicting information contained within a procedure note and the Operations governing document for EP/AP implementation.

Discussion:

1. EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation) contains a note which states "An invalid SPDS orange path may briefly exist between opening NS suction valve from sump and starting NS pump. FR-Z.1 should not be entered unless NS pump fails to start."
2. The purpose of this note is to prevent a crew from needlessly transitioning to a CSF procedure while attempting to restore the ability to align for Cold Leg Recirculation.
3. The signal generated is actually valid as the logic for this condition is met due to the alignment specified by this procedure (see attached logic diagram).
4. OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) states that an SPDS signal is only "invalid" if caused by an instrument malfunction or computer related failure (see attached note). Since this document governs all Emergency and Abnormal Procedures, this guidance would apply to ECA-1.1.
5. Operations Department management has determined that the orange SPDS signal that is generated is technically VALID, however current wording of the note in ECA-1.1 states to consider it invalid. Ultimately the reason for the note is to ensure that an unnecessary transition to FR-Z.1 is not made. A procedure change request has been generated to modify this note (in ECA-1.1), to remove the term "invalid", in order to eliminate the conflict discovered during this exam.

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Question 17 as administered ("A" identified as correct answer)

Catabwa Nuclear Station

ILT16 CNS RO NRC Examination

Question: 17

(1 point)

Given the following conditions on Unit 1:

- The crew has entered EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation) and is preparing to initiate an NC system cooldown
- Primary chemistry has been instructed to sample the NC system for boron concentration
- The BOP is performing Enclosure 2 (Aligning NS for Recirculation)
 - NS suction valves from the containment sump are opened
 - Containment CSF status turns ORANGE

Per ECA-1.1,

The Containment CSF status ____ (1) ____ valid.

Boron sample results ____ (2) ____ required prior to beginning the cooldown

Which ONE (1) of the following complete the statements above?

- A.
 - 1. is NOT
 - 2. are NOT
 - B.
 - 1. is
 - 2. are NOT
 - C.
 - 1. is NOT
 - 2. are
 - D.
 - 1. is
 - 2. are
-

