

Indian Point 3
Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511
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**New York Power
Authority**

L. M. Hill
Site Executive Officer

October 16, 1995
IPN-95-106

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

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License No. DPR-64
Licensee Event Report # 95-020-00
"Plant Outside Design Basis Due to a Lack of Compliance With
10 CFR 50, Appendix R"

Dear Sir:

The attached Licensee Event Report (LER) 95-020-00 is hereby submitted as required by 10CFR50.73. This event is of the type defined in 10CFR50.73(a)(2)(ii)(B). Also attached are commitments made by the Authority in this LER.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'L. M. Hill'.

L. M. Hill
Site Executive Officer
Indian Point 3 Nuclear Power Plant

Attachment
cc: See next page

210120

9510260008 951016
PDR ADDCK 05000286
S PDR

A handwritten signature in dark ink, appearing to read 'JE221'.

cc: Mr. Thomas T. Martin
Regional Administrator
Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

U.S. Nuclear Regulatory Commission
Resident Inspectors' Office
Indian Point 3 Nuclear Power Plant

INPO Records Center
700 Galleria Parkway
Atlanta, Georgia 30339-5957

Attachment 1
List of Commitments

Number	Commitment	Due
IPN-95-106-01	The IP3 Fire Protection Design Basis Document was scheduled for completion by December 29, 1995 in commitment IPN-95-003-04. The schedule for this commitment is being revised to reflect delays due to personnel unavailability.	June 30, 1996
IPN-95-106-02	An assessment of several questions on the past reportability determination of the Appendix R items will be completed. If any item is determined to be reportable, this LER will be supplemented or a new LER written within 30 days of the determination.	November 13, 1995

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TITLE (4) Plant Outside Design Basis Due to a Lack of Compliance with 10 CFR 50, Appendix R

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	17	87	95	-- 020 --	00	10	16	95	FACILITY NAME	DOCKET NUMBER 05000
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		000	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			20.405(a)(1)(iv)		✓ 50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

NAME A. Ettlinger, Fire Protection Project Manager TELEPHONE NUMBER (Include Area Code) (914) 681-6560

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE). ✓ NO EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 25, 1995, with the plant in cold shutdown, a Licensing Engineer identified the need for an exemption to 10 CFR 50, Appendix R, Section III.G for the source range instrumentation in the electrical tunnel. No exemption had been requested. The configuration of the source range instrumentation required operator entry into the fire area where a fire was postulated in order to transfer to an alternate source range signal. Corrective action had already been taken by protecting one source range channel with a one hour fire barrier. The probable cause was personnel error during the preparation of a 1986 modification. A lack of clear fire protection documentation and inadequate fire protection knowledge were considered contributing causes. Corrective actions have been taken in response to prior events and include upgrades to the design control program, updated Appendix R and Fire Hazard analyses, inspection and evaluation of fire seals, updated drawings, Appendix R compliance training, the addition of a Fire Protection System Engineer position, and a review of the effect of modifications on the fire protection analysis. A Fire Protection Design Basis Document is being completed.

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DESCRIPTION OF EVENT

On September 25, 1995, at approximately 1830 hours, with the plant in cold shutdown (reactor power level at 0%, reactor coolant temperature at 179 degrees Fahrenheit, and reactor coolant pressure at 375 psig), Licensing concluded that an exemption from 10 CFR 50, Appendix R, Section III.G had been required for the source range instrumentation (IG) configuration in the electrical tunnel. No exemption had been requested. DER 95-2222 was issued to document the determination. No corrective action was required since the condition had been corrected in modification 93-03-373 FBAR.

Licensing evaluated this event and determined that source range instrumentation was credited as safe shutdown process monitoring instrumentation in the 1984 Appendix R Reanalysis submitted to the NRC on August 16, 1984. The Appendix R neutron flux signal instrumentation installed to meet this requirement was modified when modification 86-03-038 NI (declared operable September 17, 1987) added a new two channel neutron flux detection system (channels NI-38 and NI-39) to meet the requirements of Regulatory Guide 1.97. Channels NI-31 and NI-38, which run from the upper penetration area through the upper tunnel to the entranceway, provided the Appendix R signals after the modification. NI-31 was protected by a one hour fire barrier from the containment penetration for 20 feet into the upper tunnel with similar protection at the other end of the tunnel (this provided compliance with Appendix R, Section III.G for penetration area and entranceway fires based on an exemption granted February 2, 1984). The NI-38 channel was not protected but was provided with an alternate power supply (JX) and an additional isolated output signal to perform the function of the displaced dedicated Appendix R neutron flux signal. The modification required an operator to enter the upper penetration area to manually transfer to the alternate signal if a fire in the upper cable tunnel damaged channels NI-38 and NI-31 (entrance was also required when a fire outside the cable tunnel (e.g., control room fire) caused a signal loss). The modification was not in compliance with 10 CFR 50, Appendix R because an exemption request is required for operator entry into the fire area where a fire is postulated (see LER 93-031).

