

Mr. Thomas F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

May 5, 1999

SUBJECT: ISSUANCE OF A REVISED EXEMPTION AND ITS SUPPORTING SAFETY
EVALUATION FOR FIRE BARRIERS IN THE TURBINE BUILDING - TURKEY
POINT PLANT, UNITS 3 AND 4 (TAC NOS. MA4953 AND MA4954)

Dear Mr. Plunkett:

By letter dated December 22, 1998, the U. S. Nuclear Regulatory Commission (NRC) issued an exemption from certain requirements of 10 CFR Part 50, Appendix R, Section III.G.2.a, and a supporting safety evaluation (SE), for certain fire zones in the turbine building at Turkey Point Plant, Units 3 and 4. By letter dated March 8, 1999, Florida Power and Light Company (FPL) provided the NRC staff with its review comments of the issued exemption and its SE.

FPL's review comments, identified in its March 8, 1999, submittal, consisted primarily of clarifications, editorial corrections, and minor inconsistencies between FPL's submittals and the issued exemption and SE. Based on its review, the NRC staff has determined that these comments which do not cause the conclusions made previously in the exemption and SE that were issued on December 22, 1998, to be altered, should be incorporated appropriately. Therefore, the staff is issuing a revised exemption and SE to reflect FPL's comments. The revised exemption and the SE supersede those issued on December 22, 1998.

A copy of the corrected Exemption is being forwarded to the Office of the Federal Register for publication. If you have any questions concerning this matter, please contact me at (301) 415-1496.

Sincerely,

Original signed by:

Kahtan N. Jabbour, Senior Project Manager, Section 2
Project Directorate II
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosures: 1. Revised Exemption
2. Revised SE

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 5, 1999

Mr. Thomas F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ISSUANCE OF A REVISED EXEMPTION AND ITS SUPPORTING SAFETY
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A copy of the revised exemption is being forwarded to the Office of the Federal Register for publication. If you have any questions concerning this matter, please contact me at (301) 415-1496.

Sincerely,

A handwritten signature in cursive script, reading "Kahtan N. Jabbour", is positioned above the typed name.

Kahtan N. Jabbour, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure: 1. Revised Exemption
2. Revised SE

cc w/encl: See next page
Mr. Thomas F. Plunkett

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
FLORIDA POWER AND LIGHT COMPANY)	Docket Nos. 50-250 and 50-251
)	
(Turkey Point Units 3 and 4))	
)	

REVISED EXEMPTION

I.

Florida Power and Light Company (the licensee or FPL) is the holder of Facility Operating Licenses Nos. DPR-31 and DPR-41, which authorize operation of Turkey Point Units 3 and 4 (the facility), respectively, at a steady-state reactor power level not in excess of 2300 megawatts thermal. The facility is a pressurized-water reactor located at the licensee's site in Dade County, Florida. The licenses require among other things that the facility comply with all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (the Commission or NRC) now or hereafter in effect.

II.

By letter dated December 22, 1998, the NRC issued an exemption from certain requirements of 10 CFR Part 50, Appendix R, Section III.G.2.a, and a supporting safety evaluation (SE), for certain fire zones in the turbine building at Turkey Point Plant, Units 3 and 4. By letter dated March 8, 1999, FPL provided the NRC staff with its review comments regarding the issued exemption and SE.

The licensee's comments consisted primarily of clarifications, editorial corrections, and minor inconsistencies between FPL's submittals and the issued exemption and SE. Based on its review, the NRC staff has determined that these comments, which do not cause the conclusions made previously in the exemption and SE that were issued on December 22, 1998, to be altered, should be incorporated appropriately. Therefore, the staff is issuing this revised exemption and a revised SE to reflect FPL's comments. This revised exemption and the revised SE supersede those issued on December 22, 1998.

In exemptions dated March 27, 1984, and August 12, 1987, concerning the requirements of Section III.G, Appendix R to 10 CFR Part 50, the NRC staff approved the use of 1-hour-rated fire barriers in lieu of 3-hour-rated fire barriers in certain outdoor areas at Turkey Point Units 3 and 4. In addition, the staff found that, for certain outdoor areas not protected by automatic fire detection and suppression systems, separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of 20 feet free of intervening combustibles provided an acceptable level of fire safety.

On the basis of the results of the industry's Thermo-Lag fire endurance testing program, the licensee concluded that the outdoor Thermo-Lag fire barrier designs cannot achieve a 1-hour fire-resistive rating but can achieve a 30-minute fire-resistive rating when exposed to a test fire that follows the American Society for Testing and Materials Standard E-119 time-temperature curve. Because of these test results, the licensee in a letter dated June 15, 1994, requested an exemption to use 30-minute fire barriers for outdoor applications in lieu of the 1-hour-rated fire barriers previously approved; however, the licensee withdrew the exemption request by letter dated June 28, 1996.

In a letter dated July 31, 1997, as supplemented on July 2, October 27, and December 9, 1998, the licensee requested an exemption from the requirements pertaining to the 3-hour-rated fire barriers required by Section III.G.2.a, Appendix R to 10 CFR Part 50, for

fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 89 (partial), 91, 92, 105, and 117 in the turbine building. The licensee requested that the NRC approve the following fire protection schemes as alternatives to the protection required by Section III.G.2 of Appendix R to 10 CFR Part 50: (1) separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 91, 92, and 105 between column lines A and E-1¹ by a fire barrier having a minimum 1-hour fire resistive rating; (2) separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial) between column lines E-1 and Jc by a fire barrier having a minimum 25-minute fire resistive rating; and (3) separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building above the turbine operating deck, fire zone 117, by a fire barrier having a minimum 25-minute fire resistive rating. This request is based on the following: (1) for the turbine building between column lines A and E-1, automatic fixed water suppression systems would be provided for the major fire hazards (combustible sources) and the turbine lube oil equipment, and automatic wet pipe sprinkler protection would be provided for area coverage, including the turbine lube oil distribution piping locations as described in the

¹ What is referred to as column line E-1 is actually a boundary plane formed by walls below grade. This boundary plane is defined by FPL's submittal dated July 2, 1998, Figures 4 and 5, and discussed on pages 3 and 4 of the attachment to the July 2, 1998, transmittal letter. In the submittal, column line E-1 is defined by those post-fire safe shutdown circuits located above the condensate pump pit, up to the underside of the 42' elevation operating deck. This protection results in 1-hour rated fire barriers until a distance of over 20' is obtained from the postulated pool fire at the 18' elevation and a distance of approximately 9'-6" from the edge of the checker plate flooring above the condensate pump pit. For those areas where the condensate pump pit extends to the east, the 1-hour fire barriers will follow the outline of the pit, augmenting the distance referenced above. The remainder of the post-fire shutdown circuits between column lines E and J will be protected by 25-minute rated fire barriers.

enclosed safety evaluation; and (2) for the turbine building between column lines E-1 and J, an automatic wet pipe sprinkler protection would be provided.

III.

The underlying purpose of Section III.G.2.a, Appendix R to 10 CFR Part 50, is to provide reasonable assurance that one safe-shutdown train and associated circuits used to achieve and maintain safe shutdown are free of fire damage.

On the basis of the staff's supporting safety evaluation of the licensee's submittals, the staff concludes that the exemption from the requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50, for fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 89 (partial), 91, 92, 105, and 117 as requested by the licensee, provides an adequate level of fire safety and presents no undue risk to public health and safety. In addition, the staff concludes that the underlying purpose of the rule is achieved.

