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September 14, 1984

Ivan W. Smith, Chairman
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. A. Dixon Callihan
Administrative Judge
Union Carbide Corporation
P.O. Box Y
Oak Ridge, Tennessee 37830

Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: In the matter of Commonwealth Edison Company (Byron Nuclear Power Station, Units 1 and 2) Docket Nos. 50-454 O L and 50-455 O L

Dear Administrative Judges:

Enclosed is Commonwealth Edison Company's final report of a deficiency considered reportable pursuant to 10 C.F.R. §50.55(e) regarding butt splices in electrical conductors at Byron Station. This subject was addressed at the prehearing conference last May.

Very truly yours,

Martha E. Gibbs

Martha E. Gibbs

MEG:mg
Encl.

cc: Service List

DS03

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

August 28, 1984

Mr. James G. Keppler
Regional Administrator
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Byron Generating Station Units 1 and 2
Electrical Conductor Butt Splices
NRC Docket Nos. 50-454 and 50-455

References (a): May 17, 1984 letter from D. L. Farrar to J. G. Keppler.

(b): June 12, 1984 letter from T. R. Tramm to J. G. Keppler.

(c): July 2, 1984 letter from T. R. Tramm to J. G. Keppler.

Dear Mr. Keppler:

This letter provides the final report of a deficiency considered reportable pursuant to 10 CFR 50.55(e) regarding butt splices in electrical conductors at Byron station. For tracking purposes, this deficiency is numbered 84-03.

In reference (c), we provided the results of the electrical butt splice reinpection program which was described in reference (a). At that point in time the inspections had been completed but the safety significance of the minor splice installation discrepancies had not been established through engineering analysis. Those analyses are now complete.

A total of 82 butt splices were reviewed. In reference (c) we indicated that only 65 discrepant splices were found. In several cases, however, the cut-out section of the deficient butt splice did not contain enough of the conductor to positively identify the color code. Wherever this occurred, all of the conductors in the cable were analyzed. Attachment A to this letter contains the documentation on the engineering review of each conductor.

In 73 cases it was found that an open circuit at the splice would not result in a loss of control that would defeat the safety function of the associated equipment. In nine cases it was determined that the butt splice failure would defeat the safety function of the associated equipment. In each of those nine cases, however, indication regarding the status of the equipment is available and the operator can take manual actions to accomplish the safety function through manipulation of switches or valves.

Please address any further questions you may have regarding this matter to this office.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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9120N

ATTACHMENT A

Safety Impact of Butt Splice Failure

Cables Reviewed:

1AP047	1SI142
1RH110	1RH029
1SX286	1VA228
1RH034	1RH010
1RH062	2SX013
1SI495	1MS543
1VA073	1MS286
10G157	1MS276
1SI063	1FW441
1SX474	1FW122
1SX280	1FP039
1RC241	1SX172
1VQ097	1RC239
1VQ087	1AP137
1RC091	10G158
1SI152	1SI106
1SX204	1EF038
1VA003	1CC026
1VC387	1CC008
1VQ136	2AP052
2AP137	1MS528
2DC014	1MS276
1SI149	1SI143
1AP137	1RH062
1CC008	1SI143

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1AP047

Conductor: #4 Green

Function: The green wire of cable 1AP047 is in the circuit for the System Auxiliary Transformer (SAT) feed to 4kV bus 142 overcurrent alarm which annunciates in the main control room.

Safety Impact: None, alarm only. The feed breaker will still perform its protective function of tripping on overcurrent. Information breaker status (open, closed, tripped) is provided in the control room via position indicating lights above the breaker control switch.

References: Schematic 6/20E-1-4030AP32, Rev. N
Drawings:

W/D 6/20E-1-4613S, Rev. S

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 2AP052

Conductor: Red

Function: The red conductor of cable 2AP052 is in the circuit for the SAT feed to 4kV Bus 241 overcurrent alarm in the main control room. A failure of the butt splice would disable the alarm.

Safety Impact: None. The breaker will still perform its protective function of tripping on overcurrent. Information on breaker status will be provided in the main control room by the position indicating lights (open, tripped, close) above the breaker control switch.

References: 6/20E-2-4611, Rev. P

6/20E-2-4030AP23, Rev. M

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1AP137

Conductor: White

Function: The white conductor of cable 1AP137 is in the auto-trip alarm circuit for the manually operated feed breaker in 480V ESF unit substation 132Z to 480V essential service water cooling tower motor control center 132Z1. This auto-trip alarm is activated by an overcurrent trip switch in the feed breaker assembly. The alarm is in the main control room.

Safety Impact: None. The breaker will perform its protective function of tripping on overcurrent. Loss of the motor control center can be determined by other indication in the control room (i.e., loss of position indication and alarms associated with services fed from the motor control center). In addition, close/trip indication for the feed breaker is provided locally at the 480V unit substation.

References: 6/20E-1-4156A, Rev. M

6/20E-1-4156C, Rev. T

6E-1-4030AP76, Rev. B

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 2AP137

Conductor: Green

Function: The green conductor of cable 2AP137 is a connection in the auto trip alarm circuit of ACB #2425X (4kV feed to 480V ESF auxiliary transformer 232X). A failure of the butt splice will prevent an initiation of this alarm.

Safety Impact: None. Loss of alarm function only. The breaker (#2425X) will still perform its protective function. The breaker trip position is indicated in the main control room by indicating lights above the breaker control switch. In addition, if a loss of power to the 480V unit substation should occur, equipment fed from this substation will cause other alarms to annunciate in the main control room.

References: Equipment No. 2PA32J

6/20E-2-4156A, Rev. H

6/20E-2-4030AP36, Rev. D

Wire code - (CB9)

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Inspection Report Disposition

Cable Number: 1CC008

Conductor: White-Black

Function: The white-black conductor of cable 1CC008 is in the auto-start alarm of the component cooling pump 1A (1CC01PA). A failure of the butt splice will prevent the initiation of the auto-start alarm.

Safety Impact: None. Control circuit performing safety-related function is unaffected. Operator can find the position of the breaker from indicating lights above the control switch.

References: 6/20E-1-4155B, Rev. T

6/20E-1-4030CC01, Rev. L

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Inspection Report Disposition

Cable Number: 1CC026

Conductor: Red

Function: The red conductor of cable 1CC026 is in the circuit for the trip alarm for the common component cooling pump (0CC01P) in the main control room. A failure of the butt splice would disable this alarm.

Safety Impact: None. Pump breaker position status is also provided in the main control room by the indicating lights (open, tripped, close) above the pump control switch.

References: 6/20E-1-4054G, Rev. S

6/20E-0-4030CC01, Rev. K

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Inspection Report Disposition

Cable Number: 2DC014

Conductor: Orange-Black, Blue-Black

Function: The orange-black conductor of cable 2DC014 is connected in the under voltage alarm circuit of DC bus 212. The failure of the butt splice will prevent actuation of this alarm. The blue-black conductor of cable 2DC01A is connected in the alarm circuit for battery charger breaker to bus 212 tripped. The failure of the butt splice will prevent the actuation of this alarm.