Licensing could not identify why the safety consideration associated with operator entry was not considered in the modification. Licensing considered a lack of attention to detail in design change to be the most likely cause. Safety evaluation NSE 86-03-038-NI discussed

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alternate instrumentation for the control room fire but did not indicate that the effects of a cable tunnel fire or the need for an exemption were considered. The safety evaluation stated that the original Appendix R signal design requirements were exceeded but did not assess whether operator entry to the upper penetration area was acceptable for the upper tunnel fire even though no operator entry was required by the initial design. Licensing also concluded that a lack of clear documentation in the 1984 analysis contributed to the failure to properly evaluate operator action in the upper penetration area for a fire in the upper cable tunnel. Additionally, Licensing found that the safety evaluation was not reviewed by personnel who had performed the detailed fire protection analyses or were likely to have detailed knowledge of NRC guidance.

The source range event was item 11 of 58 fire protection items that were documented in the Indian Point 3 Appendix R & Fire Protection Improvement Plan, an Appendix R compliance reassessment. The resolution of these items was reported to the NRC (NYPA letter IPN-95-039 of March 28, 1995) and discussed in NRC Inspection Reports 93-24 and 95-81. An assessment of the reportability of the 58 items was discussed in LER 95-006 but item 11 was not considered reportable (the aggregate was not considered to be reportable but several of the individual items were reported). LER 95-006 mentioned continuing action by NYPA ("note - several questions are still being addressed on issues identified as not reportable"). Licensing identified the reportability of item 11 during a reassessment of background documentation that was initiated because the assessment of reportability done to support LER 95-006 did not document the reasons why 10 CFR 50, Appendix R, Section III.G.2.b were met. The Licensing reassessment documented the reasons and found that no exemption had been granted for entry to the upper penetration area with a fire in the upper electrical tunnel.

CAUSE OF EVENT

The probable cause of the event was personnel error, an inadequate engineering evaluation during the modification process due to an inattention to detail. Contributing causes were the lack of clear documentation in the Appendix R analyses (through 1984) for use in design review and inadequate fire protection knowledge on the part of the reviewers.

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CORRECTIVE ACTIONS

The following actions have been or are being performed to provide corrective action and prevent recurrence of this event:

- Modification 93-03-373 FBAR corrected the Appendix R deficiency.
- No specific corrective action(s) was defined for the design control program to address the potential cause. The Authority has identified corrective actions for the design control program in a letter dated June 8, 1994 in response to the findings of Inspection Reports 93-22, 93-27, 93-29 and 93-81.
- The consideration of fire protection in the plant modification process has been improved by past and ongoing corrective action including the following:
 - To assure long term compliance with the requirements of Appendix R, the following programmatic corrective actions have been completed: Appendix R Analysis updated, Fire Hazards Analysis updated, the Fire Area drawings revised, procedure for modification review revised, detailed fire protection Operational Specifications developed, plant modifications installed between 1984 and 1995 reviewed, Multiple High Impedance Fault (MHIF) study performed, safe shutdown procedures revised, fire barrier penetration seals reinspected/reevaluated, fire barrier penetration drawings updated and a long term compliance program implemented. The long term compliance program requires continual updating and revision of the above documents and procedures to keep them current and reflect any new issues that may be identified. This repeats a summary of corrective actions identified in LER 95-006.
 - The IP3 Fire Protection Design Basis Document was scheduled for completion by December 29, 1995 in commitment IPN-95-003-04. The schedule for this commitment is being revised to June 30, 1996 due to emergent work. Most of the documentation is currently in draft format and available for use.
 - Appendix R compliance training has been conducted for Nuclear Engineering design engineers to familiarize them with the IP3 Appendix R compliance strategy and to help prevent the reoccurrence of events similar to the one in this report. This

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action was undertaken as part of the lessons learned from the reassessment of the James A. FitzPatrick Fire Protection Program. This repeats a corrective action identified in LER 94-012.

- Responsibility for Appendix R compliance has been transferred to Design Engineering. A Fire Protection System Engineer position has been established and is responsible for supporting Design Engineering to monitor and assess Fire Protection and Appendix R compliance issues at IP3. This revises a corrective action identified in LER 93-007.
- An assessment of several questions on the past reportability determination of the Appendix R items will be completed by Operations by November 13, 1995. If any item is determined to be reportable, this LER will be supplemented or a new LER written within 30 days of the determination.

ANALYSIS OF EVENT

This event is reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B). An assessment of the source range instrumentation in the electrical tunnel determined that, for a fire in the upper electrical tunnel, an exemption was required to allow operator entry to the upper penetration area to establish alternate instrumentation. Therefore, the plant had been outside the design basis requirements of 10 CFR 50, Appendix R since modification 86-03-038 NI was declared operable on September 17, 1987 (this modification required operator entry into the upper penetration area during a cable tunnel fire), until the plant outage that was entered March 7, 1993 (modification 93-03-373 FBAR, ECN 5, completed during that outage, eliminated the need for that operator action). This was a period of approximately 5-1/2 years.

Additional events related to fire protection are discussed in LERs 95-001, 002, 003, and 006, 94-010, and 012, 93-007, 018, 022, 029, 031, 037, 038, 041, 051, and 055, and 92-010, 016 and 017.

SAFETY SIGNIFICANCE

The event did not significantly effect the public health and safety.