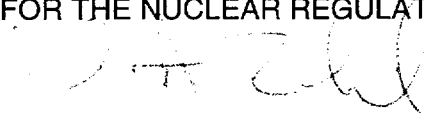
IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security. In addition, the Commission has determined that special circumstances are present in that application of the regulation is not necessary to achieve the underlying purpose of the rule. Therefore, the Commission hereby grants Florida Power and Light Company an exemption from the requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50, as requested in its previously-referenced submittals, for fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 89 (partial), 91, 92, 105, and 117.

Pursuant to 10 CFR 51.32, the Commission has determined that granting this exemption for fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 89 (partial), 91, 92, 105, and 117, will not have a significant effect on the quality of the human environment (63 FR 65619).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John A. Zwolinski, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 5th day of **May** 1999



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

REVISED SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

EXEMPTION RELATED TO 10 CFR PART 50, APPENDIX R, SECTION III.G.2.a

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNITS 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 BACKGROUND

Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to Title 10 of the Code of Federal Regulations (10 CFR) Part 50, establishes fire protection features required to satisfy General Design Criterion 3, "Fire protection," of Appendix A to 10 CFR Part 50 with respect to certain generic issues for nuclear power plants licensed to operate prior to January 1, 1979.

By letter dated December 22, 1998, the U. S. Nuclear Regulatory Commission (NRC) issued an exemption from certain requirements of 10 CFR Part 50, Appendix R, Section III.G.2.a, and a supporting safety evaluation (SE), for certain fire zones in the turbine building at Turkey Point Plant, Units 3 and 4. By letter dated March 8, 1999, Florida Power and Light Company (the licensee or FPL) provided the NRC staff with its review comments of the issued exemption and SE.

The licensee's comments consisted primarily of clarifications, editorial corrections, and minor inconsistencies between FPL's submittals and the issued exemption and SE. Based on its review, the NRC staff has determined that these comments are appropriate, and they do not alter the conclusions made previously in the exemption and SE issued on December 22, 1998. Therefore, the staff is issuing a revised exemption and SE to reflect the licensee's comments. The revised exemption and this SE supersede those issued on December 22, 1998.

In exemptions from certain technical requirements of Appendix R dated March 27, 1984, and August 12, 1987, the U.S. Nuclear Regulatory Commission (NRC) staff approved the use of 1-hour-rated fire barriers in lieu of 3-hour-rated fire barriers in certain outdoor areas, including certain areas inside the turbine building at Turkey Point Nuclear Plant, Units 3 and 4 (Turkey Point). In addition, the staff found, for certain outdoor areas not protected by automatic fire detection and suppression systems, that separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of 20 feet free of intervening combustibles provided an acceptable level of fire safety. In a letter dated June 15, 1994, Florida Power and Light Company (FPL or the licensee) requested exemptions from the technical requirements of Sections III.G.2.a and c of Appendix R to 10 CFR Part 50. Section III.G.2.a requires that cables, equipment, and associated nonsafety-related circuits of redundant safe-shutdown trains be separated by fire barriers having a 3-hour fire rating. Where separation by 3-hour-rated fire barriers cannot be achieved, Section III.G.2.c allows cables, equipment, and nonsafety-related

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circuits of redundant trains to be separated by 1-hour-rated fire barriers provided that the area of concern is protected by fire detection and automatic suppression systems.

In a letter dated October 12, 1994, the staff issued a request for additional information (RAI) pertaining to the licensee's exemption request and the actual fire ratings of the existing Thermo-Lag electrical raceway fire barriers installed in outdoor areas. On August 29, 1995, the licensee responded to the RAI.

From April 29 through May 2, 1996, the staff visited Turkey Point to independently review the licensee's exemption request. The primary focus was on the in situ and transient fire hazards in the fire areas and zones of concern, on the potential risks they present to plant safety, and on options available to mitigate the consequence of a fire and provide reasonable assurance of post-fire safe-shutdown capability. During the site visit, the licensee informed the staff that it planned to revise its exemption request of June 15, 1994. The staff requested that the revised exemption request demonstrate that the fire-resistive capabilities of the site-specific outdoor electrical raceway fire barrier systems and the applicable fire barrier system upgrades be supported by representative fire tests. The staff also requested that the revised exemption request stand alone, be technically sound (its technical basis should not rely on previous submittals), and supersede any previous exemptions granted for these areas. The staff documented its site visit in a memorandum of July 26, 1996, from P. Madden to S. West. In a letter dated June 28, 1996, the licensee withdrew its exemption request dated June 15, 1994, and confirmed that it would submit a revised exemption request.

In a letter dated December 12, 1996, the licensee submitted a revised exemption request for the outdoor area. In this letter, the licensee excluded the turbine building areas from the north-south column lines 22 to 36 and from the east-west column lines A to Jc. By letter dated July 31, 1997 (FPL letter L-97-181), the licensee requested exemptions from the technical requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50 for certain turbine building fire zones to the extent that it had not protected one train of systems necessary to achieve and maintain hot shutdown with the level of fire protection required. Based on its review of this request, the NRC, by letter dated March 23, 1998, requested additional information. In addition, the NRC, in a public meeting, met with the licensee on May 26, 1998, to further discuss the information it needed to complete the review of the Appendix R exemption requests for the outdoor and turbine building plant areas. The licensee provided this information in its letter dated July 2, 1998 (FPL letter L-98-153).

On September 14, 1998, a public meeting between the NRC and FPL was held at Turkey Point facility. The NRC staff met with the licensee to obtain an understanding of the licensee's response to the RAI and the proposed fire protection for the safe-shutdown trains located in the turbine building and performed a walkdown of the turbine building areas that could be directly affected by turbine lube oil fire.

During this meeting, the licensee agreed that it needed to submit additional information to clarify its response to the NRC RAI dated March 23, 1998, and support the staff's completion of its review. The staff documented the meeting in a summary dated September 30, 1998. By letter dated October 27, 1998 (FPL letter L-98-255), the licensee clarified its RAI responses and the additional information needed by the staff to support its review of the turbine building exemption request.

The licensee, in its letters dated July 2, and December 9, 1998, stated that it will not take credit for spatial separation (20 feet with no significant intervening combustibles) within column lines A to E. The licensee also stated that its evaluation for those areas east of column line E was not complete. In addition, the licensee indicated that if the results of this evaluation determined that spatial separation of post-fire safe-shutdown circuits between column line E and Jc is a viable alternative to a fire barrier, it would request an exemption and provide the details of its evaluation in a subsequent submittal.

2.0 EXEMPTION REQUESTED

The licensee requested an exemption from the technical requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50 for the following fire zones in the turbine building: 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 89 (partial), 91, 92, 105, and 117 to the extent that it requires the separation of cables and equipment and associated nonsafety-related circuits of redundant trains by a fire barrier having a 3-hour fire rating.

