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50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251

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RECIP.NAME RECIPIENT AFFILIATION
Records Management Branch (Document Control Desk)

Revised 11/4/99

SUBJECT: Forwards rev 16 of updated FSAR.Info accurately reflects plant changes made since previous submittal.Rev incorporates changes completed between 971015 & 990408.Summary of accuracy review changes & instructions,included.

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TITLE: OR Submittal: Updated FSAR (50.71) and Amendments

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FPL

OCT 08 1999
L-99-209
10 CFR 50.4
10 CFR 50.71

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Updated Final Safety Analysis Report Revision 16

Florida Power and Light Company has completed Revision 16 of the Turkey Point Units 3 and 4 Final Safety Analysis Report (FSAR). As specified in 10 CFR 50.4(b)(6), ten additional copies of the revision are enclosed. Please note that a separate set of the revised FSAR-related plant drawings are also provided for each copy of the FSAR.

The enclosed information accurately reflects plant changes made since the previous submittal. This revision incorporates changes completed between October 15, 1997, and April 8, 1999. Miscellaneous user comments resolved during this time period have also been incorporated.

This revision also includes those changes identified during the Turkey Point FSAR accuracy review. For completeness, FPL has elected to incorporate all of the accuracy review changes into Revision 16 of the FSAR. A summary of the applicable 10 CFR 50.59 safety evaluations supporting the FSAR accuracy review is included herein for reference.

Very truly yours,

R. J. Hovey
Vice President
Turkey Point Plant

DRL

Attachment

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point

A053 1/11

Summary of Turkey Point Units 3 and 4 Final Safety Analysis Report Accuracy Review Changes Completed After April 8, 1999

SAFETY EVALUATION PTN-ENG-SEMS-99-001
REVISION 1

UNIT	:	3 & 4
APPROVAL DATE	:	7/27/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 4

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

FSAR Chapter 4 provides a basic overview of the Reactor Coolant System Design and Operation. The review of Chapter 4 identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

Revision 1 of this Safety Evaluation incorporated minor changes made as a result of comments received during a PNSC meeting. All conclusions of Revision 0 remain unaffected as a result of this revision.

Safety Evaluation:

This review has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not constitute an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SECS-99-019
REVISION 0

UNIT : 3 & 4
APPROVAL DATE : 6/8/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 5 EXCLUDING APPENDIX 5E

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

FSAR Chapter 5 provides an overview of the plant buildings including safety related structures. The review of Chapter 5 identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review. The evaluation to address any proposed revisions to Appendix 5E of the FSAR has been performed separately.

Safety Evaluation:

This review has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not constitute an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SECS-99-020
REVISION 0

UNIT	:	3 & 4
APPROVAL DATE	:	6/20/99

FSAR ACCURACY REVIEW CHANGES FOR APPENDIX 5E

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

Appendix 5E of the FSAR provides a description of the design basis missiles for Turkey Point Units 3 and 4 and outlines the protective measures taken against unacceptable damage due to missile impact for vital structures and components including safety related structures. The review of Appendix 5E identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

Safety Evaluation:

This review has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not constitute an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SEIS-99-062
REVISION 0

UNIT : 3 & 4
APPROVAL DATE : 7/29/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 7 [SECTIONS 7.2 AND 7.5]

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

FSAR Chapter 7, Sections 7.2 and 7.5, involve the Reactor Protection System (RPS) and Engineered Safety Features Actuation System (ESFAS). The review of these Chapter 7 sections identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

Safety Evaluation:

This review has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not constitute an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SEIS-99-099
REVISION 0

UNIT	:	3 & 4
APPROVAL DATE	:	8/26/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 7 [SECTIONS 7.3, 7.4 AND 7.6]

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

Chapter 7, Sections 7.3, 7.4, and 7.6 describe Regulating Systems, Nuclear Instrumentation, and In-Core Instrumentation. The review of Chapter 7, Sections 7.3, 7.4, and 7.6 identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

The activity being performed by this evaluation updates the documentation in the FSAR to accurately reflect the facility in terms of how it is operated and what equipment is present in the field. No physical changes are being made to the facility or its manner of operation. These documentation changes have been evaluated and do not identify cases where the field condition is inappropriate or in conflict with the plants design bases.

Safety Evaluation:

This evaluation has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not involve an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SEIS-99-102

REVISION 0

UNIT	:	3 & 4
APPROVAL DATE	:	8/26/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 7 [APPENDIX 7A]

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

Chapter 7, Appendix 7A describes the Safety Assessment System. The review of Chapter 7, Appendix 7A identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

The activity being performed by this evaluation updates the documentation in the FSAR to accurately reflect the facility in terms of how it is operated and what equipment is present in the field. No physical changes are being made to the facility or its manner of operation. These documentation changes have been evaluated and do not identify cases where the field condition is inappropriate or in conflict with the plants design bases.