A loss of source range instrumentation due to a fire in the upper cable tunnel would not prevent boron sampling as an alternate method to assure adequate shutdown margin during the cooldown and cold shutdown phases. Core reload analyses demonstrate the adequacy of

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shutdown margin using only control rods at hot shutdown conditions. Additionally, due to administrative controls which limit transient combustibles, the fire in the cable tunnel is expected to be of short duration. An intense fire in the tunnel would quickly initiate an alarm, fire brigade response and automatic suppression. After recovery from the fire, operator action to initiate alternate instrumentation could be taken to support cooldown and cold shutdown.

The extent of condition has been assessed by evaluating the effects of plant modifications on the safe shutdown capability of the plant. This assessment, undertaken as part of the Indian Point 3 Appendix R & Fire Protection Improvement Plan, was tracked as Unresolved Item 93-24-05 and closed in Inspection Report 95-81.

SUPPLEMENTAL INFORMATION ON OTHER ITEMS

This section summarizes the items and enhancements / corrective actions for the 58 items described in LER 95-006. This information is being provided in accordance with the action identified in the transmittal letter for LER 95-006. Several previously undocumented items have been added to increase the item numbers to 60. The Indian Point 3 Appendix R & Fire Protection Improvement Plan addressed the causes associated with the breakdown of the Appendix R fire protection program that resulted in these items. This plan was developed by NYPA to address fire protection and safe shutdown issues at IP3 which included the incomplete documentation of the Appendix R design basis, the inadequate review of plant modifications for effects on the Appendix R analysis, deficiencies in the 1984 methodology and documentation and procedures that provided insufficient guidance for shutdown. Inspection Report 93-24 describes the scope of the IP3 program and Inspection Report 95-81 describes an assessment of the implementation of that program to date. Industry feedback is provided by the following description of the items and the enhancements / corrective actions made:

1. Vapor Containment (NH) (VC) Habitability To Support Appendix R Operator Actions

Item - The 1984 Appendix R analysis did not include the VC fan cooler units (FCU) (FCUs). The FCUs are needed to support containment entry since the containment heats above 130°F (limit for operator entry based on OSHA limits) for a loss of the FCUs. A separation analysis determined that separation was adequate except for the entrance to the Electrical Tunnel (ET). A fire at

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this location could cause loss of the cables to all of the FCUs as well as spurious operation of multiple valves which would require manual operation from inside VC to establish Residual Heat Removal (BP) (RHR) (e.g., RHR suction valves 730 and 731, RHR discharge valves 638, 747 and 899B, and VC spray isolation valve 889B) and place the plant in cold shutdown.

Enhancement - Additional guidance was added to safe shut down procedures. Jumpers and a repair procedure to restore the operation of one FCU for a fire were provided.

2. Embedded Conduits (CND) In Unprotected Manholes/Pull Points

Item - No evidence could be found in the 1984 Appendix R analysis that the exposure of embedded cables (CBL) at pull points was considered.

Enhancement - A review documented the acceptability of the protection afforded embedded conduit containing shutdown cables in plant areas. Where cables associated with Charging (CB) Pump (P) 33 were exposed in the PAB, marinite board was placed in each of the 3 compartments of Manhole 33 and the cover of the manhole was sealed.

3. Appendix R Analysis Update

Item - Following the 1984 analysis, the Appendix R design basis documentation was not maintained current.

Enhancement - The corrective actions that addressed this issue were reported in the Indian Point 3 Appendix R & Fire Protection Improvement Plan. This LER repeats a summary of these corrective actions presented in LER 95-006.

4. Control Building (NA) (CB) Air Intake Fire Exposure

Item - The 1984 Appendix R analysis did not address the adequacy of separation between the CB air intakes and the Turbine Building(NM) / Administrative Service Building (MA) walls.

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Enhancement - The Turbine Building and Administrative Service Building Walls were added to the surveillance program as controlled barriers. These walls were also identified as controlled barriers on the fire area / zone arrangement plan drawings

5. Emergency Lighting (FH) or Charging (CB) Pump 33 Operator Actions

Item - A loss of instrument air (LD) requires controlling charging pump speed manually at the pump. The 1984 Appendix R analysis identified Charging Pump 33 as a safe shut down component but there are no emergency lighting units to support this action.

Enhancement - Charging Pump 33 was removed from the safe shut down list and the Operational Specification was revised to limit operation above cold shutdown when less than Charging Pumps 31 and 32 are operable.

6. Simultaneous Transformer (XFMR) Yard/Turbine Building Fire

Item - The 1984 Appendix R analysis did not address a simultaneous fire involving the main transformer and the turbine generator (TB) that could endanger redundant Service Water (BI) (SW) pumps.

Enhancement - An evaluation demonstrated the design adequacy when the resolution of item 2 was considered.

7. Need To Review 1984 Appendix R Analysis Cable Selection

Item - The 1984 Appendix R analysis cable selection methodology was not readily retrievable / documented.

Enhancement - The adequacy of cable selection for a sampling of components contained in the 1984 Appendix R analysis was documented. Discrepancies between the cable and raceway schedule and plant drawings were resolved and are being corrected. Cable selection adequacy is now assessed during Fire Protection/Appendix R compliance reviews performed for plant design changes.