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ECA-1.1 Guidance

CNS EP/1/A/5000/ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	PAGE NO. 8 of 84 Revision 41
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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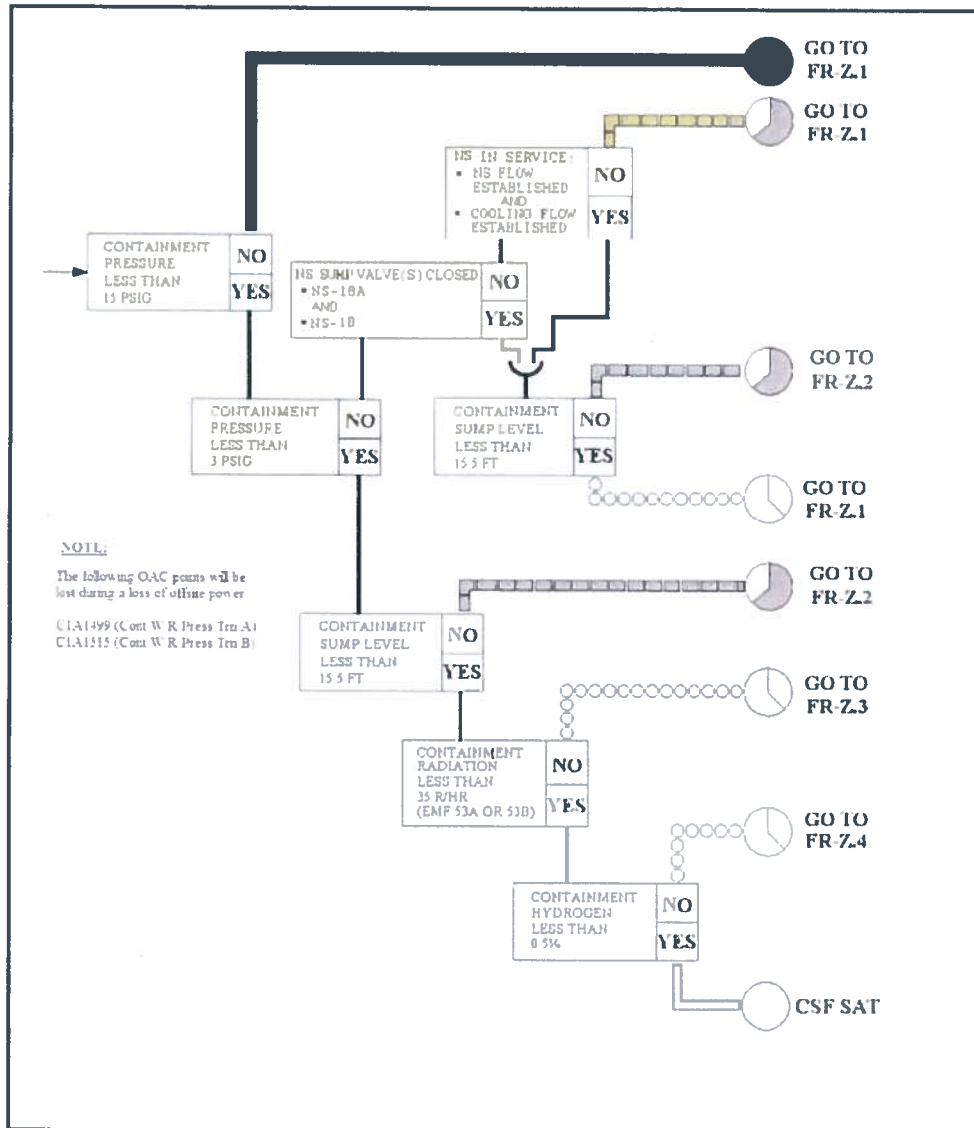
<p>7. Verify criteria to align NS for recirc as follows:</p> <p><u> </u> a. Verify both NS pumps - OFF</p> <p><u> </u> b. Verify containment pressure - GREATER THAN 3 PSIG.</p> <p><u> </u> c. Verify at least one of the following annunciators - LIT:</p> <p><u> </u> • 1AD-20, B/3 "CONT. SUMP LEVEL >3.3 ft"</p> <p><u> </u> OR</p> <p><u> </u> • 1AD-21, B/3 "CONT. SUMP LEVEL >3.3 ft"</p> <p>NOTE An invalid SPDS orange path may briefly exist between opening NS suction valve from sump and starting NS pump. FR-Z.1 should not be entered unless NS pump fails to start.</p> <p><u> </u> d. Align NS for recirc. REFER TO Enclosure 2 (Aligning NS for Recirculation)</p>	<p>a. IF all the following conditions met:</p> <p><u> </u> • NS in service</p> <p><u> </u> • NS suction aligned to Containment Sump</p> <p><u> </u> • RN established to associated NS Hx.</p> <p><u> </u> THEN GO TO Step 8</p> <p>b. Perform the following:</p> <p><u> </u> 1) IF AT ANY TIME containment pressure goes above 3 PSIG, THEN perform Step 7.</p> <p><u> </u> 2) GO TO Step 8.</p> <p>c. Perform the following:</p> <p><u> </u> 1) WHEN at least one "CONT. SUMP LEVEL >3.3 ft" annunciator is LIT, THEN perform Step 7.</p> <p><u> </u> 2) GO TO Step 8.</p>
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Containment SPDS Orange Path Logic Flowpath

CNS EP/1/A/5000/F-0	CRITICAL SAFETY FUNCTION STATUS TREES CONTAINMENT - Page 1 of 1	PAGE NO. 9 of 11 Revision 9
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OMP 1-7 SPDS Guidance

- E. After the CSF Status Trees have been implemented, the following "rules of usage" apply:
- Use of EPs to restore a critical safety function is based on a two factor priority system. The first factor considers the relative importance of the safety function in an accident scenario. On the OAC alarm video, the order of priority is established by position along the bottom of the screen. SUBCRITICALITY at the left side of the screen has the highest priority. The others in decreasing priority, are:

CORE COOLING, HEAT SINK, NC INTEGRITY, CONTAINMENT (Integrity) and NC INVENTORY on the right side of the screen.
 - The second factor considers the degree of severity to which the critical safety function is being challenged. The order of priority is designated by color in decreasing order, as follows:
 1. Red - Extreme Challenge
 2. Orange - Severe Challenge
 3. Yellow - Off-Normal
 4. Green - Satisfied

NOTE: An instrument or computer related failure that causes an erroneous SPDS indication is the only example of an invalid CSF Status Tree condition.