Safety Impact: None. Failure in these circuits will only impact alarm functions. If the undervoltage alarm does fail, a bus voltmeter is provided in the control room to allow monitoring of the bus voltage. If the battery charger feed breaker trip alarm fails, the tripping of this breaker will also initiate a charger fail alarm in the control room.

References: 6/20E-2-4156A, Rev. H, 4251A, Rev. N, 4251B, Rev. J

6/20E-2-4030DC02, Rev. E

6/20E-2-4030DC08, Rev. F

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1EF038

Conductor: Black

Function: The black conductor of cable 1EF038 is in the reset leg of the test lockout relay in the ESF sequencing and actuation cabinet Train A. This conductor is specifically in a circuit that resets the test lockout relay if the SAT feed breaker to 4kV ESF Bus 141 trips. A failure of the butt splice will prevent this resetting of the test lockout relay.

Safety Impact: Minimal. For a loss of offsite power concurrent with periodic testing of the sequencing panel, failure to reset the test lockout relay will prevent sequencing of the associated safety-related loads. Before beginning testing of the sequencing cabinet surveillance procedures require that the shift engineer be notified and that authorization to proceed be obtained. Performance of this testing also requires that the cabinet door be opened which is alarmed in the Main Control Room.

Should a loss of offsite power occur during the testing, each of the ESF loads could be manually started from the Control Room. Operating procedures require the operator to verify that all ESF loads have auto-started following a loss of offsite power, and if not manually start the load.

This circuit was also tested and found functional during pre-op testing. Due to the remote possibility of a loss of offsite power occuring concurrently with testing of the ESF sequencing cabinet, administrative controls with regard to the testing, and the ability to manually start the loads from the Control Room, failure of this butt splice was determined to have a minimal safety impact.

References: 6/20E-1-4122C, Rev. G

6/20E-1-4030EF01, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1FP039

Conductor: White

Function: The white conductor of cable 1FP039 is the negative return path for containment isolation contact monitoring lights. A failure of the butt splice will disable both white and green lights that monitor contacts K607 and K818 used in control of the fire protection containment isolation valve.

Safety Impact: None. Loss of indication only.

References: 6/20E-1-4120B, Rev. F

6/20E-1-4030FP03, Rev. E

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1FW122

Conductor: #1 - Black

Function: The black wire of 1FW122 is used to connect isolation signals from the Protection System Cabinet Train A (1PA09J) to auxiliary feedwater isolation relays. Contacts of these "isolation" relays are used to automatically close various Division 11 feedwater isolation valves. The affected valves are 1FW043A, B, C, D, 1FW540, 1FW510A, 1FW520, 1FW520A, 1FW530, 1FW530A, 1FW540A, 1FW035A, B, C, D, 1FW034A, B, C, D, 1FW009A, B, C, D and 1FW039A, B, C, D. Valves 1FW510, 1FW510A, 1FW520, 1FW520A, 1FW530, 1FW530A, 1FW540, 1FW540A, and 1FW034A, B, C, D do not perform a safety function. Valves 1FW009A, B, C, D, 1FW035A, B, C, D, 1FW039A, B, C, D and 1FW043A, B, C, and D do perform a safety function The operator for each of these valves is provided with redundant solenoids (Solenoids "A" & "B") interlocked with ESF actuation signals from redundant trains. For each valve which performs a safety function, the control circuit has a control switch on the main control board with position station indicating lights.

Safety Impact: Minimal. Butt splice failure will only cause loss of one train's ESF actuation signal to the valve operator. The manual closing circuit in this control train is unaffected by this failure. Position indicating lights and control switches are provided in the control room to allow the operator to manually close these valves. In addition, pre-op testing and periodic testing of the ESF actuation signals would detect any failure of the butt splice. The redundant ESF actuation signal to the redundant solenoid is unaffected by this failure.

References: 6/20E-1-4030FW46, Rev. D

6/20E-1-4256C, Rev. R

6/20E-1-4114J, Rev. H

M-36, Sheet 1

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1FW441

Conductor: #1 - Black

Function: The black wire of 1FW441 is used to connect an ESF actuation signal into the circuitry for Solenoid A of steam generator feedwater isolation bypass isolation valve (1FW043A). Solenoid A is normally energized. Upon receipt of an actuation signal the solenoid de-energizes which closes the valve. Failure of this wire will de-energize the solenoid and cause valve to close (i.e., go to its safe position). In addition, there is a Solenoid B interlocked with the ESF actuation signal from the redundant train which will also close the valve.

Safety Impact: None. Valve 1FW043A is normally closed and the ESF actuation signal is merely a confirmatory signal. Failure of the butt splice (i.e., circuit opening) will also simulate the actuation signal and place the valve in its safe position. In addition, a redundant solenoid interlocked with an ESF actuation signal from the redundant train is provided in the valve circuit.

References: 6/20E-1-4030FW50

6/20E-1-4256C

6/20E-1-4148D

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1FW441

Conductor: #2 - White

Function: The white wire of 1FW441 is used to connect an ESF actuation signal into the circuitry for Solenoid A of steam generator feedwater isolation bypass isolation valve (1FW043A). Solenoid A is normally energized. Upon an actuation signal the valve will close. Failure of this wire will de-energize circuit and cause valve to close (go in its safety direction). In addition, there is a Solenoid B powered from opposite divisional train, which is provided for redundancy, to close valve.

Safety Impact: None. Valve 1FW043A is normally closed and the ESF actuation signal is merely a confirmatory signal. Failure of the butt splice (i.e., circuit opening) will also simulate the actuation signal and place the valve in its safe position. In addition, a redundant solenoid interlocked with an ESF actuation signal from the redundant train is provided in the valve circuit.

References: 6/20E-1-4030FW50

6/20E-1-4256C

6/20E-1-4148D

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1FW441

Conductor: #6 - Blue

Function: The blue wire of 1FW441 is used to connect an ESF actuation signal into the circuitry for Solenoid A of steam generator feedwater isolation bypass isolation valve (1FW043C). Solenoid A is normally energized. Upon an actuation signal the valve will close. Failure of this wire will de-energize circuit and cause valve to close (go in its safety direction). In addition, there is a Solenoid B powered from opposite divisional train, which is provided for redundancy, to close valve.

Safety Impact: None. Valve 1FW043C is normally closed and the ESF actuation signal is merely a confirmatory signal. Failure of the butt splice (i.e., circuit opening) will also simulate the actuation signal and place the valve in its safe position. In addition, a redundant solenoid interlocked with an ESF actuation signal from the redundant train is provided in the valve circuit.

References: 6/20E-1-4030FW50

6/20E-1-4256C

6/20E-1-4148D

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Inspection Report Disposition

Cable Number: 1FW441

Conductor: #7 - White-Black

Function: The white-black wire of 1FW441 is used to connect an ESF actuation signal into the circuitry for Solenoid A of steam generator feedwater isolation bypass isolation valve (1FW043D). Solenoid A is normally energized. Upon an actuation signal the valve will close. Failure of this wire will de-energize circuit and cause valve to close (go in its safety direction). In addition, there is a Solenoid B powered from opposite divisional train, which is provided for redundancy, to close valve.