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8. Mechanical Equipment Selection

Item - The adequacy of mechanical equipment selection in the 1984 Appendix R analysis was questioned.

Enhancement - System reviews, including review of IP3 system design documentation (DBD's, system descriptions, flow diagrams and other documentation) were performed to identify the required mechanical equipment for Appendix R. See items 10, 16, 17, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 40, 42, 44, 56, 57, 58, 59, and 60.

9. Prompt Failures

Item - The adequacy of the evaluation of prompt failures in the 1984 Appendix R analysis was questioned.

Enhancement - This item was resolved as discussed in item 8.

10. Mechanical Failure And Adequacy Of Isolation Of The Atmospheric Dump Valves (ADV's)

Item - The 1984 Appendix R analysis did not address spurious operation of the ADVs (fail open) without safety injection.

Enhancement - Safe shut down procedures were modified to reflect operator actions.

11. Inadequate Source Range Separation In The Upper Electrical Tunnel (Reported in this LER.)

12. Local Operator Actions In The Plant Auxiliary Building (NF) (PAB) 55' Elevation, Fire Zone 17A

Item - A fire in the motor control center (MCC) 36A&B area that could make the PAB elevation and above inaccessible was not addressed in the 1984 Appendix R analysis. The 1984 Appendix R analysis credits shut down from outside the CR which requires entry into the area (FZ-17A) within the first hour.

Enhancement - The shut down strategy was changed to shut down from inside the CR utilizing the Appendix R Diesel and aligning it to the 480V Vital Buses. Additional cables and components were added to the analysis to support this alignment.

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13. Isolation Of Non-Required Systems

Item - The adequacy of the evaluation of the isolation of non-required systems in the 1984 Appendix R analysis was questioned.

Enhancement - This item was resolved as discussed in item 8.

14. Fixed Emergency Lighting Design In The Control Room (Reported in LER 94-012.)

15. Need To Document Safe Shut Down Components By Fire Zone

Item - The 1984 Appendix R reevaluation documented the location of safe shutdown equipment and cables on a fire area basis. The actual compliance strategy in some fire areas is different. Analyses used fire zones and sub-zones based on approved exemptions.

Enhancement - The Appendix R compliance summary and the updated Appendix R analysis identify safe shut down components by an analysis sub fire zone in some areas (this did not change the 1984 fire areas or zones). The Appendix R design basis documentation is required to aid in long term compliance and these deficiencies were determined to be a cause of the other issues.

16. Emergency Diesel Generator (DG) (EDG) Fuel Tank (TK) Level

Item - The 1984 Appendix R analysis did not include EDG fuel tank level instrumentation.

Enhancement - Additional mechanical gages have been included in the Appendix R analysis. Operations reviewed existing procedures and found them to provide adequate guidance for the periodic operator inspection of the level in EDG underground fuel tanks.

17. Switchgear (SWGR) Room Ventilation Requirements (Reported in LER 95-006.)

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18a. Plant Auxiliary Building (PAB) Ventilation Requirements

Item - The 1984 Appendix R analysis did not define the effects of a loss of PAB ventilation from fires in all areas. The ventilation Design Basis Document (DBD) indicated that portable ventilation is required in one hour to cool safe shutdown pumps. The analysis did not address the requirements for personnel access for alternate shut down action in the piping penetration area and the charging pump cubicle.

Enhancements - The PAB ventilation system was added to the Appendix R analysis and safe shutdown procedures were changed to include additional areas within the PAB for portable ventilation. FP-29 has been revised to specify the fire scenario in fire areas CTL-3, ETN-4 (fire zones 1A and 3) and PAB-2 (fire zone 5). Fire area PAB-2, fire zone 17A (MCC 36A & B area) was also added to those areas requiring establishment of portable ventilation.

18b. Control Room (CR) Ventilation Requirements For Appendix R

Item - The 1984 Appendix R analysis makes no reference to the CR Heating Ventilating Air Conditioning (HVAC) systems for area cooling to ensure operation of safe shutdown equipment. The potential exists for loss of CR ventilation fed from MCC's 36A and 36B due to a fire in certain plant areas.

Enhancements - Supplemental air conditioning units have been added to the Appendix R analysis. The circuits were routed independent of fire areas ETN-4 and PAB-2 so supplemental cooling will be available unless there is a loss of offsite power coincident with the fire. Procedures were revised to implement station blackout actions related to CR ventilation for the applicable fire scenarios with loss of offsite power.

18c. Cable Spreading Room (CSR) Ventilation (Reported in LER 95-006.)

19. Loss Of EDG Auxiliaries For An Upper Cable Tunnel Fire

Item - The 1984 Appendix R analysis did not address loss of the exhaust fans for the EDG cells due to an Upper Cable Tunnel fire although the 1984 Appendix R analysis strategy for this fire called for shut down from the CR using the EDG.

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Enhancements - The strategy was changed to shut down from the CR using the Appendix R Diesel Generator aligned to the 480V vital buses instead of the EDGs. Guidance is given to align the Appendix R Diesel to the 480V Vital Buses. The cables and components necessary to accomplish this were included in the Appendix R analysis.