Safety Evaluation:

This evaluation has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not involve an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SEMS-99-003

REVISION 0

UNIT	:	3 & 4
APPROVAL DATE	:	8/24/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 9

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

FSAR Chapter 9 provides a basic overview of the Chemical and Volume Control System, Auxiliary Coolant System, Sampling System, Fuel Handling System, Facility Services, Equipment and System Decontamination, Auxiliary Building Ventilation and Containment Purge, and Post-Accident Hydrogen Control.

The activity being performed by this evaluation updates the documentation in the FSAR to accurately reflect the facility in terms of how it is operated and what equipment is present in the field. No physical changes are being made to the facility or its manner of operation. These documentation changes have been evaluated and do not identify cases where the field condition is inappropriate or in conflict with the plant design bases.

Safety Evaluation:

This evaluation has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not involve an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SEMS-99-004
REVISION 0

UNIT	:	3 & 4
APPROVAL DATE	:	5/13/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 10

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

FSAR Chapter 10 provides a basic overview of the Steam and Power Conversion System. The review of Chapter 10 identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

Safety Evaluation:

This review has determined that the identified FSAR discrepancies do not impact safe operation of the plant, do not constitute an unreviewed safety question, and do not require a change to the Technical Specifications. Consequently, pursuant to the requirements of 10 CFR 50.59, the resulting updates to the Turkey Point FSAR for correctness and clarification can be made and do not require NRC approval prior to implementation.

SAFETY EVALUATION PTN-ENG-SENS-99-050
REVISION 0

UNIT : 3 & 4
APPROVAL DATE : 6/28/99

FSAR ACCURACY REVIEW CHANGES FOR CHAPTER 11 AND SECTION 14.1.13

Summary:

Industry events and regulatory concerns have resulted in an increased emphasis by the NRC on the accuracy of the facility and procedure descriptions in the Final Safety Analysis Reports (FSAR). FPL has performed several self-assessments of the Turkey Point FSAR for accuracy over the last several years. Although these self-assessments did not identify significant concerns, a number of FSAR discrepancies were identified. In the Turkey Point response to the NRC 10 CFR 50.54(f) request for information regarding the adequacy of and availability of design basis information, FPL committed to perform an FSAR assessment using an approach outlined in NEI 96-05. FPL also committed to perform an additional detailed review of portions of the FSAR over a two year period to identify and correct documentation discrepancies. The scope of the detailed review of the entire FSAR is described in FPL letter L-97-143 dated July 1, 1997.

Chapter 11 provides a description of the Waste Disposal and Radiation Protection System. Section 14.1.13 discusses the turbine control system. The review of Chapter 11 and Section 14.1.13 identified a number of editorial discrepancies and minor technical discrepancies. No operability issues were identified as a result of this review.

The activity being performed by this evaluation updates the documentation in the FSAR to accurately reflect the facility in terms of how it is operated and what equipment is present in the field. No physical changes are being made to the facility or its manner of operation. These documentation changes have been evaluated and do not identify cases where the field condition is inappropriate or in conflict with the plants design bases.

Safety Evaluation:

The FSAR changes proposed in this evaluation have been evaluated under 10 CFR 50.59 and found not to require any changes to the Technical Specifications and not to involve an unreviewed safety question. Accordingly, these changes may be implemented without prior NRC approval.