Specifically, the licensee requested staff approval of the following fire protection schemes for the protection of safe-shutdown capability in the turbine building as alternatives to the protection required by Section III.G.2.a of Appendix R to 10 CFR Part 50:

- a. Separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within turbine building fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 91, 92, and 105 between column lines A and E-1 by a fire barrier having a minimum 1-hour fire resistive rating. Automatic fixed water suppression systems would be provided for the major fire hazards (combustible sources) and the turbine lube oil equipment, and automatic wet pipe sprinkler protection would be provided for area coverage including the turbine lube oil distribution piping locations as described in Section 3.0, below.
- b. Separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within turbine building fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial) between column lines E and Jc by a fire barrier having a minimum 25-minute fire resistive rating. Automatic wet pipe sprinkler protection would be provided between column lines E-1 and J as described in Section 3.0, below.
- c. Separation of cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building above the turbine operating deck, fire zone 117, by a fire barrier having a minimum 25-minute fire resistive rating.

The underlying purpose of Section III.G.2.a of Appendix R to 10 CFR Part 50 is to provide reasonable assurance that one safe-shutdown train and associated circuits used to achieve and maintain safe-shutdown are free of fire damage.

3.0 EVALUATION OF EXEMPTION REQUEST FOR TURBINE BUILDING FIRE ZONES

3.1 General

The staff, during its site visits on April 29, 1996, May 6, 1997, and September 14, 1998, used the following general criteria for its walkdowns of the turbine building fire zones:

- Review the general area and assess fire protection features (manual and automatic)
- Review the location of the fire brigade equipment
- Review fire brigade accessibility to the area
- Observe fire hazards and fire loadings associated with the area
- Observe the material conditions of the plant and fire protection equipment
- Observe the adequacy of administrative controls (note any transient combustibles)
- Review the adequacy of the fire rating of the raceway fire barriers in the area

Based on the configuration of the turbine building fire zones noted below, the impact a fire may have on the plant and its ability to achieve and maintain safe-shutdown tends to be related to those fire zones that can be affected by a failure of one of the station transformers (e.g., main and auxiliary) or the turbine lube oil system and a fire that involves the oil that can be released from a transformer or the turbine lube oil system. During its plant site evaluation the staff observed that in the event of a fire, the open sides of the turbine building would facilitate the venting of hot fire gases and smoke from the turbine building. This configuration would also allow unrestricted entrainment of air for growth and propagation. Due to the mezzanine floor and concrete turbine deck, fires in the turbine building are capable of developing a ceiling jet and a ceiling upper level hot gas layer.

In its submittal dated July 31, 1997, the licensee committed to establish the fire resistive rating of 25-minute and 1-hour for the electrical raceway fire system applications (e.g., for various conduit diameters, lateral bends, radial bends, junction boxes, and conduit bank enclosures) by tests that are representative of the installed configurations. The licensee committed to conduct the fire endurance and hose stream testing in accordance with Generic Letter (GL) 86-10, Supplement 1, "Fire Endurance Test Acceptance Criteria For Fire Barrier Systems Used to Separate Redundant Safe-Shutdown Trains Within The Same Fire Area." The staff did not review the licensee's analyses for concluding that the Thermo-Lag fire barriers could achieve a 25-minute or a 1-hour fire resistance rating as part of this safety evaluation.

3.2 Fire Hazards in the Turbine Building

The in situ combustible materials located in the turbine building fire zones consist of transformer oil, turbine lube oil, generator hydrogen and seal oil, condensate and feed pump lube oil and grease, and cable insulation. The combined oil capacity of the hydrogen seal oil unit and auxiliary transformer is 5,842 gallons. For each turbine, the lube oil system contains approximately 14,000 gallons. There are approximately 20 gallons of lube oil in each condensate pump (three pumps per unit) and 100 gallons of lube oil in each steam generator feed pump (two pumps per unit). In addition, there are approximately 1000 gallons of turbine lube oil in each lube oil conditioner. In each generator a 6,400 cubic foot hydrogen gas blanket is maintained.

A significant fire involving the equipment listed in Section 3.4, with the exception of the turbine lube oil transfer skid, would operationally result in a turbine trip/reactor trip. The auxiliary transformers, hydrogen seal oil units, and turbine lube oil transfer skids are protected by

automatic fixed water spray systems designed to meet National Fire Protection Association (NFPA) Standard 15, "Water Spray Systems," with system actuations alarmed and annunciated inside the main control room. In addition, there is some form of curbing or diking around these major fire hazards/sources of combustibles to contain the oil and control its spread. One train of the post-fire safe-shutdown circuits routed within 50 feet of these major in situ combustibles will be protected with fire barriers having a minimum fire resistive rating of 1-hour. The adequacy of the fire protection provided for the protection of post-fire safe-shutdown capability located in outdoor fire zones (i.e., within 50 feet of the outdoor fire zones associated with the Units 3 and 4 main and startup transformers and the Units 3 and 4 turbine lube oil reservoirs) has been previously evaluated by the NRC and addressed in a separate exemption dated October 8, 1998. The Units 3 and 4 auxiliary transformers and the hydrogen seal oil units are located in their respective turbine buildings, and additional fire protection features have been provided for one train of the required post-fire safe-shutdown trains located in these affected fire zones. The ability of these fire protection features provided to protect post-fire safe-shutdown functions within the turbine building fire zones is addressed below.

3.3 Description of Turbine Building Fire Zones

The open turbine building at Turkey Point Units 3 and 4 is unique in that the turbine deck is open to the environment and the intermediate (mezzanine) and grade levels have some open sides. As such, the turbine deck area is open to weather and prevailing winds. The turbine building layout consists of three levels. The grade level is a reinforced concrete slab at plant elevation 18'-0". The steam generator feed pumps (fire zones 66 and 69, Units 4 and 3, respectively) and heater drain pumps and lube oil conditioners (fire zones 78 and 83, Units 4 and 3, respectively) are located at grade. The condensate pumps are located near the condenser in a pit (fire zones 91 and 92, Units 4 and 3, respectively) below grade and the Units 3 and 4 auxiliary feedwater pumps (fire zone 84) are located just east of the turbine building boundary (column line Jc). The auxiliary transformers and the hydrogen seal oil units are located in the turbine building (fire zones 82 and 87, Units 4 and 3, respectively) west of column line A. The main and startup transformers are located just west of the structure. The safety-related electrical load centers and switchgear rooms are enclosed by 3-hour fire barriers and are located within the turbine building.

The mezzanine level (plant elevation 30'-0") consists of a series of access platforms and walkways. The mezzanine platforms are a combination of reinforced concrete and checker plate construction supported by structural steel. These platforms do not extend over the areas where the condensate pumps, hydrogen seal oil units, and auxiliary transformers are located. Much of the area beneath the Units 3 and 4 high- and low-pressure turbines and their respective generator, and the turbine deck is open to plant elevation 18'-0" below.

The turbine deck (plant elevation 42'-0") is a reinforced concrete platform and is supported by the building structural steel members. The turbine deck supports the turbine building crane and provides maintenance access to the turbines and generators.