20. Alternate Shut Down Fire Zone 17A Contains Alternate Shut Down Cable

Item - The 1984 Appendix R analysis did not address reliance on alternate shut down when there is a required shut down cable within 20 feet of the fire.

Enhancements - The strategy was changed to shut down from the CR using the Appendix R Diesel Generator instead of the EDGs and additional cable and components were included in the Appendix R Analysis and Compliance Procedure, FPES-04B.

21. Inadequate Separation Of Service Water (SW) Pump Strainers Power Feeds

Item - The 1984 Appendix R analysis did not identify the potential loss of automatic backwashing of the strainers due to loss of instrument air or control circuits.

Enhancements - Shut down procedures were changed to monitor strainer delta P and manually backwash the SW pump strainers as required. Fixed 8 hour emergency lights were provided in the intake enclosure to support local operation of equipment and of the strainer. An exemption was granted on March 29, 1995 to use security lights for access and egress.

22. Loss Of Heat Tracing

Item - The 1984 Appendix R analysis did not consider the effects of loss of heat tracing. Refueling Water Storage Tank (RWST) and Condensate Storage Tank (CST) tank level indication are required and may not have been available if the instrument lines froze. Backwashing of the SW pump strainers is needed if and when the strainers clog.

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Enhancements - Safe shut down procedures were changed to place portable heating units as necessary to prevent instrument line freezing and to allow manual backwash of the SW pump strainers, if required. In addition, portable heating units were procured. Procedure(s) for fuel storage / provision and on-site refueling are being revised and / or developed for these components. This action is tracked by ACTS 12976 and currently scheduled for completion November 1995. An exemption was granted on March 29, 1995 to use security lights for the above actions.

23. Failure Of The MSIVs To Close

Item - The timeliness of closing the MSIVs, as detailed in the 1984 Appendix R analysis, during a Control Building Fire was questioned. In addition, the secondary system isolation valves down stream of the valves may fail. Also, the possibility of a fire at the MSIVs potentially blocking access to the valves was not considered.

Enhancements - The 1994 analysis addressed the concerns and no changes were required.

24. Adequacy Of Steam Generator PORV Isolation Capability (This item is covered by item 10.)

25. Need To Trip Reactor Coolant Pumps

Item - The 1984 Appendix R analysis did not address the concern that fires in different locations could require tripping of the Reactor Coolant Pumps (RCPs) due to the depressurization of the Reactor Coolant System (AB) (RCS) through open spray valves, the potential for powering the bus with the Appendix R diesel while the RCPs are on, or the loss of support systems (e.g., loss of seal leakoff, loss of Component Cooling Water (CC) (CCW) to the lube oil coolers, loss of CCW to the thermal barriers and loss of seal injection).

Enhancements - The safe shut down procedure was revised to trip the RCPs before exiting the CR when operation is not in accordance with normal operating procedures and to verify, locally, that they have tripped.

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26. Need To Repair MOVs After Spurious Failures Due To Over Torque

Item - The 1984 analysis did not consider that a fire induced hot short on the valve control circuitry could bypass the push-button control room switches and limit/torque switches which could subsequently energize the open/close coil of the valve and could result in the valves being driven beyond their travel limit potentially resulting in potential valve/operator failure. The valve and/or valve operator locked rotor conditions would not have been prevented by the thermal overload relay. The potential damage to the valves could have rendered the valves inoperable (cannot be manually operated locally), created a loss of the pressure boundary and/or created a loose parts problem.

Enhancements - Safe shut down procedures were changed to incorporate manual actions to de-energize MOVs to prevent additional spurious actuation and to include a new letdown path. Valve control circuitry was modified.

27. Need To Trip Non-Required Charging Pumps

Item -The 1984 Appendix R analysis did not assess whether or not a fire could cause spurious actuation of the charging pumps or suction valves and result in equipment damage (valve actuation with a pump in operation could cause pump damage when running, multiple pumps running could affect the relief valve through overuse, and the loss of letdown could cause the VCT to drain and entrain H₂ into the charging pump suction lines).

Enhancements - Safe shut down procedures were changed to provide guidance to the operators for tripping the charging pumps, isolating the VCT and aligning the RWST.

28. Potential Damage Due To Volume Control Tank (VCT) Isolation Valve Closure

Item - The 1984 Appendix R analysis did not identify the capability for spurious actuation of motor operated valve LCV-112C. Spurious operation of LCV-112C could have isolated the VCT from the charging pumps creating the problem discussed in item 27.

Enhancements - These are as discussed in item 27.

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29. Component Cooling Water and Charging Pump Alignment

Item - The 1984 analysis relies upon alignment of a CCW and Charging Pump to alternate shutdown power supplies for a CB fire. Due to transfer switch design, this alignment can only be accomplished when the normal and alternate feeds are deenergized. Due to potential circuit failures within the CB, the deenergization of the normal feed cannot be assured, thereby, jeopardizing transfer to alternate shutdown power supplies.

Enhancements - Safe shut down procedures were changed to provide additional operator procedural guidance for transfer.