50-250 Superseded Per Rev 16 to UFSAR Dtd 10/8/99 #9910130142

50/250

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-A-60	1	11	9.6A-8	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION FIRE ZONES AND BARRIERS FLOOR PLAN EL. 10'-0"	13
5610-A-60	2	2	9.6A-12	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION DETECTION, SUPPRESSION, & LIGHTING FLOOR PLAN EL. 10'-0"	13
5610-A-61	1	14	9.6A-9	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION FIRE ZONES AND BARRIERS FLOOR PLAN EL. 18'-0"	13
5610-A-61	2	6	9.6A-13	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION DETECTION, SUPPRESSION, & LIGHTING FLOOR PLAN EL. 18'-0"	13
5610-A-62	1	9	9.6A-10	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION FIRE ZONES AND BARRIERS FLOOR PLAN EL. 30'-0"	13
5610-A-62	2	4	9.6A-14	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION DETECTION, SUPPRESSION, & LIGHTING FLOOR PLAN 30'-0"	13
5610-A-63	1	10	9.6A-11	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION FIRE ZONES AND BARRIERS FLOOR PLAN EL. 42'-0"	13
5610-A-63	2	7	9.6A-15	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION DETECTION, SUPPRESSION, & LIGHTING FLOOR PLAN EL. 42'-0"	13
5610-C-2		24	1.2-1	TURKEY POINT PLANT UNITS 3 & 4 GENERAL BUILDING ARRANGEMENT PLAN	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR REVISION NUMBER *
5610-C-2		24	11.2-3	TURKEY POINT PLANT UNITS 3 & 4 GENERAL STATION AREA	13
5610-C-1168	2	4	2.2-3	TURKEY POINT PLANT UNITS 3 & 4 GENERAL SITE FEATURES	13
5610-C-1695	1	3	5G-1	TURKEY POINT PLANT UNITS 3 & 4 EXTERNAL FLOOD PROTECTION FLOOD PROTECTION BARRIERS PLANT ARRANGEMENT	13
5610-C-1695	2	0	5G-2	TURKEY POINT PLANT UNITS 3 & 4 EXTERNAL FLOOD PROTECTION PERIMETER FLOOD WALL DETAILS	13
5613-E-11	1	12	8.2-4a	TURKEY POINT PLANT UNIT 3 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ON LINE DIAGRAM - SHEET 1	15
5613-E-11	2	9	8.2-4b	TURKEY POINT PLANT UNIT 3 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ONE LINE DIAGRAM - SHEET 2	13
5614-E-11	1	8	8.2-4d	TURKEY POINT PLANT UNIT 4 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ONE LINE DIAGRAM - SHEET 1	15
5614-E-11	2	12	8.2-4e	TURKEY POINT PLANT UNIT 4 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ONE LINE DIAGRAM - SHEET 2	13
5613-E-12		5	8.2-4c	TURKEY POINT PLANT UNIT 3 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ONE LINE DIAGRAM - SHEET 3	15

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-E-12		6	8.2-4f	TURKEY POINT PLANT UNIT 4 ELECTRICAL 125V DC AND 120V INSTRUMENT AC ONE LINE DIAGRAM - SHEET 3	15
5610-E-54-1	1	10	8.2-6	TURKEY POINT PLANT UNITS 3 & 4 COMPOSITE DRAWING OF CONTAINMENT ELECTRICAL PENETRATION CANISTERS	13
5610-E-54A-1		3	8.2-7	TURKEY POINT PLANT UNITS 3 & 4 5KV ELECTRICAL POWER PENETRATION ASSEMBLY	13
5610-M-51		3	11.2-2	TURKEY POINT PLANT UNITS 3 & 4 AREA RADIATION ZONE PLAN FULL POWER OPERATION WITH 1% FAILED FUEL	13
5610-M-55		6	1.2-2	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT PLAN EL. 10'-0"	13
5610-M-56		36	1.2-3	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT GROUND FLOOR PLAN EL. 18' -0"	13
5610-M-56		36	11.2-1	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT GROUND FLOOR PLAN EL. 18'-0"	13
5610-M-57	1	17	1.2-4	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT OPERATING FLOOR PLAN EL. 42'-0" & EL 58'-0"	15
5610-M-58		11	1.2-5	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT MEZZANINE FLOOR PLAN AND SECTION "A - A"	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-59		10	1.2-6	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT SECTIONS "B - B" AND "C - C"	15
5610-M-60		5	1.2-7	TURKEY POINT PLANT UNITS 3 & 4 GENERAL ARRANGEMENT SECTIONS "D - D" & "E - E"	13
5610-M-63		10	7.7-1	TURKEY POINT PLANT UNITS 3 & 4 CONTROL ROOM EQUIPMENT LOCATIONS	13
5610-M-85	1	6	9.9-3 SH 1	TURKEY POINT PLANT UNITS 3 & 4 DC EQUIPMENT/INVERTER ROOMS HVAC SHEET 1	15
5610-M-85	2	3	9.9-3 SH 2	TURKEY POINT PLANT UNITS 3 & 4 DC EQUIPMENT/INVERTER ROOMS HVAC SECTIONS SHEET 2	15
5610-M-86		8	9.9-1	TURKEY POINT PLANT UNITS 3 & 4 CONTROL BUILDING HVAC EL 42'-0"	15
5610-M-87	1	5	9.9-2	TURKEY POINT PLANT UNITS 3 & 4 CONTROL BUILDING HVAC EL. 30'-0"	15
5610-M-301-12		32	7.7-3	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL"A" FRONT VIEW SECTION 3C04	13
5610-M-301-13	1	33	7.7-4	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL "A" FRONT VIEW SECTION 3C03	13