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Question 28

Recommendation: Facility recommends that this question be removed from the exam as no correct answer to part 1 is listed.

Discussion:

1. Part 1 of this question is technically correct concerning the loss of a Reactor Coolant Pump with no other plant transient in progress .
2. With the given conditions, a Reactor trip will occur based on P-8 (Single Loop Loss of Flow Reactor Trip > 48%) resulting in a fluctuation of all S/G levels.
3. Post exam simulator analysis revealed that the identified S/G level (1C) would actually begin to shrink first and at a faster rate but not to a lower level when compared with other S/Gs (see attached S/G level trend).
4. The question did not specify a detailed time frame for analysis. "Initially" is open to interpretation as the applicable S/G level varies considerably within a relatively short period of time (as compared to other S/G levels).
5. The listed answer is technically incorrect. The other available answer is also technically incorrect as S/G swell will not occur.

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Question 28 as administered ("A" identified as correct answer)

Catawba Nuclear Station

ILT16 CNS RO NRC Examination

Question: 28
(1 point)

Given the following conditions on Unit 1:

- Unit is at 100% RTP

Subsequently:

- 1C NC pump trips due to an operator error on the Main Control Board
- The crew verifies the reactor trips

1C S/G N/R level will initially ____ (1) ____ than the other S/Gs after the 1C NC pump trips.

NC loop 1C delta T would initially be ____ (2) ____ than the other NC loops delta Ts.

Which ONE (1) of the following completes the statements above?

- A. 1. shrink lower
 2. lower

 - B. 1. swell higher
 2. lower

 - C. 1. swell higher
 2. higher

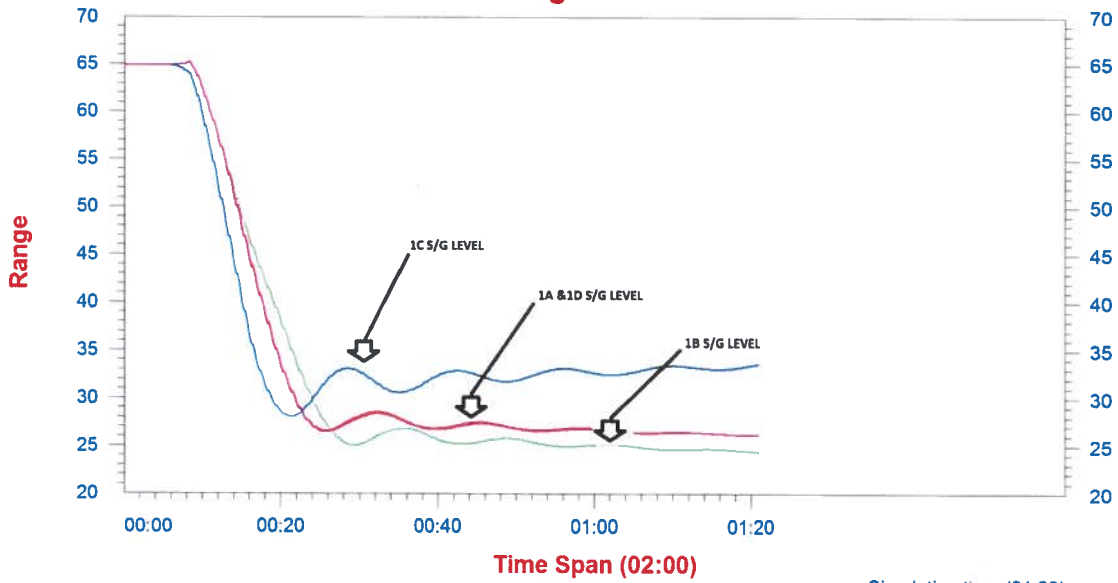
 - D. 1. shrink lower
 2. higher
-

Post Exam Comments

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S/G level trend following trip of 1C NCP and resulting Reactor Trip

Insight Trend



Color	Name	Description	Value	Units	Minimum	Maximum
Red	LCF_3501	LCF_3501 S/G 1A N/R LVLS CH1 TO DCS/MCB/OAC (CFAA3501)	26.12		20	70
Green	LCF_3540	LCF_3540 S/G 1B N/R LVLS CH1 TO DCS/MCB/OAC (CFAA3540)	24.39		20	70
Blue	LCF_3570	LCF_3570 S/G 1C N/R LVLS CH1 TO DCS/MCB/OAC (CFAA3570)	33.55		20	70
Pink	LCF_3591	LCF_3591 S/G 1D N/R LVLS CH1 TO DCS/MCB/OAC (CFAA3591)	26.08		20	70

Simulation time (01:20)

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Question 50

Recommendation: Facility recommends that question 50 be deleted from the exam due to not having enough information in the stem of the question in order to answer it correctly.