30. Residual Heat Removal Pump Operation Under Degraded Conditions

Item - The 1984 Appendix R analysis did not identify the capability for associated circuits to spuriously actuate the RHR pumps during degraded conditions (mini flow conditions, degraded power, and no seal cooling) which could lead to pump damage, making the pump(s) unavailable for cold shut down.

Enhancements - Safe shut down procedures were changed to ensure adequate guidance is provided to the operators to monitor status of the RHR system pumps, and secure at least one of these pumps within the first hour of a fire event, as required.

31. Spurious Operation Of Containment Spray (BE) (CS) Pumps

Item - The 1984 Appendix R analysis did not identify the capability for spurious actuation of the CS pumps which could have depleted the RWST inventory in approximately one hour.

Enhancements - Safe shut down procedures were changed to ensure adequate guidance is provided to the operators to monitor pump status and trip the CS pumps in the event of a fire-induced spurious start of the pumps.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

32. Spurious Operation Of Safety Injection (BQ) (SI) Pumps

Item - The 1984 Appendix R analysis did not identify the capability for spurious actuation of the SI pumps which could complicate cooldown with respect to RCS inventory and pressure control or, when RHR is established, lead to failure of the RCS and /or RHR due to overpressurization.

Enhancements - Safe shut down procedures were changed to ensure adequate guidance is provided to the operators to monitor pump status and trip the SI pumps in the event of a fire-induced spurious start of the pumps or prior to the RCS pressure decreasing below SI actuation set point.

33. Spurious Safety Injection/Containment Isolation/Containment Spray Signal (SIS/CIS/CS)

Item - The 1984 Appendix R analysis did not identify the capability for spurious actuation of the SIS and/or the phase A and B CIS and/or CS which could lead to valves, pumps and/or breakers changing state. The signals could start the Auxiliary Feedwater (BA) (AFW) pumps (operator action required to stop), trip the charging pumps (operator action required to restart), trip the CCW pumps (operator action required to restart), start the CS pumps and open discharge valves 866A and B (operator action required to stop), trip the PAB and VC purge exhaust fans (operator action required to restart), trip MCC 32, 33, 37 and 39 breakers (operator action required to reclose), start the SI pumps (operator action required to stop), open valves 1835A and B and 1852A and B (no action required for BIT valves), close valves 769, 789, 797 and FCV 625 on phase B (operator action required to reopen), and trip non essential SW pumps 37, 38, and 39 (operator action required to start non-essential pumps or cross connect headers). This could complicate safe shut down.

Enhancements - Safe shut down procedures were changed and ONOP-FP-1A revised to explain operator action to re-align components or reset the SIS/CIS/CS signal.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

34. 480V Supply and Bus Tie Breaker Local Operation

Item - The 1984 Appendix R analysis compliance strategy for an upper cable tunnel (Fire Zone 60A) and PAB (Fire Zone 17A) fire relied on the ability to power the 480V emergency switchgear (Vital Buses) from the Appendix R Diesel. The analysis did not demonstrate that remote control of the 480V supply and tie breakers (offsite power supply breakers to the 480V emergency switchgear as well as the tie breakers between emergency switchgear cannot be locally closed).

Enhancements - Remote control of the breakers was demonstrated and safe shut down procedures were changed to reflect this.

35. Need To Start Appendix R Diesel for T_c and T_h

Item - The 1984 Appendix R analysis requires starting the Appendix R diesel to power just two instruments (i.e., T_c and T_h).

Enhancements - A decision was made to make no enhancements.

36. Effects Of CO₂ System Actuation On Safe Shut Down Capability

Item - The 1984 Appendix R analysis did not identify the potential for and evaluate the effects on safe shut down system operation and operator access as a result of spurious CO₂ system operation.

Enhancements - A documented analysis of CO₂ system circuitry identified that possible spurious discharges could occur in the generator exciter housing, at the turbine and generator bearings, in the cable spreading room (CSR), 480V switchgear room (SR), at the main boiler feed pumps and in the EDG cells. The pre-fire plans and safe shut down procedures were changed to provide the Fire Brigade and operator with guidance on ventilation and preventative mitigating actions.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

37. Inadequate Definition Of Service Water Requirements

Item - The 1984 Appendix R analysis did not identify the effects of loss of instrument air (LD) to the SWS control valves (loss of air requires manual actions to support use of one SW pump and, for SW Pump 38, manual action is required before pump start to remove unnecessary loads prior to pump start to avoid runout) and was not modified to reflect the effects of a river water temperature of 95°F (discharge canal at 110°F) on single pump NPSH.

Enhancements - Safe shut down procedures were changed to indicate that multiple normal SWS pumps are required for normal fire related shutdown, manually close the SWS valves to support use of one SWS pump (Back-up Pump No. 38) for alternative shutdown (isolate flow to FCUs and EDGs), and to include the additional requirements of the Ultimate Heat Sink temperature increase to 95°F.

38. Main Feedwater (SJ) Pump Trip

Item - The 1984 Appendix R analysis did not address the need for main feedwater isolation to prevent overfilling the steam generators and causing an excessive cooldown of the RCS. Upon initiation of a reactor trip, automatic signals to isolate the main feedwater system actuate. However, because main feedwater isolation is an automatic function initiated by the reactor trip, they cannot always be credited for an Appendix R event and alternate means might be required.