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-301-20		28	7.7-9	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANELS "A" AND "C" FRONT VIEW SECTION 4C04	13
5610-M-301-23	1	24	7.7-7	TURKEY POINT PLANT UNITS 3 & 4 CONTROL CONSOLE FRONT VIEW SECTION 4C01	13
5610-M-301-23	2	9	7.7-8	TURKEY POINT PLANT UNITS 3 & 4 CONTROL CONSOLE FRONT VIEW SECTION 4C02	13
5610-M-301-26		25	7.7-10	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL "A" FRONT VIEW SECTION 4C03	13
5610-M-301-28	1	41	7.7-2a	TURKEY POINT PLANT UNITS 3 & 4 CONTROL CONSOLE EQUIPMENT LAYOUT SECTIONS 3C01	13
5610-M-301-28	2	10	7.7-2b	TURKEY POINT PLANT UNITS 3 & 4 CONTROL CONSOLE FRONT VIEW SECTION 3C02	15
5610-M-301-36		18	7.7-5	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANELS "B" AND "C" FRONT VIEW SECTION 3C05	13
5610-M-301-37		33	7.7-6	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL "B" FRONT VIEW SECTION 3C06	15
5610-M-301-40		19	7.7-11	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL "B" FRONT VIEW SECTION 4C05	13

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FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-301-41		34	7.7-12	TURKEY POINT PLANT UNITS 3 & 4 VERTICAL PANEL "B" FRONT VIEW SECTION 4C06	14
5614-M-724		0	1.2-8	TURKEY POINT PLANT UNIT 4 GENERAL ARRANGEMENT UNIT 4 EDG BUILDING PLAN AND SECTIONS	13
5610-M-1388		2	7.8-1	TURKEY POINT PLANT UNITS 3 & 4 LOOSE PARTS MONITORING SYSTEM	13
5610-M-3000	2	3	6.6-2	TURKEY POINT PLANT UNITS 3 & 4 LEGEND & GENERAL NOTES	13
5613-M-3008	1	14	9.6-8	TURKEY POINT PLANT UNIT 3 TURBINE PLANT COOLING WATER SYSTEM	15
5614-M-3008	1	18	9.6-9	TURKEY POINT PLANT UNIT 4 TURBINE PLANT COOLING WATER SYSTEM	15
5613-M-3010	1	11	10.2-60	TURKEY POINT PLANT UNIT 3 CIRCULATING WATER SYSTEM	13
5613-M-3010	2	6	10.2-61	TURKEY POINT PLANT UNIT 3 CIRCULATING WATER SYSTEM CONDENSER WATER BOX PRIMING	13
5613-M-3010	3	12	10.2-62	TURKEY POINT PLANT UNIT 3 CIRCULATING WATER SYSTEM LUBE WATER TO CIRCULATING WATER PUMPS	13

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-M-3010	1	11	10.2-63	TURKEY POINT PLANT UNIT 4 CIRCULATING WATER SYSTEM	13
5614-M-3010	2	6	10.2-64	TURKEY POINT PLANT UNIT 4 CIRCULATING WATER SYSTEM CONDENSER WATER BOX PRIMING	13
5614-M-3010	3	9	10.2-65	TURKEY POINT PLANT UNIT 4 CIRCULATING WATER SYSTEM LUBE WATER TO CIRCULATING WATER PUMPS	13
5613-M-3013	1	12	9.17-1	TURKEY POINT PLANT UNIT 3 INSTRUMENT AIR SYSTEM	14
5614-M-3013	1	11	9.17-2	TURKEY POINT PLANT UNIT 4 INSTRUMENT AIR SYSTEM	15
5613-M-3014	3	11	10.2-58	TURKEY POINT PLANT UNIT 3 CONDENSER SYSTEM	14
5614-M-3014	3	14	10.2-59	TURKEY POINT PLANT UNIT 4 CONDENSER SYSTEM	15
5610-M-3016	1	9	9.6A-5A	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM WATER SUPPLY AND STORAGE TANKS FLOW DIAGRAM	13
5610-M-3016	2	12	9.6A-5B	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM BACKUP SERVICE WATER FLOW DIAGRAM	13

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR REVISION NUMBER *
5610-M-3016	3	10	9.6A-5C	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM ELECTRIC AND DIESEL FIRE PUMPS FLOW DIAGRAM	14
5610-M-3016	4	3	9.6A-1	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM UNDERGROUND FIRE MAINS SITE LAYOUT PLAN	13
5610-M-3016	5	6	9.6A-2	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM TURBINE BLDG SPRINKLER SYSTEM BLDG LAYOUT PLAN	13
5610-M-3016	7	5	9.6A-3	TURKEY POINT UNITS 3 & 4 AUX. BLDG. AND EDG UNIT 3 DELUGE WATER SUPPRESSION DETAILS	15
5610-M-3016	9	0	9.6A-4	TURKEY POINT UNITS 3 & 4 FIRE PROTECTION SYSTEM HALON SUPPRESSION SYSTEM	13
5613-M-3018	1	17	9.11-11	TURKEY POINT PLANT UNIT 3 CONDENSATE STORAGE SYSTEM	15
5614-M-3018	1	19	9.11-10	TURKEY POINT PLANT UNIT 4 CONDENSATE STORAGE SYSTEM	15
5613-M-3019	1	20	9.6-1	TURKEY POINT PLANT UNIT 3 INTAKE COOLING WATER SYSTEM	15
5613-M-3019	2	17	9.6-2	TURKEY POINT PLANT UNIT 3 INTAKE COOLING WATER SYSTEM	15