Discussion:

1. The stem of the question states that battery 1EBA is supplying AC vital bus 1ERPA through inverter 1EIA without a battery charger connected. Even though this would be the lineup if a battery charger were to fail, it does not provide a complete load profile for this battery. 1EBA would be supplying 1EDA and Panelboard 1EPA as well as other loads (see system drawing).
2. The question stem also states that only the voltage range of 125 VDC to 120 VDC is taken into account. Battery discharge tests in the plant suggest that the battery would only be in this voltage range for mere seconds (see 1EBA discharge test data sheet).
3. Due to the short duration of being in the specified voltage range and the unknown load profile for the specific battery listed, it is the opinion of CNS that there is not enough information to answer this question correctly and it should be deleted from the exam.

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2016 CNS NRC WRITTEN EXAM

Question 50 as administered ("D" identified as correct answer)

Catabwa Nuclear Station

ILT16 CNS RO NRC Examination

Question: 50
(1 point)

Vital battery 1EBA is supplying 1ERPA through inverter 1EIA without a battery charger on line.

As battery terminal voltage decreases from 125 VDC to 120 VDC, battery current flow _____ (1) _____ and battery discharge rate _____ (2) _____.

Which ONE (1) of the following correctly completes the statement above?

- A. 1. increases
 2. decreases
 - B. 1. decreases
 2. decreases
 - C. 1. decreases
 2. increases
 - D. 1. increases
 2. increases
-

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Battery 1EBA Discharge Test Data Sheet

Enclosure 11.3

Battery Discharge Data Sheet

IP/0/A/3710/010

Page 1 of 6

TECH SPEC/SLC

BATTERY 1EBA WORK ORDER 02085844-01 DATE 11.12.13

	TIME	BATTERY VOLTAGE, VDC		DISCHARGE CURRENT, mV *	
		ACTUAL	REQUIRED**	ACTUAL****	REQUIRED**
TEST START	0950	117.64	≥ 110.70	53.12	≥ 52.70 mV
59 seconds ***	0950	112.75		53.05	
1 Minute	0951	116.26		27.96	≥ 27.26 mV
9 Min 59 Sec.	0959	117.88		28.01	
10 Minutes	1000	116.65		38.38	≥ 38.10 mV
19 Min 59 Sec.	1009	116.58		38.42	≥ 38.10 mV
20 Minutes	1010	117.66		29.40	≥ 28.68 mV
60 Minutes	1050	117.10		28.99	≥ 28.68 mV
90 Minutes	1120	116.29		28.98	≥ 28.68 mV
115 Minutes	1145	115.56		28.99	≥ 28.68 mV
120 Minutes	1150	115.42		28.99	≥ 28.68 mV
TEST END	1150	119.54			