Safety Impact: None. Valve 1FW043D is normally closed and the ESF actuation signal is merely a confirmatory signal. Failure of the butt splice (i.e., circuit opening) will also simulate the actuation signal and place the valve in its safe position. In addition, a redundant solenoid interlocked with an ESF actuation signal from the redundant train is provided in the valve circuit.

References: 6/20E-1-4030FW50

6/20E-1-4256C

6/20E-1-4]48D

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1MS276

Conductor: Blue & White-Black

Function: The blue and white-black conductors of cable 1MS276 connect the test control switch in Main Control Board 1PM06J to Panel 1PL05J, for testing of the main steam isolation valve 1A. Failure of one or both of the butt splices will disable the test function.

Safety Impact: None. Control circuits permitting manual or automatic closing (i.e. safety function) of the valve are unaffected. In addition, there is a redundant test circuit in the second control train actuated simultaneously from the same control switch, therefore, valve can be tested through second train

References: 6/20E-1-4089K, Rev. R

6/20E-1-4030MS01, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1MS286

Conductor: Red

Function: The red conductor of cable 1MS286 is in the auto closing circuit of main steam isolation valve 1B (1MS001B). A failure of the butt splice will prevent energi ation of solenoid "A" to close the valve on a safety actuation signal from Relay K616. The test circuit for K616 will not operate also.

Safety Impact: Minimal. Position indicating lights and a control switch are provided in the control room. Upon failure to auto-close, the operator could manually close the valve. In addition, the valve operator is furnished with redundant controls. Failure of this butt splice does not affect the redundant auto-close circuit. This butt splice was also tested and found to be functional during system pre-op testing. The periodic testing of the ESF actuation signals would also detect failure of this butt splice.

References: 6/20E-1-4089K, Rev. R

6/20E-1-4030MS02, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1MS528

Conductor: Red-Black

Function: The red-black conductor of cable 1MS528 is in the manual closing circuit of the main steam isolation valve 1MS001D from Main Control Board 1PM06J. A failure of the butt splice will prevent energization of solenoid "A1" in the Division 12 circuit to close the valve.

Safety Impact: None. The valve has two redundant control circuits. The control switch "CS2" at 1PM06J simultaneously actuates the closing solenoids in both control trains. Failure of this butt splice only affects the Division 12 manual closing circuit. The Division 11 closing circuit is unaffected by this failure. The automatic closure of this valve on a low steamline pressure or hi-hi containment pressure signal (i.e., the valve's safety function) is also unaffected by this failure.

References: 6/20E-1-4054L, Rev. S

6/20E-1-4030MS04, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1MS543

Conductor: Red & Green

Function: The red and green conductors of cable 1MS543 are in an auxiliary relay circuit which energizes on a containment phase A isolation signal. Contacts from this relay close the letdown orifice isolation valves 1CV8149A, B & C.

Safety Impact: None. These valves are non-safety related and do not perform a containment isolation function. The isolation function is performed by valves 1CV8152 & 1CV8160. The containment phase A isolation signal interlock with these valves was added to prevent the letdown orifice common outlet header isolation relief valve 1CV8117 from operating.

References: 6/20E-1-4150C, Rev. M

6/20E-1-4030EF100, Rev. B

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1ØG157

Conductor: #4 Green

Function: The green wire of cable 1ØG157 is used to connect a limit switch of valve 1ØG079 (H2 Recombiner Discharge Containment Isolation valve) into the valve control circuit to light a green (valve closed) status lamp. A failure of the butt splice would prevent the "closed" indication light from illuminating on the main control panel.

Safety Impact: No safety impact, indication only.

References: Schematic 6/20E-1-4030OG09, Rev. F
Drawings:

W/D 6/20E-1-4683C, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1ØG158

Conductor: Red & Green

Function: The red and green conductors of cable 1ØG158 are in the indication circuit of hydrogen recombiner containment isolation valve 1ØG079. A failure of the butt splice for the red conductor will disable the "open" indicating light. A failure of the butt splice for the green conductor will disable the "close" indicating light.

Safety Impact: None. Loss of indication only. The valve's opening and closing circuits, including automatic operation on containment isolation signal, are unaffected.

References: 6/20E-1-4683C, Rev. J

6/20E-1-4130ØG09, Rev. F

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RC091

Conductor: Black, White, Red, Orange, Blue, Red-Black, Green-Black, Orange-Black and Blue-Black
Two of the splices passed reinspection but color codes could not be identified; therefore all splices were analyzed.

Function: Control, indication and limit switch interlocks of reactor coolant loop 1A - hot leg stop value 1RC8001A.

The function of the circuit containing each butt splice is discussed below:

1. The orange-black and red-black conductors interlock a close limit switch contact of valve 1RC8001A with a loop isolation/block safety injection signal input to the reactor projection system, a loop 1A bypass relief line low flow alarm, and an indicating light (relay K104) and one of the permissives in a reactor coolant pump trip circuit.

2. The white and black conductors interlock an open limit switch contact of valve 1RC8001A with a permissive in the cold leg stop valve open circuit and a reactor coolant pump permissive light.

3. The red conductor energizes the open indicating light on the main control board.

4. The black conductor energizes the control circuit for valve 1RC8001A.

5. The blue-black and green-black conductors energize the heater in the valve's motor operator.

6. The orange conductor energizes the opening circuit for valve 1RC8001A.

Safety Impact: None. The hot leg loop stop valve 1RC8001A is normally open with power to the motor operator "locked out". Closure of the stop valve is only allowed with the unit in a shutdown mode. The valve therefore has no safety function and failure of the butt splices has no safety impact.

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RC091 (Cont'd)

References: Equipment No. 1SI03E

6/20E-1-4326B, Rev. M

6/20E-1-4030RC07, Rev. J

6/20E-1-4030RC22, Rev. J

Wire codes: Black (8001AX1), White (105A)
Red (8001AR), Orange (8001A01)
Blue (004A), Red-Black (106A)
Green-Black (HTRY), Orange-Black (004A)
Blue-Black (HTRX)

Technical Specification 3/4.4.1

NRC Safety Evaluation Report - Byron Station
Section 7.6.2.6

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RC241

Conductor: Red & Green

Function: The red and green conductors of cable 1RC241 are connections in an alarm circuit for "Loop 1C Bypass Relief Line Flow Low". A break in this circuit will prevent initiation of this alarm. The alarm is initiated by flow indicating switch 1FIS-0438A in series with permissive interlocks from valves 1RC8001C and 1RC8002C.

Safety Impact: None. The valve permissives in this alarm circuit are such that valve 1RC001C must be open and valve 1RC002C must be closed to initiate the alarm. These valves are the loop hot and cold leg stop valves. Closure of the stop valves is only allowed with the unit in a shutdown mode. Both these valves are normally in the "open" position with power "locked-out" to the motor actuator. The bypass line is only opened when a reactor coolant loop is isolated. Therefore, this alarm is normally disabled. In addition, a redundant instrument (1FIS-0438B) provides a low flow input to the same annunciator window in the main control room.