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3019 AND FSAR FIGURE DELETED	3	N/A	9.6-3 DELETED	TURKEY POINT PLANT UNIT 3 INTAKE COOLING WATER SYSTEM TUBE CLEANING FOR CCW HEAT EXCHANGERS	13
5614-M-3019	1	23	9.6-5	TURKEY POINT PLANT UNIT 4 INTAKE COOLING WATER SYSTEM	15
5614-M-3019	2	15	9.6-6	TURKEY POINT PLANT UNIT 4 INTAKE COOLING WATER SYSTEM	15
5614-M-3019 AND FSAR FIGURE DELETED	3	N/A	9.6-7 DELETED	TURKEY POINT PLANT UNIT 4 INTAKE COOLING WATER SYSTEM TUBE CLEANING FOR CCW HEAT EXCHANGERS	13
5613-M-3020	1	12	9.6-15	TURKEY POINT PLANT UNIT 3 PRIMARY WATER MAKEUP SYSTEM	15
5613-M-3020	2	17	9.6-16	TURKEY POINT PLANT UNIT 3 PRIMARY MAKEUP WATER SYSTEM	15
5614-M-3020	1	12	9.6-17	TURKEY POINT PLANT UNIT 4 PRIMARY WATER MAKEUP SYSTEM	15
5614-M-3020	2	19	9.6-18	TURKEY POINT PLANT UNIT 4 PRIMARY MAKEUP WATER SYSTEM	15
5610-M-3021	1	10	9.6-10	TURKEY POINT PLANT UNITS 3 & 4 WATER TREATMENT PLANT SYSTEM FILTRATION	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-3021	2	9	9.6-11	TURKEY POINT PLANT UNITS 3 & 4 WATER TREATMENT PLANT SYSTEM DEMINERALIZER	13
5610-M-3021	3	6	9.6-12	TURKEY POINT PLANT UNITS 3 & 4 WATER TREATMENT PLANT SYSTEM DEMINERALIZER	13
5610-M-3021	4	6	9.6-13	TURKEY POINT PLANT UNITS 3 & 4 WATER TREATMENT PLANT SYSTEM WASTE NEUTRALIZATION	15
5610-M-3021	5	1	9.6-14	TURKEY POINT PLANTS UNITS 3 & 4 WATER TREATMENT PLANT SAMPLING SYSTEM	13
5613-M-3022	1	8	9.15-1	TURKEY POINT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3A AIR STARTING SYSTEM	13
5613-M-3022	2	7	9.15-2	TURKEY POINT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3B AIR STARTING SYSTEM	13
5613-M-3022	3	11	9.15-3	TURKEY POINT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3A FUEL OIL	13
5613-M-3022	4	7	9.15-4	TURKEY POINT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3B FUEL OIL	13
5613-M-3022	5	6	9.15-5	TURKEY POINT PLANT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3A LO & COOLING WATER	15