Enhancements - An analysis was performed and no enhancements were required.

39. Emergency Lighting for CST / RWST Level Indication

Item - The 1984 Appendix R Reevaluation identifies the CST and RWST level instrumentation as instruments selected to ensure the safe shutdown capability. Appendix R Section III.J requires 8 hour battery backed emergency lighting units to support the operation of safe shutdown equipment and for access and egress routes thereto. Emergency lights are not currently installed at the CST and RWST or on the access / egress paths.

Enhancements - An evaluation showed that no enhancements were required.

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40. Loss Of Hydrogen Seals.

Item - The 1984 Appendix R analysis did not address a CR fire that could incapacitate the Turbine (TRB) Generator (GEN) Lube Oil System (LL), including the DC emergency oil pump resulting in bearing damage and hydrogen leakage at the seals.

Enhancements - The safe shutdown procedures were changed to vent the generator.

41. CST Heat Tracing (This item is covered by item 22.)

42. Failure Of Low Pressure Bypass Steam Dump System.

Item - The 1984 Appendix R analysis did not address that, for a CB fire scenario, the power supplies to the low pressure steam bypass valves and the control circuitry of the main generator output breaker may be adversely affected. A postulated event which simultaneously prevents the low pressure steam bypass dump valves from opening and a failure of the main generator output breaker time delay could potentially cause a turbine overspeed condition.

Enhancements - An analysis was performed and no enhancements were required.

43. Associated Circuits By Common Enclosure

Item - The 1984 Appendix R analysis did not address that fire-induced faults in non safe shutdown circuits which are not properly fused/protected can potentially result in high fault currents potentially resulting in damage to adjacent cables. This is a potential concern when any such circuits share common raceways with safe shutdown circuits. The 1984 Appendix R analysis approach was to ensure that any cables that share a common enclosure with safe shutdown equipment have adequate electrical protection via circuit breakers, fuses or current limiting devices that will prevent the occurrence of electrically induced secondary fires. No documentation or evaluation has been located that would support this approach.

Enhancements - An analysis was performed and no enhancements were required.

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44. PRT Rupture Disc Failure / VC Habitability

Item - The 1984 Appendix R analysis did not address that numerous fire-induced transients can cause hot RCS fluid and / or steam to be added to the Pressurizer Relief Tank (PRT). This can ultimately cause the tank rupture disk to fail causing the contents to be exposed to the containment environment.

Enhancements - An analysis was performed and no enhancements were required.

45. RWST Heat Tracing (This item is covered by item 22.)

46. Classification Of Safe Shut Down Equipment As Non-Category I

Item - The 1984 Appendix R analysis relies upon portable ventilation and portable communications equipment to support safe shutdown. Licensing Amendment No. 24 commits to utilize Branch Technical Position (BTP) 9.5-1 guidance with respect to Fire Protection Quality Assurance. Implementation of this guidance is provided in IP3 Administrative Procedure AP-16.

Enhancements - Equipment will be reclassified from Non-Category I to QA Category M to provide documentation requirements that UL criteria are met. This is being tracked in ACTS 5567 scheduled for completion December 31, 1995. The schedule does not require immediate action since the equipment is standard (UL/RM) and has been purchased as such in the past. Included are: fire hose (1-1/2", 2", 2-1/2"; lined or unlined); hose nozzles, adapters, fittings wyes, siamese connections and gate valves; smoke removal equipment, including ejector, smoke tunnels and door bars; portable electric generators, including wire reels, adapters and floodlights; portable, hand-held radios and safe shutdown communications equipment; portable fire extinguishers, and foams; and, turn-out gear and SCBA.

47. CR Lighting (This item is covered by item 14.)

48. LER For Appendix R Open Issues

Item - The items determined reportable should be reported.

Enhancements - LERs issued for reportable items have been identified next to the individual items.

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49. RCS Pressure Control

Item - Appendix R relies on inventory addition from the charging pumps through seal injection as a means of maintaining the RCS pressure above the minimum pressure required for sufficient subcool margin. The 1984 Appendix R analysis did not specifically address how the RCS will be depressurized to support RHR initiation. Reliance on ambient losses for this purpose complicates operator response as it requires the operator to minimize make-up to an extent that the pressurizer steam bubble will not be compressed. In addition, the pressurizer heaters have not been assured available for fires. The Appendix R Analysis considers the complete loss of pressurizer heaters.

Enhancements - The safe shutdown procedures were changed to provide operators with guidance if entry into RHR conditions is not expected to be achieved within 29 hours and the emergency lighting design basis was revised.

50. CCW For Thermal Barriers Or Letdown For Volume Control

Item - The 1995 Appendix R Compliance Summary documents that Reactor Coolant Pump (RCP) seal integrity is maintained by ensuring the availability of either seal injection via a charging pump or thermal barrier cooling via a CCW pump. Initially, Reactor Coolant System (RCS) shrink during cooldown and available space in the pressurizer would accommodate seal injection flow. The 1984 Appendix R analysis did not address that, in the latter phases of cooldown, there may be insufficient RCS shrinkage and pressurizer steam space to accommodate the required seal injection flow. This can result in the RCS being driven water solid prior to Residual Heat Removal (RHR) cut in and also result in liquid discharge through the code safety valves.