* 1mV = 10 Amps

** Engineering Limits. Refer to Section 9.1 for Tech Spec Limits.

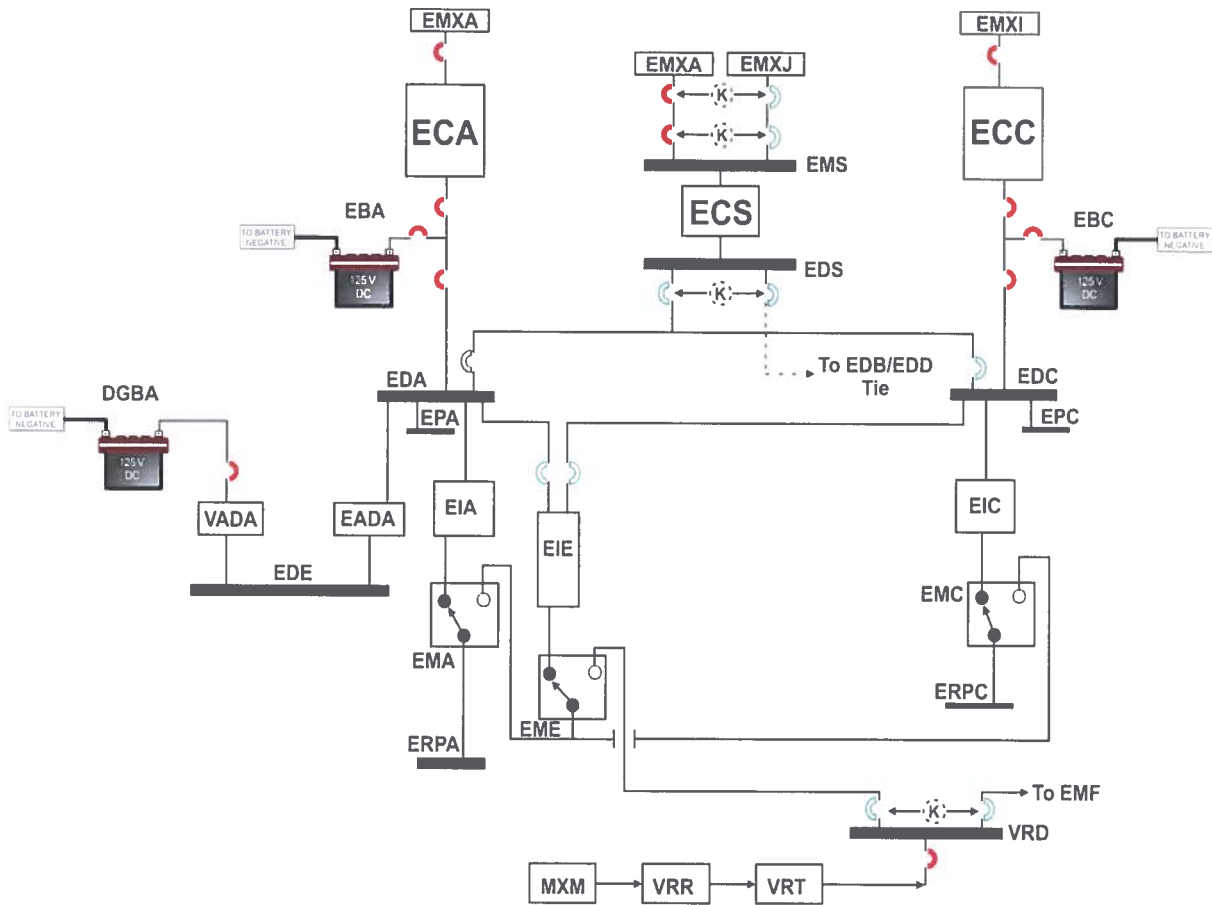
*** During 1 to 59 seconds of test, record lowest battery voltage observed. It is **NOT** necessary to record the actual time when the lowest battery voltage occurred.

**** For Actual Discharge Current, a tolerance of +1.0 mV (or +10.0 Amps) with respect to Required Discharge Current is allowed. However, tolerance should be kept to minimum if possible.

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2016 CNS NRC WRITTEN EXAM

Vital Instrumentation and Control System Drawing



Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Question 75

Recommendation: Facility recommends that the Exam Key be changed to list the correct answer as "C" (approved exam listed "D" as correct answer).

Discussion:

1. Several CNS procedures list the sound powered phone circuit power supply for each unit, but omit information concerning a permanent cross-tie installed per NSM 50307.
2. Post exam review identified conflicting information concerning split versus cross-tied power supplies.
3. CNS Engineering staff has verified that a previously installed modification tied sound powered phone circuits together ensuring availability from the opposite unit following a loss of one unit's essential "B" train power (see attached email and NSM).
4. Per the listed conditions, the emergency sound power phone circuit will be available, via Unit 2 power supply. Answer "D" is technically incorrect. Answer "C" is technically correct.

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Question 75 as administered ("D" identified as correct answer)

Catabwa Nuclear Station

ILT16 CNS RO NRC Examination

Question: 75
(1 point)

Given the following conditions on Unit 1:

- 1B D/G is tagged out
- The control room has been evacuated per AP/1/A/5500/017 (Loss of Control Room) due to a fire in the Auxiliary Building
- Following control room evacuation, a loss of offsite power occurred

AP/17 requires a reactor operator to be dispatched to the _____ (1) _____ to maintain Hot Standby conditions on Unit 1.

The emergency sound powered phone circuit _____ (2) _____ be available for communications.

Which ONE (1) of the following completes the statements above?