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FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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5613-M-3022	6	6	9.15-6	TURKEY POINT PLANT UNIT 3 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 3B LO & COOLING WATER	15
5614-M-3022	1	2	9.15-7	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM EDG 4A AIR STARTING SYSTEM	14
5614-M-3022	2	2	9.15-8	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM EDG 4B AIR STARTING SYSTEM	14
5614-M-3022	3	1	9.15-9	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM EDG 4A FUEL SYSTEM	13
5614-M-3022	4	2	9.15-10	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM EDG 4B FUEL SYSTEM	13
5614-M-3022	5	3	9.15-11	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 4A LO & COOLING WATER	13
5614-M-3022	6	3	9.15-12	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL ENGINE AND OIL SYSTEM DG 4B LO & COOLING WATER	13
5610-M-3025	1	3	9.9-4	TURKEY POINT PLANT UNITS 3 & 4 CONTROL BUILDING VENTILATION CONTROL ROOM HVAC	13
5610-M-3025	2	8	9.9-5	TURKEY POINT PLANT UNITS 3 & 4 CONTROL BUILDING VENTILATION COMPUTER FACILITY/CABLE SPREADING ROOM HVAC	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3030	1	13	9.3-1	TURKEY POINT PLANT UNIT 3 COMPONENT COOLING WATER SYSTEM	14
5613-M-3030	2	8	9.3-2	TURKEY POINT PLANT UNIT 3 COMPONENT COOLING WATER SYSTEM	13
5613-M-3030	3	10	9.3-3	TURKEY POINT PLANT UNIT 3 COMPONENT COOLING WATER SYSTEM	13
5613-M-3030	4	19	9.3-4	TURKEY POINT PLANT UNIT 3 COMPONENT COOLING WATER SYSTEM	15
5613-M-3030	5	11	9.3-5	TURKEY POINT PLANT UNIT 3 COMPONENT COOLING WATER SYSTEM	14
5614-M-3030	1	18	9.3-6	TURKEY POINT PLANT UNIT 4 COMPONENT COOLING WATER SYSTEM	15
5614-M-3030	2	7	9.3-7	TURKEY POINT PLANT UNIT 4 COMPONENT COOLING WATER SYSTEM	13
5614-M-3030	3	15	9.3-8	TURKEY POINT PLANT UNIT 4 COMPONENT COOLING WATER SYSTEM	14
5614-M-3030	4	15	9.3-9	TURKEY POINT PLANT UNIT 4 COMPONENT COOLING WATER SYSTEM	15

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FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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5613-M-3033	1	12	9.3-10	TURKEY POINT PLANT UNIT 3 SPENT FUEL POOL COOLING SYSTEM	15
5614-M-3033	1	12	9.3-11	TURKEY POINT PLANT UNIT 4 SPENT FUEL POOL COOLING SYSTEM	15
5613-M-3034	1	3	9.8-3	TURKEY POINT PLANT UNIT 3 SPENT FUEL POOL AND NEW FUEL STORAGE AREA VENTILATION	13
5614-M-3034	1	2	9.8-4	TURKEY POINT PLANT UNIT 4 SPENT FUEL POOL AND NEW FUEL STORAGE AREA VENTILATION	14
5613-M-3036	1	14	9.4-1	TURKEY POINT PLANT UNIT 3 NUCLEAR STEAM SUPPLY SYSTEM SAMPLE SYSTEM	15
5614-M-3036	1	15	9.4-2	TURKEY POINT PLANT UNIT 4 NUCLEAR STEAM SUPPLY SYSTEM SAMPLE SYSTEM	15
5613-M-3041	1	17	4.2-1	TURKEY POINT PLANT UNIT 3 REACTOR COOLANT SYSTEM	15
5613-M-3041	2	21	4.2-9	TURKEY POINT PLANT UNIT 3 REACTOR COOLANT SYSTEM	15
5613-M-3041	3	19	4.2-10	TURKEY POINT PLANT UNIT 3 REACTOR COOLANT SYSTEM REACTOR COOLANT PUMPS	14

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3041	4	5	4.2-11	TURKEY POINT PLANT UNIT 3 REACTOR COOLANT SYSTEM PORV CONTROL	13
5614-M-3041	1	13	4.2-12	TURKEY POINT PLANT UNIT 4 REACTOR COOLANT SYSTEM	15
5614-M-3041	2	21	4.2-13	TURKEY POINT PLANT UNIT 4 REACTOR COOLANT SYSTEM	15
5614-M-3041	3	21	4.2-14	TURKEY POINT PLANT UNIT 4 REACTOR COOLANT SYSTEM REACTOR COOLANT PUMPS	15
5614-M-3041	4	5	4.2-15	TURKEY POINT PLANT UNIT 4 REACTOR COOLANT SYSTEM PORV CONTROL	13
5610-M-3046	1	21	9.2-1	TURKEY POINT PLANT UNITS 3 & 4 CHEMICAL AND VOLUME CONTROL SYSTEM BORIC ACID SYSTEM	15
5610-M-3046	2	21	9.2-2	TURKEY POINT PLANT UNITS 3 & 4 CHEMICAL & VOLUME CONTROL SYSTEM BORON RECYCLE SYSTEM	15
5610-M-3046	3	11	9.2-3	TURKEY POINT PLANT UNITS 3 & 4 CHEMICAL AND VOLUME CONTROL SYSTEM BORON RECYCLE SYSTEM	15
5610-M-3046	4	12	9.2-4	TURKEY POINT PLANT UNITS 3 & 4 CHEMICAL AND VOLUME CONTROL SYSTEM BORON RECYCLE SYSTEM	15