The fire zones affected by this exemption request are listed below:

<i>FIRE ZONE</i>	<i>DESCRIPTION</i>
79 (partial)	Area West of Unit 4 Containment
80 (partial)	Unit 4 Main Condenser Area
82	Unit 4 Auxiliary Transformer Area
84 (partial)	Units 3 and 4 Auxiliary Feedwater Pump Area
85 (partial)	Unit 3 Main Condenser Area
88 (partial)	Unit 3 Switchgear/Emergency Diesel Generator Vestibule
89 (partial)	Unit 3 Condensate Storage Tank Area
91	Unit 4 Condensate Pump Area
92	Unit 3 Condensate Pump Area
105	Units 3 and 4 Turbine Building Mezzanine Deck
117	Units 3 and 4 Turbine Deck

3.4 Fire Protection for Major Fire Hazards and In situ Combustibles

The major fire hazards and in situ combustibles located inside or in close proximity to the Units 3 and 4 turbine buildings are oil in the following equipment:

- Unit 3 Main Transformer (Fire Zone 86)
- Unit 3 Startup Transformer (Fire Zone 86)
- Unit 3 Auxiliary Transformer (Fire Zone 87 - Inside Turbine Building)
- Unit 3 Turbine Lube Oil Reservoir (Fire Zone 81)
- Unit 3 Turbine Lube Oil Transfer Skid (Fire Zone 83 - Inside Turbine Building)
- Unit 3 Hydrogen Seal Oil Skid (Fire Zone 87 - Inside Turbine Building)
- Unit 4 Main Transformer (Fire Zone 81)
- Unit 4 Startup Transformer (Fire Zone 81)
- Unit 4 Auxiliary Transformer (Fire Zone 82 - Inside Turbine Building)
- Unit 4 Turbine Lube Oil Reservoir (Fire Zone 76)
- Unit 4 Turbine Lube Oil Transfer Skid (Fire Zone 78 - Inside Turbine Building)
- Unit 4 Hydrogen Seal Oil Skid (Fire Zone 82 - Inside Turbine Building)

3.5 Fire protection features provided for post-fire safe-shutdown capability

In the event of a postulated fire involving the turbine lube oil system, fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 91, 92, and 105 could be directly affected by the fire. Electrical raceways with circuits that are essential to post-fire safe-shutdown are routed through these fire zones. One train of these post-fire safe-shutdown functions (identified in Appendix 1) will be protected by a fire barrier system that has a minimum fire resistive rating of 1-hour. The use of 1-hour fire barrier protection for one train of post-fire

safe-shutdown functions is bounded by turbine building column lines A to E and 22 to 36. In addition, 1-hour fire barrier protection will be provided for one train of post-fire safe-shutdown functions located in and over the condensate pump/condenser pits. For those protected post-fire safe-shutdown functions located over and in close proximity to the condensate pump/condenser pit, 1-hour fire barrier protection will be extended to column line E-1¹ which is 9'-6" east of column line E (raceways protected by 1-hour fire barriers in and around the condensate pump/condenser pit are described in Appendix 2). For a Thermo-Lag raceway fire barrier system that may be in the path of leaking lube oil from the turbine/generator bearings, the licensee will install sheet metal drip shields over the raceway fire barrier system to prevent oil from impinging on the protected circuits.

In fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial) between column lines E and Jc and column lines 22 and 36 (except for the condenser pit area as noted above), the licensee will protect one train of post-fire safe-shutdown functions with a fire resistive barrier having a minimum fire rating of 25-minutes. The post-fire safe-shutdown functions protected by fire barriers having a 25-minute fire resistive rating are identified in Appendix 3.

Within the turbine building above the turbine operating deck, fire zone 117, the licensee will protect one train of post-fire safe-shutdown functions with a fire resistive barrier having a minimum fire rating of 25-minutes. The post-fire safe-shutdown functions protected above the turbine operating deck by fire barriers having a 25-minute fire resistive rating are identified in Appendix 3.

The licensee will also upgrade the existing automatic wet pipe sprinkler system and extend its coverage such that all affected fire zones containing equipment, components and cables required for post-fire safe-shutdown are adequately protected against the effects of a turbine lube oil fire. The design of the sprinkler system upgrades and the system modifications to extend the sprinkler coverage will conform to the current version of NFPA 13, "Standard for the Installation of Sprinkler Systems," extra hazard group 1 criteria. The additional sprinkler protection will provide complete coverage in the turbine building areas where pooling of lube oil could occur and in the areas, between turbine building column lines D and J, where raceway fire barriers (used to protect post-fire safe-shutdown functions) are located. The original water application design density of the existing turbine building sprinkler system was to provide 0.3 gallon per minute (gpm) per 3,000 square feet (ft²) of floor area. Due to the sprinkler

¹ What is referred to as column line E-1 is actually a boundary plane formed by walls below grade. This boundary plane is defined by FPL's submittal dated July 2, 1998, Figures 4 and 5, and discussed on pages 3 and 4 of the attachment to the July 2, 1998, transmittal letter. In the submittal, column line E-1 is defined by those post-fire safe shutdown circuits located above the condensate pump pit, up to the underside of the 42' elevation operating deck. This protection results in 1-hour rated fire barriers until a distance of over 20' is obtained from the postulated pool fire at the 18' elevation and a distance of approximately 9'-6" from the edge of the checker plate flooring above the condensate pump pit. For those areas where the condensate pump pit extends to the east, the 1-hour fire barriers will follow the outline of the pit, augmenting the distance referenced above. The remainder of the post-fire shutdown circuits between column lines E and J will be protected by 25-minute rated fire barriers.

system coverage enhancements the area of coverage will be increased to 5,000 ft². This increased design area is sufficient to provide coverage to essentially the entire area underneath the generator, which is open from the ground floor elevation to the underside of the turbine operating floor, and the condenser/condensate pump pit. The water density for this new coverage area will be 0.25 gpm per ft² of floor area. The enhanced sprinkler system will have a water flow demand of 1,250 gpm. In addition, a fire in the turbine building could actuate the fixed water spray systems protecting the auxiliary transformer and the hydrogen seal oil unit. This actuation would require an additional 489 gpm demand. Combining the sprinkler and water spray system flows with an additional 500 gpm demand for hose streams, would require a total water flow demand of 2,239 gpm. The output of the smaller of the two plant fire pumps is 2,390 gpm. Therefore, the existing fire pumps should have sufficient capability to supply the required fire flow. The water supply system should be capable of supplying this demand for 2 hours. Therefore, at 2,239 gpm for 2 hours a total of 268,680² gallons of water is required. The onsite water supply dedicated for fire fighting purpose is 300,000 gallons.

In addition to the turbine building sprinkler system enhancements, the licensee will incorporate passive fire protection features into the design, such as curbs and ramps. These impoundment features will be installed north-south at grade elevation (18'-0") between column lines B and D (under the generator end) to limit turbine lube oil flow westward and divert its flow towards the condensate pump/condenser pit. The licensee will modify the checker-plate walkways at column line D, near the condensate pumps, to include an open section of grating. These open grating sections should aid in directing the oil into the condensate pump/condenser pit. The licensee, as part of its sprinkler system enhancements, will modify the sprinkler system in the condenser pit such that it also conforms to the current version of NFPA 13. This will require system modifications to eliminate the use of sidewall sprinklers and additional sprinklers located under the various checker plate floors and catwalks. In addition, the licensee will provide sprinkler coverage in and above the circulation water piping expansion joints. The checker plate decking installed partially over the condensate pump/condenser pits is being considered by the licensee as a non-fire rated fire barrier in the licensee's analysis. These barriers would help confine the flame height of a turbine lube oil fire in the pit and would improve the performance (actuation and fire control) of the sprinklers located within the pit.

The unit specific auxiliary transformer and hydrogen seal oil unit are protected by fixed water spray systems, installed in accordance with NFPA 15, which are actuated by thermal fire detectors installed in the area of these potential fire hazards.