- A. 1. Auxiliary Shutdown Panels
 2. will
- B. 1. Auxiliary Shutdown Panels
 2. will NOT
- C. 1. Standby Shutdown Facility
 2. will
- D. 1. Standby Shutdown Facility
 2. will NOT
-

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Question 75 - CNS Engineering Response

Miller, Rusty E

From: Coble III, James W
Sent: Thursday, May 26, 2016 6:15 PM
To: Byrum, Josh O
Cc: Rudisill, Rudy; Miller, Rusty E
Subject: RE: NRC ILT 2016 Question
Attachments: NSM-CN-50307.pdf

The Unit 1 and Unit 2 emergency sound-powered systems are cross tied together. The cross tie is depicted on CN-1821-01 Rev. 3 (reference drawing Coordinates 3-J). The cross tie was added as part of by NSM-50307 (Pertinent documents of the modification are attached). WO 00738173-01 documents the installation of the cross tie. WR604009 (associated WO is 00739085) performed the testing of the tie and 2 newly installed sound powered jacks in the OSC and TSC. Per CNSD-1348-04-01 the emergency sound powered system is powered as follows:

Unit 1	Breaker
Normal	2LA6 Breaker 25
Alternate	2ELB Breaker 19

Unit 2	Breaker
Normal	2LA6 Breaker 25
Alternate	2ELB Breaker 19

The breaker power ties were further validated by reviewing CN-1819-02 and CN-1819-03.

Question 75 states the following conditions of the Station:

- 1B D G is tagged out
- The control room has been evacuated per AP 1 A.5500 017 (Loss of Control Room) due to a fire in the Auxiliary Building
- Following control room evacuation, a loss of offsite power occurred

Since the Unit 1 and Unit 2 Emergency Sound powered systems are tied together, power to the system remains available as the system can get power from Unit 2 sources.

Additional Notes:

From, NSM-50307 there's a memo to file dated June 26th, 1989 which states the need for this change on "having a loss of offsite power event occurring and causing insufficient communications systems to be available between the ASP/SSF and the TSC/OSC during emergencies". This Memo is attached.

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Question 75 Reference (NSM 50307)

Form NSM 6422a (7/1/88)

NUCLEAR STATION MODIFICATION REQUEST	
SFR CNFR 1446	
(1) NSM # <u>C N - 5 0 3 0 7</u> Rev # <u>0</u>	(1a) System(s) <u>ECR</u>
(2) Description of Problem <u>The Unit 1 and Unit 2 emergency sound powered phone circuits are separate circuits not allowing people at Unit 2 phone jacks to talk to people at the Unit 1 phone jacks or the SSP. Also no sound powered phone jacks exist in the TSC/OSC.</u>	
(3) Requested Modification <u>Tie the Unit 1 and Unit 2 emergency sound powered phone circuits together and add sound powered phone jack in the TSC and OSC.</u>	
(4) Design Responsibility <input type="checkbox"/> SDM <input checked="" type="checkbox"/> DDM (Urgent Modification? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No)	
(4a) Verbal Approval (SDM's only) Provided By: <u>N/A</u> Date _____	
(4b) Verbal Approval (SDM's only) Requested By: <u>N/A</u> Date _____	
(5) Implementation Responsibility: <input type="checkbox"/> NPD or <input checked="" type="checkbox"/> CMD QA Condition <u>N</u>	
(6) Accountable Engineer: <u>T. Scott Martin</u> Initiator: <u>J. G. Leathers</u>	
(7) Category Assigned (1 thru 16): <u>15</u> Urgency (check one): <input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low	
(8) Commitment Dates: <u>NONR</u> Commitment To: <u>NONR</u>	
(9) Date Design Desired by Station: <u>Design on site 10-1-90</u> Outage Related? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Reason: <u>To support 1991 non-outage implementation</u>	
(10) NSM Request Approved By: <u>[Signature]</u> Date <u>7/17/88</u>	
For Modifications Requiring Cost Estimates	(11) Estimated Cost of Modification \$ _____ Estimate By: _____ Estimate Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No
	(12) Proposed Schedule Proposed Implementation Complete Date: _____ Scheduled By: _____ Schedule Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No
	(13) Approved By: _____ Name _____ Date _____

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

CATAWBA NUCLEAR STATION
NSM CN-50307
FINAL SCOPE DOCUMENT

PROJECT DESCRIPTION

Tie the Emergency Sound Power System (ECH) of Unit 1 to the Emergency Sound Power System (ECH) of Unit 2, and add sound power jacks in the TSC & OCS.