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5613-M-3047	1	13	9.2-5	TURKEY POINT PLANT UNIT 3 CHEMICAL AND VOLUME CONTROL SYSTEM CHARGING AND LETDOWN	13
5613-M-3047	2	22	9.2-6	TURKEY POINT PLANT UNIT 3 CHEMICAL AND VOLUME CONTROL SYSTEM CHARGING AND LETDOWN	15
5613-M-3047	3	14	9.2-7	TURKEY POINT PLANT UNIT 3 CHEMICAL AND VOLUME CONTROL SYSTEM SEAL WATER INJECTION TO RCP	15
5614-M-3047	1	13	9.2-8	TURKEY POINT PLANT UNIT 4 CHEMICAL AND VOLUME CONTROL SYSTEM CHARGING AND LETDOWN	13
5614-M-3047	2	25	9.2-9	TURKEY POINT PLANT UNIT 4 CHEMICAL AND VOLUME CONTROL SYSTEM CHARGING AND LETDOWN	15
5614-M-3047	3	17	9.2-10	TURKEY POINT PLANT UNIT 4 CHEMICAL AND VOLUME CONTROL SYSTEM SEAL WATER INJECTION TO RCP	15
5613-M-3050	1	17	6.2-1	TURKEY POINT PLANT UNIT 3 RESIDUAL HEAT REMOVAL SYSTEM	15
5614-M-3050	1	18	6.2-5	TURKEY POINT PLANT UNIT 4 RESIDUAL HEAT REMOVAL SYSTEM	15
5613-M-3053	1	15	9.8-5	TURKEY POINT PLANT UNIT 3 CONTAINMENT PURGE SYSTEM AND PENETRATION COOLING SYSTEM	15

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
(FOR DISTRIBUTION WITH FSAR UPDATE)

ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-M-3053	1	13	9.8-6	TURKEY POINT PLANT UNIT 4 CONTAINMENT PURGE SYSTEM AND PENETRATION COOLING SYSTEM	15
5613-M-3057	1	5	9.10-1	TURKEY POINT UNIT 3 CONTAINMENT NORMAL AND EMERGENCY COOLING SYSTEMS	13
5614-M-3057	1	5	9.10-2	TURKEY POINT UNIT 4 CONTAINMENT NORMAL AND EMERGENCY COOLING SYSTEMS	13
5610-M-3060	1	10	9.8-1	TURKEY POINT PLANT UNITS 3 & 4 AUXILIARY BUILDING VENTILATION	15
5610-M-3060	2	2	9.8-2	TURKEY POINT PLANT UNITS 3 & 4 AUXILIARY BUILDING VENTILATION LAUNDRY DRYERS EXHAUST	13
5610-M-3061	1	14	11.1-9	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM WASTE HOLDUP & TRANSFER	15
5610-M-3061	2	9	11.1-10	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM LAUNDRY WASTE	15
5610-M-3061	3	6	11.1-11	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM DRAIN HEADERS AND SUMPS	15
5610-M-3061	4	6	11.1-12	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM POLISHING DEMINERALIZER	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-3061	5	12	11.1-13	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM WASTE EVAPORATOR FEED	15
5610-M-3061	6	7	11.1-14	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM WASTE EVAPORATOR PACKAGE	15
5610-M-3061	7	7	11.1-15	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM LIQUID SAMPLING, MONITORING, AND CHEMICAL ADDITION	15
5610-M-3061	8	6	11.1-16	TURKEY POINT PLANT UNITS 3 & 4 LIQUID WASTE DISPOSAL SYSTEM WASTE MONITOR TANKS	15
5610-M-3061	9	7	11.1-17	TURKEY POINT PLANT UNITS 3 & 4 SOLID WASTE DISPOSAL SYSTEM SPENT RESIN STORAGE	15
5610-M-3061	9 & 11	7 & 4	11.1-7	TURKEY POINT PLANT UNITS 3 & 4 RADWASTE SOLIDIFICATION SYSTEM CEMENT HANDLING AND CONTAINER FILLING	15
5610-M-3061	10	4	11.1-18	TURKEY POINT PLANT UNITS 3 & 4 SOLID WASTE DISPOSAL SYSTEM HOLDUP & MIXING	15
5610-M-3061	11	4	11.1-19	TURKEY POINT PLANT UNITS 3 & 4 SOLID WASTE DISPOSAL SYSTEM CONTAINER FILL	15
5610-M-3061	12	12	11.1-20	TURKEY POINT PLANT UNITS 3 & 4 GASEOUS WASTE DISPOSAL SYSTEM WASTE GAS COMPRESSORS	15