3.6 Assessment of Postulated Turbine Failure Fire Event

As stated in Section 3.5 above, FPL will provide raceway fire barriers having a minimum fire resistive rating of 1-hour for one train of required post-fire safe-shutdown circuits in those fire zones below the turbine operating deck (fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 91, 92, and 105). In addition, FPL will enhance the automatic sprinkler protection under the turbine operating deck by improving the sprinkler coverage in the

² The values provided in the July 2, 1998, submittal were preliminary. Final design values are slightly higher while satisfying the basis of 2-hour reserve at the highest expected demand.

condensate pump/condenser pits and extending the sprinkler coverage under the turbine operating floor, mezzanine level, and under the generator.

Automatic fire detection is not provided under the turbine operating floor, under the generators or in the condensate/condenser pits. The addition of fire detection in the areas below the turbine operating deck would not significantly enhance the level of fire protection from that already proposed by the licensee. With the turbine building being an open structure, the addition of smoke detection would not be a reliable means of early warning detection. The addition of thermal detection would provide a minimal advanced warning to that of initiating sprinklers. Activation of the automatic sprinklers would be evident via the local alarms or the fire pump start, which is annunciated in the main control room. In addition, the hydrogen seal oil skid and the auxiliary transformers are protected by automatic water spray systems which upon activation alarm and annunciate in the main control room.

Based on industry events, the potential exists for ignited turbine lube oil to reach areas below the turbine operating floor. Although preventative measures are taken by the licensee and programs are in place at Turkey Point to reduce the likelihood of turbine blade failure, it is possible that a rotating turbine-generator may become unbalanced (e.g., overspeed, high vibration, eccentricity) and result in a loss of turbine and generator bearing and seal integrity. The resulting turbine trip would result in a reactor trip. It is credible to assume that the failure of the generator and its seals would result in a release of hydrogen and would most likely result in a hydrogen fire which would ignite leaking turbine lube oil. A lube oil pool fire, being supplied by the failed bearings at a rate of 450 gpm, would involve the area beneath the generator and in the condensate pump/condenser pit. From an operational perspective it can be expected that alarms associated with the turbine (e.g., vibration, overspeed, loss of lube oil) would also be occurring in the main control room and that the control room would send operators to check the condition of the turbine, provide an immediate assessment of the conditions within the turbine building, and assist in the deployment of the plant fire brigade if needed.

Under the postulated conditions (turbine failure resulting in a significant turbine lube oil pool fire) it is expected that the 1-hour raceway fire barriers directly affected by the oil fire will adequately protect the one train of post-fire safe-shutdown functions until sufficient energy is developed by the fire to activate those sprinklers that are within the immediate area of the fire. The water spray density being discharged from the operating sprinklers is sufficient to cool the fire environment and control the fire such that it will not thermally degrade the integrity of the raceway fire barrier systems protecting post-fire safe-shutdown functions. In addition, it is expected that the operating sprinklers will reduce the intensity of the fire and minimize its environmental affects. This will allow the fire brigade to gain access into the fire-affected turbine building areas and take the appropriate actions to manually suppress the fire. Therefore, there is reasonable assurance that the post-fire safe-shutdown functions protected by 1-hour fire barriers will remain free of fire damage until the fire is controlled by the automatic sprinkler system and fully extinguished by the plant fire brigade.

In addition, the indirect fire environment (hot gases in the ceiling jet) can thermally expose the required post fire safe-shutdown functions located between column lines E-1 and Jc. Within this area (fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial), automatic sprinkler protection will be provided out to column line J and one train of post-fire safe-shutdown functions will be protected by a fire barrier with a minimum fire resistive rating of 25-minutes

out to column line Jc. Under the fire environmental conditions anticipated from a lube oil pool fire in and around the low pressure turbines and the generator, it can be reasonably expected that the post-fire safe-shutdown functions protected by the 25-minute raceway fire barriers will remain free of fire damage until the sprinklers affected by the energy from the fire will activate and cool the fire environment. Therefore, there is reasonable assurance that the post-fire safe-shutdown functions protected by 25-minute raceway fire barriers will remain free of fire damage and that the fire environment will be cooled by the operating sprinklers in the fire affected area until the fire is controlled and fully extinguished by the plant fire brigade.

Based on the outdoor configuration of turbine deck, fire zone 117, the impact a fire may have on the plant and its ability to achieve and maintain safe-shutdown in the event of a fire tends to be localized to the fire zone of concern. During its site visit, the staff observed the conditions affecting fire growth on the turbine deck and in the event of a fire, the hot fire gasses and smoke would vent directly to the atmosphere. Therefore, components within fire zone 117 required to achieve and maintain safe-shutdown would not be affected by convective heat transfer. For example a fire in this area of the plant (outdoor area) would not develop a hot gas layer as it would in an enclosed compartment.

Fire mitigation features that are accessible to fire zone 117 consists of fire extinguishers and standpipe hose stations. Since the fire zone is an open outdoor area and the in situ fire load is minimal, it can be reasonably expected that the post-fire safe-shutdown functions protected by the 25-minute raceway fire barriers will remain free of fire damage until either the fire burns itself out or it is detected by plant personnel and extinguished by the plant fire brigade.

4.0 CONCLUSIONS

On the basis of its evaluation and review, which included a site walkdown of the fire zones, the staff concluded the following;

- a. For turbine building fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 88 (partial), 91, 92, and 105, 3-hour fire-rated barriers are not needed to satisfy the underlying purpose of Section III.G.2.a of Appendix R to 10 CFR Part 50 for the post-fire safe-shutdown functions identified in Appendices 1 and 2 to this safety evaluation. The licensee's request to separate cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building between column lines A and E-1 by using fire barriers having a minimum 1-hour fire resistive rating in conjunction with automatic fixed water suppression systems for the major fire hazards (combustible sources) and the turbine lube oil equipment, and by providing automatic wet pipe sprinkler protection for area coverage within the subject fire zones and the turbine lube oil distribution piping locations in lieu of 3-hour fire rated barriers for these functions presents no undue risk to the public health and safety and presents no undue risk to the public health and safety and is acceptable. Therefore, the licensee's request for exemption from the technical requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50 for fire zones 79 (partial), 80 (partial), 82, 84 (partial), 85 (partial), 89 (partial), 91, 92, and 105 should be granted.
- b. For fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial) 3-hour fire-rated barriers are not needed to satisfy the underlying purpose of Section III.G.2.a of

Appendix R to 10 CFR Part 50 for the post-fire safe-shutdown functions identified in Appendix 3 to this safety evaluation. The licensee's request to separate cables and equipment and associated circuits of redundant post-fire safe-shutdown trains within the turbine building between column lines E-1 and Jc by a fire barrier having a minimum 25-minute fire resistive rating and provide automatic wet pipe sprinkler protection between turbine building column lines E and J in lieu of 3-hour fire rated barriers for these functions presents no undue risk to the public health and safety and is acceptable. Therefore, the licensee's request for exemption from the technical requirements of Section III.G.2.a. of Appendix R to 10 CFR Part 50 for fire zones 79 (partial), 84 (partial), 88 (partial), and 89 (partial) should be granted.

- c. For fire zone 117, 3-hour fire-rated barriers are not needed to satisfy the underlying purpose of Section III.G.2.a of Appendix R to 10 CFR Part 50 for the post-fire safe-shutdown functions identified in Appendix 4 to this safety evaluation. The licensee's rated barrier for these functions presents no undue risk to public health and safety and is acceptable. Therefore, the licensee's request for exemption from the technical requirements of Section III.G.2.a of Appendix R to 10 CFR Part 50 for fire zone 117 should be granted.