PURPOSE

The Unit 1 & Unit 2 emergency sound power phone circuits (system ECH) were separate. There are no sound power jacks in the TSC or OSC. Personnel in one area could not communicate with other areas. The emergency sound power system (ECH) of Unit 1 is to be connected to Unit 2 and to the TSC and OCS.

ELECTRICAL

The root cause of this NSM is the Emergency Sound Power System (ECH) of Unit 1 is separate from Unit 2. There is not a sound power jack in the TSC or OCS.

The existing emergency sound power jacks located at column T-33 on elevation 568'+0 of the Service Building have been identified as 1ASP-J5 for Unit 1 jack & 2ASP-J3 for Unit 2 jack. A new Sound Power Jack 1ASP-J3 has been added in the TSC (Service Building) on Elevation 594'+0 at column T-26. A new Sound Power Jack 1ASP-J4 has been added in the OSC (Service Building) on Elevation 574'+0 at column U-36.

To connect the emergency sound system of Unit 1 to Unit 2 a jumper (1SPTX16G.3) has been added between jack 1ASP-J5 and 2ASP-J3. Cable #1ECH 564 has been routed from jack # 1ASP-J5 to jack # 1ASP-J4 to tie OSC to system. Cable # 1ECH 562 has been routed from jack # 1ASP-J3 to jack # 1ASP-J4 to tie TSC to system.

The Voltage in the ECH system is 8.2 Volts DC, care must be taken to insure the polarities are properly connected. This is positive to positive and negative to negative.

Design input documentation are per PR-101.

Related Modification - None

Assumptions - None

CIVIL ENVIRONMENTAL

No involvement

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

Date November 27, 1991

T. E. Crawford
Superintendent of Integrated Scheduling

Attention: Jeff Setser

D. L. Freeze, Manager
CMD - Central

Attention: James C. Blair


Subject: Catawba Nuclear Station
NSM CN-50307 Rev. 0
Tie Unit 1 and Unit 2 Emergency Sound
Powered Phone Circuits Together.
File No.: CN-175.50

It has been determined by the Projects Group that no Implementation Procedure will be required for the referenced NSM.

This modification ties the unit 1 and unit 2 sound powered phone system together and will add additional jacks in the TSC and OSC. This work is not safety related and connecting the both units together will assist in plant activities. This modification involves no safety related system. Communication is discussed in the FSAR (9.5.2) but this modification will not require any changes to the text. There will not be any Technical Specification changes because of this modification. The work order will control the work and provide the information necessary for the installation of this modification. There will be a functional test required for this installation. It will be done by CMD and documented on the work order

Please find attached a copy of the Documentation Checklist, the Design Completion Notice, and all associated Design Summaries. The Construction and Maintenance Department should implement this modification. A start date may now be developed.

If there are any questions, please contact the NSM Accountable Engineer, John Adams, at extension 3026.


J.C. Adams
Accountable Engineer

Attachments

cc: M. L. Cornwell
B. N. Kimray
J. H. Knuti
W. L. Turbyfill
C. L. Jensen
C. L. Therrien
NSM File

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

June 26, 1989

INTRASTATION MEMO

H. B. Barron
Superintendent of Operations

SUBJECT: Sound Powered Phone System

During several Auxiliary Shutdown Panel/Standby Shutdown Facility Drills held in 1989 for Operations, a need to put sound powered phone jacks in the TSC and OSC was identified. This can be accomplished in conjunction with your NSM 50307.

This NSM is written to cross connect Unit 1 and Unit 2 Emergency Sound Powered Phone Systems. This NSM is to be activated for 1991 non-outage modifications. Scott Martin of Projects will be sending the package to Design by 7-15-89 and we would like to add an additional SFR to install these jacks as part of your NSM 50307.

We base this need on the possibility of having a loss of offsite power event occurring and causing insufficient Communications systems to be available between the ASP/SSF and the TSC/OSC during emergencies.

We have seen evidence of this problem during several ASP/SSF drills held this year. We believe having the sound powered phone system available at these locations would solve this problem.

We appreciate your consideration of this need and will be looking for your reply.

An SFR is attached for your approval and should be sent through the process if you agree. If you have any questions please call me at 3236.