Enhancements - Safe shutdown procedures were changed to ensure steps are taken to establish CCW and decrease / isolate seal injection when necessary to prevent the RCS from going solid or utilize the RPV Head Vents if required to reduce RCS inventory while providing seal injection with loss of normal and excess letdown.

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51. RCS Hot Leg Flow Path

Item - The 1984 Appendix R analysis did not identify that the sample lines coming from RCS hot leg loop 1 and 3 have normally open flow paths which discharge to the VCT. This could divert primary coolant to the VCT if these air operated valves fail to close and may create a post fire inventory problem for both the VCT and the RCS.

Enhancements - An evaluation was performed and no enhancements were required.

52. Spurious Operation of the Boric Acid Transfer (BAT) Pump

Item - The 1984 Appendix R analysis did not identify the spurious actuation of the BAT pump which would result in injection into the charging pump suction lines. The BAT pumps could spuriously inject 12% boric acid into the charging pumps suction piping. Under Appendix R conditions this 12% boric acid could precipitate and block the suction line sufficiently to interfere with charging pump operation and / or form crystals that could block seal injection by clogging the seal injection filters.

Enhancements - Safe shut down procedures were changed to ensure adequate guidance is provided to the operators to trip the BAT Pumps.

53. CVCS Injection Flow Path

Item - The 1995 Appendix R Compliance Summary indicates the need to maintain RCP seal integrity by ensuring the availability of either seal injection flow via a charging pump or thermal barrier cooling via CCW pump. The CVCS injection flow path to the RCP seals contain certain MOVs that are required to be open for Appendix R.

Enhancements - The additional cables and components (MOV-441, 442, 443, 444, MOV-250A, B, C, and D) have been included in the Appendix R analysis.

54. Diesel Fuel Transfer System (DE) Level Control

Item - The 1984 Appendix R analysis did not identify that the

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diesel fuel transfer system relies on two level control valves per day tank. Either level control valve can allow fuel to enter the day tank, therefore, to terminate the flow, both valves to a tank must be closed.

Enhancements - An evaluation was performed and no enhancements were required.

55. EDG Exhaust Fan Dampers

Item - The 1984 Appendix R analysis did not consider that each EDG Room exhaust fan unit is provided with an air/motor operated damper (DMP) which fails closed on loss of air. The EDG Room Ventilation System includes an air/motor operated inlet louver (LV) for each EDG room. These louvers were not included in the 1984 Appendix R analysis safe shutdown components list.

Enhancements - The EDG room Inlet louvers (L-316, L-317 and L-318) were added to the safe shutdown analysis and Fire Protection / Appendix R Compliance Procedure, FPES-04B, component lists.

56. The Main Steam connection to the steam driven Boiler Feed Pump represents a leak path

Item - The 1984 Appendix R analysis did not document the main steam connection to the steam driven main boiler feedwater pump as a leakage path from the SG.

Enhancements - The auto stop trip has been included in the Appendix R analysis and in the Fire Protection / Appendix R Compliance Procedure, FPES-04B.

57. CCW Pump Runout

Item - The 1984 Appendix R analysis did not identify the potential for the CCW pump to run-out as a potential problem.

Enhancements - An evaluation was performed and no enhancements were required.

58. SG level indication

Item - During the 1995 Appendix R reassessment it was determined that all wide range Steam Generator (SG) level sensors may be

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

lost for a fire. This condition was contrary to the analyzed shutdown strategy for all plant areas which relied exclusively on wide range SG level sensors.

Enhancements - The Appendix R analysis was revised to include narrow range SG level sensors and auxiliary feed water flow indication. Plant procedures were revised to reflect this strategy.

59. SG level indication

Item - For a fire in the upper penetration area, the 1984 Appendix R Analysis relied upon loop 4 for decay heat removal. The availability of wide range SG level indication and wide range hot and cold leg temperature indication for loop 4 was ensured by protecting the cables associated with these instruments located in the upper penetration area with a one hour barrier. The turbine driven AFW pump was relied upon for SG inventory control as the power feeders for the motor driven AFW pump 33 was located in this area and subject to fire damage. The 1984 Appendix R Analysis did not consider the effects of the turbine driven AFW pump receiving steam only from SGs 32 and 33. Wide range and narrow range SG level indication on these SGs as well as AFW flow indication was not included in the analysis and its availability was indeterminate. Consequently, inadequate process monitoring instrumentation was available to support the shutdown strategy.

Enhancements - The Appendix R Analysis was revised to include narrow range SG level indication and AFW flow indication. In addition, plant procedures were revised to provide the operators with additional guidance.

60. AFW pump local operation

Item - The 1984 Appendix R analysis identified the need to locally operate an AFW pump due to potential control circuit failures for a fire in the AFW pump room. As a result, a modification was implemented to permit local operation of the main breaker at the associated Switchgear.

Enhancements - Safe shutdown procedures were changed to provide guidance to the operators to operate the motor driven AFW pumps locally and additional lights were added at the switchgear.