References: Equipment No. 1PA15J

6/20E-1-4126D, Rev. E

6/20E-1-4030RC24, Rev. J

Wire code - Red (CA5), Green (0074A)

Technical Specification 3/4.4.1

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RC329

Conductor: White

Function: The white conductor of cable 1RC329 is in the circuit for the loop 1A bypass relief line low flow alarm in the main control room. This conductor is in the circuit initiated by flow indicating switch 1FIS-418A in series with permissive interlocks from valves 1RC8001A and 1RC8002A.

Safety Impact: None. Loss of alarm only. The valve permissives in the alarm circuit are such that valve 1RC8001A must be open and valve 1RC8002A must be closed. Both valves are normally in the open position with power "locked-out" to the motor actuator; therefore, disabling the alarm. The bypass line is only opened (i.e., valve 1RC8002A closed) when a reactor coolant loop is isolated. In addition, a redundant instrument (1FIS-418B) provides a low flow input to the same annunciator window in the main control room.

References: 6/20E-1-4155B, Rev. T

6/20E-1-4030RC22, Rev. J

M-2060, Sheet 4, Rev. K

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CHICAGO

Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH010

Conductor: Blue

Function: The blue conductor of the cable 1RH010 is in the auto-start alarm circuit of the residual heat removal pump 1B (1RH01PB). A failure of the butt splice will prevent initiation of the auto-start alarm.

Safety Impact: None. Control circuit performing safety-related function is unaffected. Operator can find the position of the breaker from indicating lights above the control switch in the control room.

References: 6/20E-1-4054S, Rev. V

6/20E-1-4030RH02, Rev. J

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH110

Conductor: #3 Red

Function: The red wire of cable 1RH110 is used to connect a limit switch of valve 1RH611 (RHR pump 1B minimum flow valve) to the Equipment Status Display (ESD). Failure of the butt splice could provide erroneous information on the position of this valve. Position status of the valve is also available in the main control room from the indicating lights above the valve control switch.

Safety Impact: None. Loss of indication only.

References: 6/20E-1-4030RH03, Rev. E

6/20E-1-4681C, Rev. F

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH029

Conductor: Green

Function: The green wire of cable 1RH029 is used to connect a close limit switch permissive of valve 1SI8811A (containment sump isolation valve) into the open control circuit of valve 1RH8701A (reactor coolant loop to RHR pump isolation valve). Failure of this butt splice would prevent the manual opening of this valve. This valve is normally closed and is opened when the RHR system is to be put in operation.

Safety Impact: None. The RHR system is aligned to take suction from two reactor coolant hot legs and discharge to two reactor coolant cold legs to bring the unit to a cold shutdown mode. As part of this alignment valve 1RH8701A must be manually opened. This alignment is not utilized following a LOCA. Position indicating lights in the control room will provide valve position status information to the operator. The valve can be opened locally utilizing a handwheel at the valve operator. The portion of the RHR system utilized with the emergency core cooling system during the injection and recirculation phases of a loss of coolant accident are unaffected by this failure.

References: 6/20E-1-4030RH04, Rev. K

6/20E-1-4661M, Rev. L

FSAR Sections 5.4.7 and 6.3.2

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH029

Conductor: #1 - Black

Function: The black wire of 1RH029 is used to connect a limit switch, of valve 1RH8701A into the opening control circuit of valve 1SI8811A (containment sump isolation valve). This limit switch contact (LS/C) is used as a permissive in the manual (control switch) opening circuitry. Failure of this butt splice would prevent the valve from being opened via the control switch, but the automatic function for the opening (safety injection concurrent with RWST lo-lo level) is unaffected.

Safety Impact: None. Automatic function is unaffected.

References: 6/20E-1-4030SI14, Rev. F

6/20E-1-4661M, Rev. L

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH029

Conductor: #2 - White

Function: The white wire of 1RH029 is used to connect a limit switch of valve 1RH8701A into the opening control circuit of valve 1SI8811A (containment sump isolation valve). This limit switch contact (LS/C) is used as a permissive in the manual (control switch) opening circuitry. Failure of this butt splice would prevent the valve from opening via the control switch, but the automatic function for the opening (safety injection concurrent with RWST lo-lo level) is unaffected.

Safety Impact: None. Automatic function is unaffected.

References: 6/20E-1-4030SI14, Rev. F

6/20E-1-4661M, Rev. L

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH034

Conductor: #4 Green

Function: The green wire of cable 1RH034 is used to connect a limit switch contact (LS/IC) of valve 1RH8701B to a "closed" indication light in the valve control circuitry. Failure of the butt splice would prevent the "closed" indicator light for valve 1RH8701B from illuminating on main control panel 1PM06J. This valve is normally closed.

Safety Impact: No safety impact, indication only.

References: 6/20E-1-4030RH04, Rev. K

6/20E-1-4683B, Rev. M

Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH062

Conductor: Green

Function: The green wire of cable 1RH062 is used to connect a close limit switch permissive of valve 1SI8811B (containment sump isolation valve) into the open control circuit of valve 1RH8702B (reactor coolant loop to RHR pump isolation valve). Failure of this butt splice would prvent the manual opening of this valve. This valve is normally closed and is opened when the RHR system is to be put in operation.

Safety Impact: None. The RHR system is aligned to take suction from two reactor coolant hot legs and discharge to two reactor coolant cold legs to bring the unit to a cold shutdown mode. As part of this alignment valve 1RH8702B must be normally opened. This alignment is not utilized following a LOCA. Position indicating lights in the control room will provide valve position status information to the operator. The valve can be opened locally utilizing a handwheel at the valve operator. The portion of the RHR system utilized with the emergency core cooling system during the injection and recirculation phases of a loss of coolant accident are unaffected by this failure.

References: Drawings - Schematic 6/20E-1-4030RH05, Rev. K
Wiring 6/20E-1-4683B, Rev. M

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Inspection Report Disposition

Cable Number: 1SI063

Conductor: #12 Black-White

Function: The black-white wire cf cable 1SI063 is part of the opening control circuit for valve 1SI8804B (RHR heat exchanger to safety injection pumps isolation valve). The failure of the butt splice would prevent the opening of this valve. This valve is required to be manually opened as part of the realignment of the ECCS from the injection mode to the recirculation mode. As a result, a portion of the train B RHR pump flow provides suction to the safety injection pumps.

Safety Impact: Failure of the butt splice would prevent manual opening of valve 1SI8804B as part of the realignment of the ECCS from the injection of the recirculation mode. The operator can determine the valve position from position indicating lights in the control room. The valve can be opened locally utilizing a handwheel at the valve operator.

In addition, during pre-op tests, the butt splices were found to be functional. The redundant RHR system can also be aligned to supply suction to the safety injection pump utilizing a flow path through valves 1CV8801A and 1SI8807A.

References: Drawings - Schematic 6/20E-1-4030SI09, Rev. H
Wiring 6/20E-1-4687E, Rev. F

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Inspection Report Disposition

Cable Number: 1SI106

Conductor: Red

Function: The red conductor of cable 1SI106 is in the indication circuit of the accumulator 1B discharge isolation valve 1SI8808B. This conductor energizes the "open" indicating light at Main Control Board 1PM06J. A failure of the butt splice will disable this position indicating light.

Safety Impact: None. Loss of indication only. The valve opening and closing circuits, including automatic operation on safety injection signal, are unaffected.