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Date: May 5, 1999

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE-RESISTIVE RATING
COLUMN LINES A TO E**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
80	Unit 4 AFW Flow Control Valves
	Unit 4 SG Level Instrumentation (Wide Range)
	Unit 4 Train B Cold Leg Temperature Instrumentation
	Unit 4 Train B Hot Leg Temperature Instrumentation
	Unit 4 RCS Pressure Instrumentation
	Unit 4 SG Blowdown Flow Control Valve
	Unit 4 Instrument Air Containment Isolation Valve
	Unit 4 AFW Turbine Steam Valve - Control
	Unit 4 AFW to SG Control Valve - Power
	Unit 4 Main Steam Isolation Valve - Control
	Normal Containment Cooling Fan 4D Ammeter
	Normal Containment Cooling Fan 4D - Control
	Normal Containment Cooling 4D Fan - Power
	Normal Containment Cooling Fan 4D, 4B Damper - Control
	Auxiliary Transformer Breaker Control - 4Kv Bus 4B
	Start-up Transformer Breaker Control - 4Kv Bus 4B
	Heater Drain Pump 4B
	Unit 4 125Vdc for Feedwater Bypass Valve
	4160V Bus 4B Lockout
82	Normal Containment Cooling Fan 4D Ammeter
	Normal Containment Cooling Fan 4D, 4B Control (Note 1)
	Normal Containment Cooling Fan 4D - Power
	Normal Containment Cooling Fan 4D, 4B Damper Control
	Auxiliary Transformer Breaker Control - 4Kv Bus 4B

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
COLUMN LINES A TO E**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
85	MCC 3K Power Feeder
91	Unit 4 AFW Flow Control Valves
	Unit 4 SG Level Instrumentation (Wide Range) (Note 2)
	Unit 4 Train B Cold Leg Temperature Instrumentation
	Unit 4 Train B Hot Leg Temperature Instrumentation
	Unit 4 RCS Pressure Instrumentation
	Unit 4 SG Blowdown Flow Control Valve
	Unit 4 Instrument Air Containment Isolation Valve
	Unit 4 AFW Turbine Steam Valve - Control
	Unit 4 AFW to SG Control Valve Power
	Unit 4 Main Steam Isolation Valves Control
	Normal Containment Cooling Fan 4D Ammeter
	Normal Containment Cooling Fan 4D Control
	Normal Containment Cooling 4D Fan Power
	Normal Containment Cooling Fan 4D, 4B Damper Control
	Auxiliary Transformer Breaker Control - 4Kv Bus 4B
	Start-up Transformer Breaker Control - 4Kv Bus 4B
	Heater Drain Pump 4B
	Unit 4 125Vdc for Feedwater Bypass Valve
	4160V Bus 4B Lockout
92	120Vac to 3B Load Sequencer
	MCC 3K Power Feeder
105	Normal Containment Cooling Fan 3B Power
	Normal Containment Cooling Fan 3B Control
	Normal Containment Cooling Fan 3B Ammeter

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
COLUMN LINES A TO E**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
105	120Vac to 3B Load Sequencer
	125Vdc to 4160V Bus 3D
	EDG 4B Breaker Control
	Auxiliary Transformer Breaker Control - 4Kv Bus 4B
	Start-up Transformer Breaker Control - 4Kv Bus 4B
	Heater Drain Pump 4B Control
	Unit 4 125Vdc for Feedwater Bypass Valve
	4160V Bus 4B Lockout
	Condensate Pump 4B Control

Notes:

1. Manual actions may be used to overcome adverse fire effects to certain circuits of NCC fans 4B and 4D.
2. Narrow range instrumentation may be used for post-fire safe shutdown under certain fire damage conditions.

Appendix 2

TURKEY POINT UNITS 3 AND 4 TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE-RESISTIVE RATING CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25-MINUTES)
79	3K1724	AFW Turbine Trip and Throttle Valve Control	From east wall of Unit 4 4160V Switchgear to Column Line 30
	4K1426	Unit 4 Pressurizer Relief Isolation Valve - Power AFW Turbine Steam Supply (Unit 4) Valve - Power	From PB4713 to raceway support at Column J
	4J1775	Unit 4 Pressurizer Relief Isolation Valve -Power 125Vdc Control Power to Load Center 4B and 4D 125Vdc Control Power to Sequencer 4B Unit 4 AFW Turbine Steam Supply Valve - Control	From PB4713 to Column J
	4J1776	125 Vdc Control Power to Load Center 4B and 4D 125 Vdc Control Power to Sequencer 4B	4160 Switchgear Room South Wall to PB4713
80	4K1212	Unit 4 Train 2 AFW Flow Control Valve - Control Unit 4 Instrument Air Header Pressure Instrumentation Unit 4 Pressurizer Level Instrumentation Unit 4 SG Level (narrow range) Instrumentation Unit 4 SG Level (wide range) Instrumentation Unit 4 Hot and Cold Leg Temperature Instrumentation Unit 4 RCS Pressurizer Instrumentation Unit 4 Atmospheric Steam Dump Valves	From PB4874 to Raceway Support at Column J
	4K1232	Unit 4 SG Blowdown Flow Control Valve Unit 4 Instrument Air Supply Header Isolation Valve - Control Unit 4 AFW Turbine Steam Supply Valve - Control Unit 4 Atmospheric Steam Dump Valve - Control Unit 4 SG Blowdown Flow Control Valve Unit 4 Backup AFW to SG Control Valve - Power Unit 4 Main Steam Isolation Valve - Control	From PB4875 to Raceway Support at Column J
	4K1411	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Ammeter	From PB4866 to Raceway Support at Column J
	4K1412	Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power	From PB4866 to Raceway Support at Column J
	4K1421	Unit 4 Train 2 AFW Flow Control Valve - Control	From PB4874 to Raceway Support at Column J

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1**

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25-MINUTES)
80	4K1417	125Vdc to Alternate Shutdown Panel 4C264 120Vac to Power Panel 4P93	From PB4875 to Raceway Support at Column J
82	4A1353	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	4160V Switchgear room South Wall to PB4864
	4A1354	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	PB4864 to PB4865
	4A1357	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	PB4865 to PB4866
	4A1417	Auxiliary Transformer Breaker Control - 4160V Bus 4B	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4J1838	Normal Containment Cooler Fan 4D Control	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4K1441	Auxiliary Transformer Breaker Control - 4160V Bus 4B Startup Transformer Breaker Control - 4160V Bus 4B Heater Drain Pump 4B Condensate Pump 4B 125Vdc for Feedwater Bypass Control Valves 4160V Bus 4B Lockout Relay	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	PB4864 PB4865	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	
85	3K1966	MCC 3K Power Feeder	4160V Switchgear Room South Wall to Support 7 Feet West of Column Line J

TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25-MINUTES)
88	3K2020	EDG 3B Relaying and Metering EDG 3B Control EDG 3B Lockout Relay	From Box Enclosure at Column 24 South to Support 2 Feet West of Column J
	3K2021	4160V Bus 3D Feeder Breaker Control	From Box Enclosure at Column 24 South to Support 2 Feet West of Column J
	3K2022	125Vdc to 4160 Bus 3D	From Box Enclosure at Column 24 South to Support 2 Feet West of Column J
91	4A1357	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	PB4865 to PB4866
	4A1417	Auxiliary Transformer Breaker Control - 4160V Bus 4B	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4J1838	Normal Containment Cooler Fan 4D Control	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4K1441	Auxiliary Transformer Breaker Control - 4160V Bus 4B Startup Transformer Breaker Control - 4160V Bus 4B Heater Drain Pump 4B Condensate Pump 4B 125Vdc for Feedwater Bypass Control Valves 4160V Bus 4B Lockout Relay	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4J1776	125Vdc Control Power to Load Center 4B and 4D 125Vdc Control Power to Sequencer 4B	4160 Switchgear Room South Wall to PB4713

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1**

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25-MINUTES)
91	4K1212	Unit 4 Train 2 AFW Flow Control Valve - Control Unit 4 Instrument Air Header Pressure Instrumentation Unit 4 Pressurizer Level Instrumentation Unit 4 SG Level (narrow range) Instrumentation Unit 4 SG Level (wide range) Instrumentation Unit 4 Hot and Cold Leg Temperature Instrumentation Unit 4 RCS Pressurizer Instrumentation Unit 4 Atmospheric Steam Dump Valves	From PB4874 to Raceway Support at Column J
	4K1232	Unit 4 SG Blowdown Flow Control Valve Unit 4 Instrument Air Supply Header Isolation Valve - Control Unit 4 AFW Turbine Steam Supply Valve - Control Unit 4 Atmospheric Steam Dump Valve - Control Unit 4 Backup AFW to SG Control Valve - Power Unit 4 Main Steam Isolation Valve - Control	From PB4875 to Raceway Support at Column J
	4K1411	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Ammeter	From PB4866 to Raceway Support at Column J
	4K1412	Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power	From PB4866 to Raceway Support at Column J
	4K1421	Unit 4 Train 2 AFW Flow Control Valve - Control	From PB4874 to Raceway Support at Column J
	4K1417	125Vdc to Alternative Shutdown Panel 4C264 120Vac to Power Panel 4P93	From PB4875 to Raceway Support at Column J
	4A1369	Unit 4 Train 2 AFW Flow Control Valve - Control Unit 4 Instrument Air Header Pressure Instrumentation Unit 4 Pressurizer Level Instrumentation Unit 4 SG Level (wide range) Instrumentation Unit 4 Hot and Cold Leg Temperature Instrumentation Unit 4 RCS Pressure Instrumentation Unit 4 Atmospheric Steam Dump Valves	From 4160V Switchgear Room south wall to PB4874
	4A1370	125Vdc to Alternate Shutdown Panel 4C264 120Vac to Power Panel 4P93	From 4160V Switchgear Room South Wall to PB4875

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1**

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25-MINUTES)
91	PB4866	Normal Containment Cooler Fan 4B Control Normal Containment Cooler Fan 4D Control Normal Containment Cooler Fan 4D Power Normal Containment Cooler Fan 4D Ammeter	
	PB4874	Unit 4 Train 2 AFW Flow Control Valve - Control Unit 4 Instrument Air Header Pressure Instrumentation Unit 4 Pressurizer Level Instrumentation Unit 4 SG Level (wide range) Instrumentation Unit 4 Hot and Cold Leg Temperature Instrumentation Unit 4 RCS Pressure Instrumentation Unit 4 Atmospheric Steam Dump Valves	
	4A1372	Unit 4 Train 2 AFW flow Control Valve - Control Unit 4 SG Level (wide range) Instrumentation	From 4160V Switchgear Room South Wall to PB4874
	4A1371	SG Blowdown Flow Control Valve Indication at Alternate Shutdown Panel 4C264 Instrumentation Air Isolation Valve Position Indication Unit 4 AFW Turbine Steam Supply Valve - Control Unit 4 SG Blowdown Flow Control Valve - Control Unit 4 Atmospheric Steam Dump Valve - Control Instrument Air Header Pressure Valve - Control Unit 4 Backup AFW to SG Valve- Power Unit 4 Main Steam Isolation Valve - Control	From 4160V Switchgear Room South Wall to PB4875
	PB4875	125 Vdc to Alternate Shutdown Panel 4C264 Unit 4 SG Blowdown Flow Control Valve - Control Unit 4 Instrument Air Isolation Valve Unit 4 AFW Turbine Steam Supply Valve - Control 120 Vac to Power Panel 4P93 Unit 4 Atmospheric Steam Dump Valve - Control Unit 4 Instrument Air Supply Header Valve - Control Unit 4 Backup AFW to SG Valve- Power Unit 4 Main Steam Isolation Valve - Control	
92	3J2040	120Vac to Sequencer 3B	From 4160V Switchgear Room South Wall to Support 9 Feet - 6 inches West of Column Line J

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 1-HOUR FIRE RESISTIVE RATING
CONDENSATE PUMP/CONDENSER PITS AND OUT TO COLUMN LINE E-1**

FIRE ZONE	RACEWAY	SAFE SHUTDOWN FUNCTIONS PROTECTED	FIRE BARRIER TRANSITION (1-HOUR TO 25 MINUTES)
92	3K1966	MCC 3K Power Feeder	4160V Switchgear Room South Wall to Support 7 Feet West of Column Line J
105	4A1417	Auxiliary Transformer Breaker Control - 4160V Bus 4B	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4J1838	Normal Containment Cooler Fan 4D Control	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4K1441	Auxiliary Transformer Breaker Control - 4160V Bus 4B Startup Transformer Breaker Control - 4160V Bus 4B Heater Drain Pump 4B Condensate Pump 4B 125Vdc for Feedwater Bypass Control Valves 4160V Bus 4B Lockout Relay	4160V Switchgear Room South Wall to Support 10 Feet West of Column J
	4A1345	125Vdc to 4160V Bus 4B (normal feed) 125Vdc to 4160V Bus 4B (alternative feed)	East wall of 4160 Switchgear to Support 8'-2" West of Column J
	3A1354	125Vdc for 480V Load Center 3D and 3B 125Vdc Control Power to 4160V Bus 3B - Normal EDG 3B - Control	Support 1 foot North Of Column 23 to Support 9'-6" West of Column J
	3J2040	120Vac to Sequencer 3B	From 4160V Switchgear Room South Wall to Support 9 Feet - 6 Inches West of Column Line J

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
COLUMN LINES E TO Jc**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
79	125Vdc Condensate and Feedwater Valves
	Unit 4 AFW Flow Control Valves - Control (Note 1)
	Unit 4 AFW to SG Control Valve - Power and Control
	AFW Turbine Driven Pump Steam Supply Valve - Control (Note 1)
	AFW Turbine Trip and Throttle Valve - Control
	Unit 4 Feedwater Bypass Control Valve
	125Vdc for Feedwater Bypass Control Valves
	CCW Pump 4C - Control (Note 2)
	Normal Containment Cooling Fan 4D Ammeter
	Normal Containment Cooling Fan 4D - Control (Note 2)
	Normal Containment Cooling 4D Fan - Power
	Normal Containment Cooling Fan 4D Damper - Control
	DC Inverter Room HVAC - E16F
	MCC 4K Power Feeder
	4160V Bus 4B lockout Relay
	4160V Bus 4B Clearing Circuit
	Auxiliary Transformer Breaker Control - 4Kv Bus 4B
	EDG 3B, 4B Breaker Control
	Heater Drain Pump 4B
	SBO Tie Breaker Control
	4160V Bus 4D to 4B alignment Signal to Load Sequencer 4B
	Unit 4 SG Level Instrumentation (Wide Range) (Note 3)
	Unit 4 Train B Cold Leg Temperature
	Unit 4 Train B Hot Leg Temperature
	Unit 4 RCS Pressure Instrumentation
	125Vdc for 480V Load Center 4B, 4H