R. Michael Glover
R. Michael Glover
Compliance Manager

GLM\kab:FRONE.GLM

Attachment

xc: D. P. Simpson
G. L. Mitchell
T. S. Martin

Scott Martin -
pls let me know
if you can / cannot
include it 50307.
Barron

This will be no
problem. TSM
7/5/89

Post Exam Comments

2016 CNS NRC WRITTEN EXAM

DUKE POWER		NUCLEAR STATION WORK REQUEST		PRIORITY	3	WORK ORDER NO.	9105851
P.R. NO. 002991		SECTIONS WORK		DATE AND TIME AT WORK		DATE AND TIME AT WORK	
CN 015M		8A		501-307M		I.D. TAG PLACED	
DESCRIPTION OF WORK REQUESTED NSM 8027000RWU TAG SHALL PERFORM CHECKOUT FOR NEWLY INSTALLED SOUND BOMB JARBS AND US TO U2 TIR-IN							
DETERMINED BY				PROCEDURE NUMBER(S)			
ON ORDER	100	MR. Stalder	501-307M		4-1-92		
ENTRY	100	MR. Stalder	501-307M		4-1-92		
PLANT. UNIT	YIELD	MR. Stalder	501-307M		4-1-92		
REQ. NO.	100	MR. Stalder	501-307M		4-1-92		
REQ. TAGS	100	MR. Stalder	501-307M		4-1-92		
CC	100	MR. Stalder	501-307M		4-1-92		
AGE	100	MR. Stalder	501-307M		4-1-92		
CLEAN SCORE	4	MR. Stalder	501-307M		4-1-92		
PLANNER	100	MR. Stalder	501-307M		4-1-92		
SPECIAL INSTRUCTIONS (INCLUDE SAFETY REMINDERS)							
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> RECEIVED SEP 18 1991 NSM </div>							
JOB SEQUENCE DESCRIPTION							
1. Perform checkout and functional of CN-50307 per attached package and PWT sheet. JE 2x6 12							
2. Return PWT paperwork and drawings to J. Stalder in Projects. JE 2x1 2							
PLANNER	MR. Stalder	DATE	02/24/92	TOTAL EST. MAN HOURS		14	
MATERIAL DESCRIPTION		REQ. D. NO.	REQ. QTY.	STATUS	LOCATION	DATE	
					1992 FEB - 7	PH 420	
					PLANNING		
REQUIRED TO GO: YES NO CHECKED 91075268 01							

Post Exam Comments

2016 CNS NRC OPERATING EXAM

JPM F

Recommendation: Facility recommends that step 7 be changed to remove the "Critical Step" designation.

Discussion:

1. The as submitted JPM F (Shift Operating RC (Condenser Circulating Water) Pumps by placing 1D RC Pump in service and securing 1B RC Pump) step 7 is labeled as a critical step.
2. The purpose of securing the pump by closing its discharge valve is to prevent exposing the pump suction line from the discharge pressure of the remaining running pumps. In this case that would be RC pumps 1A, 1C, and 1D.
3. If the step for closing the discharge valve were not performed and the 1B RC pump were secured by just depressing the OFF pushbutton, then the discharge valve would automatically close in approximately 50 seconds. This would allow the discharge pressure of the remaining running pumps to be introduced to the suction of the 1B RC pump for those 50 seconds.
4. According to the engineering department (Mike Classe – Manager Nuclear Engineering), the maximum discharge pressure of any running pump would be from the 2C RC pump (~66 PSIG at an operating temperature of 105-110 degrees F).
5. The suction piping for this system is Pipe Spec 150.4 seen in the chart below. For a conservative temperature of 200 degrees F, the maximum design pressure for the suction piping would be 215 PSIG. Therefore, having the suction piping subjected to design discharge pressure for a short duration of time is of no major consequence, and should therefore not be credited as a critical step. The critical part of securing 1B RC pump is to depress the OFF pushbutton and verify the discharge valve is closed, and therefore step 8 of the JPM should remain the critical step.

Sub-Table No.: PS-150.4
Duke Class: E,F,G,H
Generic Material: Carbon Steel
Maxium Design Conditions:

Approved for Fire Protection
Related Systems. See Note I-5
of Table 8.2.2

TEMP (°F)	100	200	300	400	500	600	650	700
PRESS (psig)	215	215	210	180	150	130	120	110