References: 6/20E-1-4683A, Rev. M

6/20E-1-4030SI11, Rev. G

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Inspection Report Disposition

Cable Number: 1SI142

Conductor: #4 - Green

Function: The green wire of 1SI142 is used to connect a limit switch of valve 1SI8811A (containment sump 1A isolation valve) into the valve control circuit to light a green (valve closed) status lamp. A failure of this butt splice would prevent the "closed" indication light from lighting on the control room panel.

Safety Impact: No safety impact, indication only.

References: 6/20E-1-4030SI14, Rev. F

6/20E-1-4574A, Rev. E

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Inspection Report Disposition

Cable Number: 1SI142

Conductor: #7 White-Black

Function: The white-black wire of 1SI142 connects a limit switch contact (9-9C) of valve 1SI8811A (containment sump isolation valve) into the opening circuitry of valve 1CV8804A (RHR heat exchanger 1A to charging pumps isolation valve). A failure of this butt splice would prevent both automatic and manual opening of 1CV8804A. This valve is manually opened as part of the realignment of the ECCS from the injection mode to the recirculation mode. As a result a portion of the Train A RHR pump flow provides suction to the charging pumps.

Safety Impact: Failure of the butt splice would prevent manual opening of valve 1CV8804A as part of the realignment of the ECCS from the injection to the recirculation mode. The operator can determine the valve position from position indicating lights in the control room. The valve can be opened locally utilizing a hand-wheel at the operator.

In addition, during pre-op tests, the butt splices were found to be functional. The redundant RHR system can also be aligned to supply suction to the charging pump utilizing a flow path through valves 1SI8804B and 1SI8807B.

Reference: Drawings - Schematic 6/20E-1-4030CV14, Rev. G
Wiring 6/20E-1-4574A, Rev. E

FSAR - Section 6.3.2.8

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1SI143

Conductor: #1 - Black

Function: The black wire of cable 1SI143 is used to connect the common side of all the limit switches used in the MOV 1SI8811A-120V control circuitry. Failure of this wire would cause loss of indication, and the inability to open or close the containment sump 1A isolation valve 1SI8811A. This valve is normally closed and is automatically opened on a safety injection signal concurrent with a RWST lo-lo level signal to re-align the emergency core cooling system (ECCS) from the injection mode to the recirculation mode.

Safety Impact: Failure of this butt splice defeats the auto opening of the containment sump isolation valve which is the initial step in the realignment of the ECCS from the injection mode to the recirculation mode. The operator can determine the valve position from position indicating lights in the control room. The valve can be opened locally by a hand wheel on the valve operator.

In addition, this butt splice was tested during pre-op test and found to be functional. The ECCS also includes a redundant containment recirculation sump and isolation valve.

Reference: Drawings Schematic 6/20E-1-4030SI14, Rev. F
Wiring 6/20E-1-4661M, Rev. L
6/20E-1-4574A, Rev. E

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Inspection Report Disposition

Cable Number: 1SI149

Conductor: #1 - Black

Function: The black wire of 1SI149 is used to connect a limit switch contact (LS/C) of valve 1RH8701B into the opening control circuitry of valve 1SI8811A (containment sump isolation valve). This contact is provided as a permissive in the manual opening circuitry. Failure of the butt splice could disable the manual (handswitch) opening of this valve. But the automatic function for the opening (safety injection concurrent with RWST lo-lo level) is unaffected.

Safety Impact: None. Automatic function is unaffected.

References: 6/20E-1-4030SI14

6/20E-1-4030RH04

6/20E-1-4232A

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Inspection Report Disposition

Cable Number: 1SI152

Conductor: Black

Function: This is a spare conductor not used in wiring.

Safety Impact: No impact.

References: Equipment No. 1AP21E

6/20E-1-4661M, Rev. L (2-24-84)

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Inspection Report Disposition

Cable Number: 1SI495

Conductor: #9 Green-Black

Function: The green-black wiere of cable 1SI495 is used to connect a limit switch of valve 1SI8802B (safety injection pump discharge isolation valve) to the Equipment Status Display (ESD). Failure of the butt splice could provide erroneous information on the position of this valve. Valve position status can be determined from position indicating lights in the control room.

Safety Impact: None. The Equipment Status Display is not essential.

References: 6/20E-1-4030SI07, Rev. F

6/20E-1-4687L, Rev. D

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Inspection Report Disposition

Cable Number: 1SI495

Conductor: #12 Black-White

Function: The black-white wire of cable 1SI495 is used to connect a limit switch of valve 1SI8802B (safety injection pump discharge isolation valve) to the Equipment Status Display (ESD). Failure of the butt splice could provide erroneous information on the position of this valve. Position status of the valve is also available in the main control room from the indicating lights above the valve control switch.

Safety Impact: None. Loss of indication only.

References: 6/20E-1-4030SI07, Rev. F

6/20E-1-4687L, Rev. D

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Inspection Report Disposition

Cable Number: 2SX013

Conductor: #2 - White

Function: The white wire of 2SX013 is used to connect the ESW Pump 2B mtor space heater to a 120V supply from 480V Auxiliary Building MCC 232-X3 (2AP24E). A break in this wire will prevent the operation of the space heater. The control circuit is designed to energize the motor heater when the ESW pump is not operating. The heater is not required but is provided (as an extra precaution) to minimize the possibility of moisture condensation on the motor windings.

Safety Impact: None. The ESW pump and motor is located in a cubicle in the auxiliary building for which the maximum relative humidity is 70% by design. The space heater does not perform a direct safety function. The service water pump motor performs the safety function. As noted above, the space heater is provided to keep moisture out of motor insulation. Moisture alone, doesn't damage the insulation; the insulation wears away or cracks for other reasons. Moisture plays a secondary role (in the failure) in that it provides an electrical path between the conductor (via damaged insulation) and ground.

References: FSAR Table 3.11 - Environmental Zone A9

6/20E-2-4030SX02, Rev. D

6/20E-2-4613J, Rev. H

6/20E-2-4685B, Rev. G

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Inspection Report Disposition

Cable Number: 1SX172

Conductor: Blue

Function: The blue conductor of cable 1SX172 inputs to the diesel driven essential service water make-up pump start-up panel trouble alarm in the main control room. Inputs to this trouble alarm are from the control selector switch on the start-up panel when placed in either the "manual" or "off" positions and from activation of any alarms on the start-up panel annunciator.

Safety Impact: None. Loss of this alarm has no direct safety impact (i.e., does not prevent auto-start of diesel) with regard to loss of the trouble alarm.

1. The annunciation on the start-up panel is for abnormal conditions that may occur when the diesel is operating. None of the conditions alarmed will prevent the diesel from auto-starting.

2. Placing the mode selector switch on the start-up panel to the "manual" or "off" position inhibits the auto-start of the diesel on a low level signal in the essential service water cooling tower basin (CLS-SX096). Information on basin level is available in the control room by level indicator OLI-SX064 and a low level alarm initiated by OLSL-SX064. Upon acknowledgement of this alarm the operator could manually start the diesel from the control room.

In addition, a redundant diesel driven essential service water pump is provided in the design.