TURKEY POINT UNITS 3 AND 4
 TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
 PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
 COLUMN LINES E TO Jc

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
79	120 Vac to Load Sequence 4B
	Alternate 125Vdc to 4160V Bus 4B
	Unit 4 Main Steam Isolation Valve - Control
	Pressure Relief Isolation Valve MOV-4-535 - Power
	Unit 4 CCW Thermal Barrier Supply Isolation Valve - Control
	Normal 125Vdc to 4160V Bus 4B
	125Vdc to 480V Load Center 4D (Note 2)
	Unit 4 Start-up Transformer Breaker Control
	125Vdc to Load Sequencer 4B
	EDG 4B - Control
	Breaker Control Bus 4B to 4D Tie
	Intake Cooling Water Pump 4C - Control (Note 2)
	CCW to Unit 4 NCC Return Isolation Valve - Power
84	Unit 3 Feedwater Bypass Control Valve
	AFW Turbine Trip and Throttle Valve - Control (Note 1)
	Normal Containment Cooling Fan 3B, 3D Damper Control
	Normal Containment Cooling Fan 3B, 3D - Control
	Normal Containment Cooling Fan 3B - Power
	Normal Containment Cooling Fan 3B Ammeter
	MCC 4K Power Feed
	4160V Bus 4B Clearing Circuit
	EDG 3B, 4B Breaker Control
	SBO Tie Breaker Control
	4160V Bus 4D to 4B Alignment Signal to Load Sequencer 4B
	RCS Pressure Instrumentation
	Unit 3 Train B Hot Leg Temperature

TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
COLUMN LINES E TO Jc

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
84	Unit 3 Train B Cold Leg Temperature
	125Vdc for 480V Load Center 3D and 3B
	120Vac to Load Sequencer 3B and 4B
	Unit 3 Main Steam Isolation Valve - Control
	Alternate 125Vdc to 4160V Bus 4B
	AFW to SG Control Valve (Note 1)
	CCW Pump 4C Breaker Control (Note 2)
	Unit 3 CCW Thermal Barrier Supply Isolation Valve - Control
	Charging Pump 3B - Control
	Normal 125 Vdc to 4160V Bus 3B, 4B
	125Vdc to 4160 Bus 4D and 3D
	Boric Acid Transfer Pump 3B - Control (Note 2)
	Boric Acid Transfer Pump 3B - Power
	Unit 3 Loop C Hot Leg Charging Isolation Valve - Control
	Unit 3 Excess Letdown Isolation Valve - Control
	Unit 3 RWST to Charging Header Supply Valve - Control
	Unit 3 Pressurizer Auxiliary Spray Valve - Control
	EDG 3B and 4B Relaying and Metering
	EDG 3B and 4B - Control
	EDG 3B and 4B Lockout Relay
	125Vdc to EDG 3B Exciter Cabinet
	EDG 4B Control Room Metering
	EDG 4B Voltage Regulator
	EDG 4B Governor Control
	MCC 3K Power Feeder
	4160V Bus 3B Clearing Circuit

TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
COLUMN LINES E TO Jc

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
84	Breaker Control Bus 4B to 4D Tie, Bus 3B to 3D Tie
	Unit 3 Containment IA Header Isolation Valve - Control
	Unit 3 Pressurizer Level Instrumentation
	Unit 3 SG level Instrumentation (Narrow Range)
	Unit 3 SG level Instrumentation (Wide Range) (Note 3)
	Pressurizer Pressure Instrumentation (Note 2)
	Unit 3 SG pressure Instrumentation
	125Vdc to Load Sequencer 3B
	120 Vac to ASD panel 3P93 from inverters 3C and CS
	125Vdc to Panel 4D36
	Pressurizer Heater Control Group 3B11 (Note2)
	Pressurizer Heater Back up Group 3B Control
	Pressurizer Power Operated Relief Valve PCV-3-455C Control
	Intake Cooling Water Pump 4C Control
88	Unit 3 AFW Flow Control Valves Control
	Normal Containment Cooling Fan 3B Damper - Control
	Normal Containment Cooling Fan 3B, 3D - Control (Note 2)
	Normal Containment Cooling Fan 3B - Power
	Normal Containment Cooling Fan 3B Ammeter
	EDG 3B Breaker Control
	SBO Tie Breaker Control
	4160V Bus 3D to 3B alignment Signal to Load Sequencer 3B
	125Vdc for 480V Load Center 3B
	120Vac to Load Sequencer 3B
	CCW Pump 3C Breaker Control

TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
COLUMN LINES E TO Jc

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
88	Normal 125Vdc to 4160 Bus 3B
	125 Vdc to 4160 Bus 3D
	EDG 3B Relaying and Metering Indication
	EDG 3B Control
	EDG 3B Lock Out Relay
	4160V Bus 3B Clearing Circuit
	Breaker Control - Bus 3B to 3D Tie
	125Vdc to Load Sequencer 3B
	Intake Cooling Water Pump 3C - Control
89	Unit 3 AFW Flow Control Valves - Control (Note 2)
	Normal Containment Cooling Fan 3B Damper - Control
	Normal Containment Cooling Fan 3B, 3D - Control
	Normal Containment Cooling Fan 3B - Power
	Normal Containment Cooling Fan 3B Ammeter
	4160V Bus 4B Clearing Circuit
	EDG 3B Breaker Control
	SBO Tie Breaker Control
	4160V Bus 4D to 4B alignment Signal to Load Sequencer 4B
	125Vdc for 480V Load Center 3D and 3B
	CCW Pump 4C Breaker Control
	Normal 125Vdc to 4160 Bus 3B
	125Vdc to 4160V Bus 4D and 3D
	125Vdc to Load Sequencer 3B
	120Vac to ASD Panel for EDG 3B Indication

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
COLUMN LINES E TO Jc**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
89	EDG 3B Relaying and Metering
	EDG 3B Control
	EDG 3B Lock Out Relay
	125Vdc to EDG 3B Exciter Cabinet
	MCC 3K Power Feeder
	Breaker Control - Bus 4B-4D Tie
	Intake Cooling Water Pump 4C Control

Notes:

- 1. AFW function protected for certain post-fire safe shutdown scenarios. Stand-by Steam Generator Feedwater Pumps may be used if AFW Function is not available.**
- 2. Manual actions used to overcome adverse fire effects to certain circuits for these components**
- 3. Narrow range instrumentation used for adverse fire effects to certain circuits**

Appendix 4

**TURKEY POINT UNITS 3 AND 4
TURBINE BUILDING POST-FIRE SAFE-SHUTDOWN FUNCTIONS
PROTECTED BY FIRE BARRIERS HAVING A 25-MINUTE FIRE-RESISTIVE RATING
TURBINE DECK**

FIRE ZONE	SAFE SHUTDOWN FUNCTION PROTECTED
117	Unit 3 Main Steam Isolation Valve - Control
	Unit 4 Main Steam Isolation Valve - Control
	Unit 4 Steam Generator Pressure instrumentation

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TURKEY POINT PLANT

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