References: 6/20E-1-4087H, Rev. L
6E-0-4030SX09, Rev. F
6E-0-4030SX24, Rev. C
M-2042, Sheet 5, Rev. E

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Inspection Report Disposition

Cable Number: 1SX172

Conductor: White-Black

Function: The white-black conductor of cable 1SX172 inputs to the diesel driven essential service water make-up pump start-up panel trouble alarm in the main control room.

Safety Impact: None. Loss of this alarm has no direct safety impact (i.e., does not prevent auto-start of diesel) with regard to loss of the trouble alarm.

1. The annunciation on the start-up panel is for abnormal conditions that may occur when the diesel is operating. None of the conditions alarmed will prevent the diesel from auto-starting.

2. Placing the mode selector switch on the start-up panel to the "manual" or "off" position inhibits the auto-start of the diesel on a low level signal in the essential service water cooling tower basin (OLS-SX096). Information on basin level is available in the control room by level indicator OLI-SX064 and a low level alarm initiated by OLSL-SX064. Upon acknowledgement of this alarm the operator could manually start the diesel from the control room.

In addition, a redundant diesel driven essential service water pump is provided in the design.

References: 6/20E-1-4087H, Rev. L

6/20E-0-4030SX09, Rev. F

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Inspection Report Disposition

Cable Number: 1SX204

Conductor: White & Blue

Function: The blue conductor of the cable 1SX204 is in the alarm circuit of "diesel-driven essential service water make-up pump 0B". A failure of the butt splice will prevent initiation of trip and auto-start alarms.

The white conductor of the cable 1SX204 is in the control and indication circuit of diesel-driven essential service water make-up pump 0B. This conductor connects local/remote selector switch at the remote shutdown panel 1PL05J to the Main Control Board 0PM01J. A failure of the butt splice will cause loss of control and indication at Main Control Board 0PM01J.

Safety Impact: With regard to loss of the trip and auto-start alarms, the operator has indicating lights on the main control board indicating the pump position. If the pump does not auto-start on a low level signal in the Essential Service Water cooling tower basin, a low level alarm and a level indicator is provided in the control room. The pump can then be manually started.

With regard to loss of control at the main control board, the pump can be controlled from the remote shutdown panel.

References: 6E-0-4044AA

6E-0-4030SX10, Rev. F

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Inspection Report Disposition

Cable Number: 1SX280

Conductor: Red

Function: The red wire of cable 1SX280 is used in the "ESW Pump 1A Lube Oil Pressure Low-Low" alarm circuit. The ESW pump 1A is provided with two lube oil pumps - one shaft driven and one motor driven. The motor driven pump is a back-up to the shaft driven pump. The alarm is initiated by a low-low lube oil pressure signal in series with an ESW pump running signal (i.e., shaft driven lube oil pump should be operating) or a motor driven lube oil pump running signal. Failure of this butt splice will only diable the alarm through the ESW pump running signal circuit.

Safety Impact: None. If the shaft driven lube oil pump fails, a low lube oil pressure signal will start the motor driven auxiluary lube oil pump for Essential Service Water pump 1A. If a low-low lube oil pressure condition exists with motor driven lube oil pump running, the alarm will be intiated.

References: Equipment No. 1AP05EB

6/20E-1-4611B, Rev. P

6/20E-1-4030SX01, Rev. J

6/20E-1-4030SX03, Rev. F

Wire Code - (0123A)

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Inspection Report Disposition

Cable Number: 1SX286

Conductor: #3 Red

Function: The red wire of cable 1SX286 is used in the Essential Service Water Pump 1B lube oil low-low pressure alarm circuit. The ESW pump 1B is provided with two lube oil pumps - one shaft driven and one motor driven. The motor driven pump is a back-up to the shaft driven pump. The alarm is initiated by a low-low lube oil pressure signal in series with an ESW pump running signal (i.e. shaft driven lube oil pump should be operating) or a motor driven lube oil pump running signal. Failure of this butt splice will only disable the alarm through the ESW pump running signal circuit.

Safety Impact: None. If the shaft driven lube oil pump fails, a low lube oil pressure signal will start the motor driven auxiliary lube oil pump. If a low-low lube oil pressure condition exists with the motor driven lube oil pump running, the alarm will be initiated.

Reference: Drawings - Schematic 6/20E-1-4030SX03, Rev. F
Wiring 6/20E-1-4681H, Rev. K

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Inspection Report Disposition

Cable Number: 1SX286

Conductor: #4 Green

Function: The green wire of cable 1SX286 is a wire connection in an annunciator circuit for ESW pump 1B lube oil pressure low. Failure of this wire would prevent an alarm on low lube oil pressure.

Safety Impact: None - annunciation is not an essential function.

Reference: Drawings - Schematic 6/20E-1-4030SX03, Rev. G
Wiring 6/20E-1-4681H, Rev. K

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Inspection Report Disposition

Cable Number: 1SX474

Conductor: #3 Red

Function: The red wire of cable 1SX474 is part of the closing control circuit for RCFC 1B & 1D service water outlet valve 1SX027B. The failure of the butt splice would prevent the closing of the outlet valve.

Safety Impact: None. The valve is normally open and is required to be open for the reactor containment fan coolers to operate. Thus the closing control circuit is not required to operate to perform a safety function.

References: 6/20E-1-4030SX11, Rev. C

6/20E-1-4687A, Rev. E

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1SX474

Conductor: #4 Green

Function: The green wire of cable 1SX474 is part of the closing control circuit for RCFC 1B & 1D service water outlet valve 1SX027B. The failure of the butt splice would prevent the closing of the outlet valve.

Safety Impact: None. The valve is normally open and is required to be open for the reactor containment fan coolers to operate. Thus the closing control circuit is not required to operate to perform a safety function.

References: 6/20E-1-4030SX11, Rev. C

6/20E-1-4687A, Rev. E

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Inspection Report Disposition

Cable Number: 1VA003

Conductor: Green-Black

Function: The green-black wire of cable 1VA003 is a connection in the starter circuit for fuel handling building charcoal booster fan 0VA04CA. This fan is normally not running but is automatically started on a fuel handling area high radiation signal or an ESF actuation signal from Unit 1 or Unit 2. This fan can also be manually started in the control room. Starting of this fan closes the normal exhaust flow and diverts it through charcoal absorbers. Failure of this butt splice will prevent both manual and automatic starting of the fan.

Safety Impact: Minimal. Failure of this fan to start may result in the release of radioactive gases to the atmosphere. Radiation monitors in both the fuel handling area and the vent stack would monitor such releases and provide alarms in the control room. Position indicating lights in the control room would also indicate that the charcoal booster fan is not running. The operator could isolate the exhaust path by closing the charcoal filter isolation dampers 0VA058YA, YB, YC and 0VA059YA and YB, utilizing a control switch in the control room.

This butt splice was also tested during system pre-op testing and found to be functional. Failure of the butt splice would be detected during periodic testing of the ESF actuation signal auto-starting the fan. Failure of this butt splice also does not affect the circuits for the redundant charcoal booster fan.

References: 6/20E-0-4030VA22, Rev. F
6/20E-0-4046A, Rev. F
6/20E-0-4030VA19, Rev. J
Wire code VA4CAC1

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Inspection Report Disposition

Cable Number: 1VA073

Conductor: #11 Blue-Black

Function: The blue-black wire of cable 1VA073 is used to connect one side of 2 relay contacts into the start circuitry and seal-in circuitry of containment spray pump cubicle cooler (1VA03SB) fans. One relay contact auto starts the fans when the temperature is greater than 120°F. The other relay contact keeps the fan running following a high temperature auto-start until the temperature drops below 108°F. This butt splice affects controls for 2 of the 4 fans on the cooler.

The function of this cooler is to provide supplemental cooling to the pump room to maintain environmental conditions within the pump requirements. The 4 fans have 3 starting modes - manually from a local control switch, automatically when the CS pump 1B is running and automatically on a second stage (120°F) temperature signal. The starting signals are sealed in such that the fan will not stop until the temperature in the cubicle is less than 108°F. The cubicle cooler is expected to operate only when the containment spray pump is running. In addition, a third stage (130°F) temperature alarm is provided in the control room.

Safety Impact: None. All the fans still start and run on a CS pump 1B running signal (normal mode of operation). The above failure would also affect only 2 of the 4 fans for the cooler which would only reduce the cooling capacity. In addition should a high temperature condition exist, at any time, an alarm will alert the operator.

References: 6/20E-1-4030VA10, Rev. H

6/20E-1-4030VA11, Rev. E

6/20E-1-4681E, Rev. M

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Inspection Report Disposition

Cable Number: 1VA228

Conductor: #1 - Black

Function: The black wire of 1VA228 is used to connect one side of a temperature switch (set at 108°F) to an auxiliary relay mounted out MCC131X1. Contacts of this relay are used in the start (seal-in) circuitry of essential service water pump cubicle cooler (1VA01SA) fans. The 1A, 1B, 1C, and 1D fans are affected. The function of these coolers is to provide supplemental cooling for the pump room to maintain environmental conditions within the pump requirements. The fans have 3 starting modes - manually from a local control switch, automatically when the ESW pump runs and automatically on a second stage (120°F) high temperature signal. The starting signals are sealed in such that the fan will not stop until the temperature in the cubicle is less than 108°F. The cubicle cooler is expected to operate only when the ESW pump is running. In addition, a third stage (130°F) high temperature condition is alarmed in the control room.

Safety Impact: None. Fans will still start on an ESW pump running signal (normal mode of starting). Should the cooler fans fail, a high temperature alarm in the control room will alert the operator.

References: 6/20E-1-4030VA12, Rev. J

6/20E-1-4661H, Rev. H

6/20E-1-4661J, Rev. L

6/20E-1-4471A, Rev. H

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Inspection Report Disposition

Cable Number: 1VA228

Conductor: #2 - White

Function: The white wire of 1VA228 is part of the start circuitry for the auxiliary building HVAC essential service water pump cubicle cooler (1VA01SA) fans 1A & 1B. Failure of the wire would prevent the auto-start of fans 1A & 1B on a high temperature (120°F) in the cubicle. Fans 1C & 1D for the cubicle cooler are unaffected by failure of this wire.

The function of this cooler is to provide supplemental cooling to the pump room to maintain environmental conditions within the pump requirements. The fans have 3 starting modes - manually from a local control switch, automatically when the ESW pump is running, and automatically on a second stage (120°F) temperature signal. The starting signals are sealed in such that the fan will not stop until the temperature in the cubicle is less than 108°F. The cubicle cooler is expected to operate only when the ESW pump is running. In addition, a third stage (130°F) temperature alarm is provided in the control room.

Safety Impact: None. Fans will still start on an ESW pump running signal (normal mode of starting). This failure would also affect only 2 of the 4 fans for the cooler which would only reduce the cooling capacity. Should a high temperature condition exist, an alarm will alert the operator.

References: 6/20E-1-3040VA12, Rev. J

6/20E-1-4661H, Rev. H

6/20E-1-4661J, Rev. L

6/20E-1-4471A, Rev. H

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Inspection Report Disposition

Cable Number: 1VA228

Conductor: #5 - Orange

Function: The orange wire of 1VA228 is used to connect temperature switch (1TS-VA001), monitoring the service water pump cubicle temperature, to auxiliary relays mounted at MCC131X1. The failure of this wire would prevent these relays from picking up on high temperature and in turn would prevent the cubicle cooler (1VA01SA) fans 1A, 1B, 1C and 1D from automatically starting.

The function of this cooler is to provide supplemental cooling to the pump room to maintain environmental conditions within the pump requirements. The fans have 3 starting modes - manually from a local control switch, automatically when the ESW pump is running and automatically on a second stage (120°F) high temperature. The starting signals are sealed in such that the fan will not stop until the temperature in the cubicle is less than 108°F. The cubicle cooler is expected to operate only when the ESW pump is running. In addition, a third stage (130°F) high temperature alarm is provided in the control room.

Safety Impact: None. Fans will still start on an ESW pump running signal (normal mode of starting). Should the cooler fans fail, a high temperature alarm in the control room will alert the operator.

References: 6/20E-1-4030VA12, Rev. J

6/20E-1-4661H, Rev. H

6/20E-1-4661J, Rev. L

6/20E-1-4471A, Rev. H

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Inspection Report Disposition

Cable Number: 1VA228

Conductor: #6 - Blue

Function: The blue wire of 1VA228 is part of the start circuitry for the auxiliary building HVAC essential service water pump cubicle cooler (1VA01SA) fans 1A & 1B. Failure of the wire would prevent the auto-start of fans 1A & 1B on a high temperature (120°F) in the cubicle and prevent the circuitry from sealing-in with a temperature signal above 108°F. Fans 1C & 1D for the cooler are unaffected by failure of this wire.

The function of this cooler is to provide supplemental cooling to the pump room to maintain environmental conditions within the pump requirements. The fans have 3 starting modes - manually from a local control switch, automatically when the ESW pump is running and automatically on a second stage (120°F) temperature signal. The starting signals are sealed in such that the fan will not stop until the temperature in the cubicle is less than 108°F. The cubicle cooler is expected to operate only when the ESW pump is running. In addition, a third stage (130°F) temperature alarm is provided in the control room.

Safety Impact: None. Fans will still start on an ESW pump running signal (normal mode of starting). This failure only affects 2 of the 4 fans for the cooler which would reduce the cooling capacity. Should a high temperature condition exist, an alarm will alert the operator.

References: 6/20E-1-4030VA12, Rev. J

6/20E-1-4661H, Rev. H

6/20E-1-4661J, Rev. L

6/20E-1-4471A, Rev. H

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1VC387

Conductor: Red & Green-Black

Function: The red conductor of cable 1VC387 is a connection in a detector trouble alarm, circuit at a local panel, for smoke detector OXY-VC065AA. Failure of the butt splice will prevent initiation of this alarm. The smoke detector is monitoring return air from main control board 2PM05J. The green-black conductor is a connection from smoke detector OXY-VC065AA to an alarm in the main control room for "main control room ionization high". Failure of the butt splice will prevent the initiation of this alarm from smoke detector OXY-VC065AA.

Safety Impact: None. With regard to the loss of the main control room ionization alarm, this smoke detector will initiate an alarm at a local panel. Alarms at this local panel annunciate in the main control room as part of an HVAC common trouble alarm.

With regard to the loss of the detector trouble alarm, since an independent fire detection system is provided, failure to identify the detector trouble will not jeopardize the control room.

References: Equipment No. 0VC01JC

6/20E-0-4623E, Rev. E

6/20E-0-4030VC41, Rev. E

Wire Code - Red (VC65AA10), Green-black (CA14)

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Inspection Report Disposition

Cable Number: 1VQ087

Conductor: White-Black, Green-Black, Blue, Orange and Red. Re-inspection rejected only one conductor, but since conductor color could not be identified, each conductor in splice was analyzed.

Function: Control and indication for the normally closed primary containment purge system supply isolation valve 1VQ001A. Valve operator is hydraulic. Failure of the butt splices in these conductors will result in the following:

Red - Loss of open indicating light in main control room

Orange - Loss of auto starting of accumulator hydraulic pump

Blue - Loss of control to manually open the valve

White-Black - Loss of control to manually close the valve

Green-Black - Loss of control to the accumulator discharge solenoid

Safety Impact: None. Safety impact of the failure of each butt splice is discussed below:

Red - No safety impact. Loss of indication only.

Orange - No safety impact. Low accumulator pressure is alarmed in the control room. Upon receipt of the alarm the operator can take corrective action to recharge the accumulator. Maintaining the accumulator in a charged condition is essential for the valve to perform its isolation function.

Blue - No safety impact. The containment purge ventilation system is only operated during planned reactor shutdowns. Therefore, this valve will only be opened with the unit in a shutdown mode.

White-Black - No safety impact, since the valve is closed during normal operation. Manual closure of the valve would only be required when shutting down the containment purge ventilation system. As discussed above, this system is only operated with the unit in a shutdown mode.

Byron Butt Splice
Inspection Report Disposition

Safety Impact: (Cont'd)

Green-Black - No safety impact. Since failure of this butt splice will de-energize the accumulator discharge solenoid. This will open the solenoid and allow the accumulator to discharge and close the valve which is its safety position.

References: Equipment No. 1AP25E

FSAR Section 9.4.9.2

W/D No. 1-4663C, Rev. J

S/D No. 1-VQ07, Rev. J

Color Code - Red (VQ1AR)

Orange (VQ1ASL2)

Blue (VQ1ASL3)

White-Black (VQ1APS4)

Green-Black (VQ1ASL1)

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1VQ097

Conductor: White-Black, Red-Black, Green-Black, Red and Blue
Re-inspection rejected only one conductor, but since conductor color could not be identified, each conductor in splice was analyzed.

Function: Control and indication for the normally closed primary containment purge system supply isolation valve 1VQ001A. Valve operator is hydraulic. Failure of the butt splices in these conductors will result in the following:

Red - Loss of open indicating light in main control room

Blue - Loss of control to manually open the valve

Green-Black - Loss of control to manually close the valve

White-Black - Loss of control to the accumulator discharge solenoid

Red-Black - Loss of power to dc control circuit for valve

Safety Impact: None. Safety impact of the failure of each butt splice is discussed below::

Red - No safety impact. Loss of indication only.

Blue - No safety impact. The containment purge ventilation system is only operated during planned reactor shutdowns. Therefore, this valve will only be opened with the unit in a shutdown mode.

Green-Black - No safety impact. Since failure of this butt splice will de-energize the accumulator discharge solenoid. This will open the solenoid and allow the accumulator to discharge and close the valve which is its safety position.

White-Black - No safety impact, since the valve is closed during normal operation. Manual closure of the valve would only be required when shutting down the containment purge ventilation system. As discussed above, this system is only operated with the unit in a shutdown mode.

Byron Butt Splice
Inspection Report Disposition

Safety Impact: (Cont'd)

Red-Black - No safety impact. Loss of power will de-energize the accumulator discharge solenoid ensuring that the valve is in a closed position and de-energize a solenoid locking out the manual open circuit of the valve.

References: Equipment No. 1AP25E

FSAR Section 9.4.9.2

W/D No. 1-4663C, Rev. J

S/D No. 1-VQ07, Rev. J

Color Code - Red (VQ1AR)

Blue (VQ1AP)

White-Black (VQ1ASL1)

Red-Black (VQ1AN)

Green-Black (VQ1AP53)

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Inspection Report Disposition

Cable Number: 1VQ136

Conductor: Green

Function: Re-inspection report identified this splice as acceptable.

Safety Impact: None

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Inspection Report Disposition

Cable Number: 1AP137

Conductor: Blue

Function: The blue conductor of cable 1AP137 is in the auto-trip alarm circuit for the manually operated feed breaker in 480V ESF unit substation 132Z to 480V essential service water cooling tower motor control center 132Z1. This auto-trip alarm is activated by an overcurrent trip switch in the feed breaker assembly. The alarm is in the main control room.

Safety Impact: None. The breaker will perform its protective function of tripping on overcurrent. Loss of the motor control center can be determined by other indication in the control room (i.e., loss of position indication and alarms associated with services fed from the motor control center). In addition, close/trip indication for the feed breaker is provided locally at the 480V unit substation.

References: 6/20E-1-4156A, Rev. M

6/20E-1-4156C, Rev. T

6E-1-4030AP76, Rev. B

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1CC008

Conductor: Black-White

Function: The Black-White conductor of cable 1CC008 is a spare conductor.

Safety Impact: None. The conductor is spare.

References: 6/20E-1-4155B, Revision T

6/20E-1-4030CC01, Revision L

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Byron Butt Splice
Inspection Report Disposition

Cable Number: 1RH062

Conductor: White

Function: The white wire of cable 1RH062 is used to connect a close limit switch permissive of valve 1SI8811B (containment sump isolation valve) into the open control circuit of valve 1RH8702B (reactor coolant loop to RHR pump isolation valve). Failure of this butt splice would prvent the manual opening of this valve. This valve is normally closed and is opened when the RHR system is to be put in operation.

Safety Impact: None. The RHR system is aligned to take suction from two reactor coolant hot legs and discharge to two reactor coolant cold legs to bring the unit to a cold shutdown mode. As part of this alignment valve 1RH8702B must be normally opened. This alignment is not utilized following a LOCA. Position indicating lights in the control room will provide valve position status information to the operator. The valve can be opened locally utilizing a handwheel at the valve operator. The portion of the RHR system utilized with the emergency core cooling system during the injection and recirculation phases of a loss of coolant accident are unaffected by this failure.

References: Drawings - Schematic 6/20E-1-4030RH05, Rev. K
Wiring 6/20E-1-4683B, Rev. M

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Inspection Report Disposition

Cable Number: 1SI143

Conductor: Blue-Black

Function: The Blue-Black conductor of cable 1SI143 is a spare conductor.

Safety Impact: None. The conductor is spare.

References: Drawings - Schematic 6/20E-1-4030SI14, Revision F
Wiring 6/20E-1-4661M, Revision L
6/20E-1-4574A, Revision E