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FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5610-M-3061	13	6	11.1-21	TURKEY POINT PLANT UNITS 3 & 4 GASEOUS WASTE DISPOSAL SYSTEM WASTE GAS DECAY TANKS	15
5610-M-3061	14	9	11.1-22	TURKEY POINT PLANT UNITS 3 & 4 GASEOUS WASTE DISPOSAL SYSTEM GAS WASTE ANALYZERS	15
5613-M-3061	1	12	11.1-1	TURKEY POINT PLANT UNIT 3 LIQUID WASTE DISPOSAL SYSTEM REACTOR COOLANT DRAIN TANK AND PUMPS	13
5613-M-3061	2	4	11.1-2	TURKEY POINT PLANT UNIT 3 LIQUID WASTE DISPOSAL SYSTEM CONTAINMENT DRAINS	15
5614-M-3061	1	12	11.1-4	TURKEY POINT PLANT UNIT 4 LIQUID WASTE DISPOSAL SYSTEM REACTOR COOLANT DRAIN TANK AND PUMPS	15
5614-M-3061	2	5	11.1-8	TURKEY POINT PLANT UNIT 4 LIQUID WASTE DISPOSAL SYSTEM CONTAINMENT DRAINS	15
5613-M-3062	1	13	6.2-6	TURKEY POINT PLANT UNIT 3 SAFETY INJECTION SYSTEM	15
5613-M-3062	2	11	6.2-7	TURKEY POINT PLANT UNIT 3 SAFETY INJECTION SYSTEM	15
5614-M-3062	1	15	6.2-8	TURKEY POINT PLANT UNIT 4 SAFETY INJECTION SYSTEM	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-M-3062	2	11	6.2-9	TURKEY POINT PLANT UNIT 4 SAFETY INJECTION SYSTEM	13
5613-M-3064	1	14	6.2-10	TURKEY POINT PLANT UNIT 3 SAFETY INJECTION ACCUMULATOR SYSTEM INSIDE CONTAINMENT	13
5614-M-3064	1	21	6.2-11	TURKEY POINT PLANT UNIT 4 SAFETY INJECTION ACCUMULATOR SYSTEM INSIDE CONTAINMENT	15
5610-M-3065	2	9	10.2-57	TURKEY POINT PLANT UNIT 3 & 4 NITROGEN & HYDROGEN SYSTEMS NITROGEN CAP SYSTEM	15
5610-M-3065	3	8	9.2-11	TURKEY POINT PLANT UNITS 3 & 4 NITROGEN & HYDROGEN SYSTEMS HYDROGEN & CO2 SUPPLY	15
5613-M-3068	1	13	6.4-2	TURKEY POINT PLANT UNIT 3 CONTAINMENT SPRAY SYSTEM	15
5614-M-3068	1	10	6.4-3	TURKEY POINT PLANT UNIT 4 CONTAINMENT SPRAY SYSTEM	13
5613-M-3070	1	1	9.16-1	TURKEY POINT PLANT UNIT 3 TURBINE BUILDING VENTILATION LOAD CENTER & SWGR ROOMS CHILLED WATER SYSTEM-TRAIN A	13
5613-M-3070	2	1	9.16-2	TURKEY POINT PLANT UNIT 3 TURBINE BUILDING VENTILATION LOAD CENTER & SWGR ROOMS CHILLED WATER SYSTEM-TRAIN B	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-M-3070	1	1	9.16-3	TURKEY POINT PLANT UNIT 4 TURBINE BUILDING VENTILATION LOAD CENTER & SWGR ROOMS CHILLED WATER SYSTEM-TRAIN A	13
5614-M-3070	2	1	9.16-4	TURKEY POINT PLANT UNIT 4 TURBINE BUILDING VENTILATION LOAD CENTER & SWGR ROOMS CHILLED WATER SYSTEM-TRAIN B	13
5613-M-3072	1	24	10.2-1	TURKEY POINT PLANT UNIT 3 MAIN STEAM SYSTEM	15
5613-M-3072	2	9	10.2-2	TURKEY POINT PLANT UNIT 3 MAIN STEAM SYSTEM	15
5613-M-3072	3	8	10.2-3	TURKEY POINT PLANT UNIT 3 MAIN STEAM SYSTEM MSIV CONTROL	13
5614-M-3072	1	24	10.2-4	TURKEY POINT PLANT UNIT 4 MAIN STEAM SYSTEM	15
5614-M-3072	2	9	10.2-5	TURKEY POINT PLANT UNIT 4 MAIN STEAM SYSTEM	13
5614-M-3072	3	7	10.2-6	TURKEY POINT PLANT UNIT 4 MAIN STEAM SYSTEM MSIV CONTROL	13
5613-M-3073	1	14	10.2-15	TURKEY POINT PLANT UNIT 3 CONDENSATE SYSTEM	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3073	2	14	10.2-16	TURKEY POINT PLANT UNIT 3 CONDENSATE SYSTEM	15
5613-M-3073	3	14	10.2-17	TURKEY POINT PLANT UNIT 3 CONDENSATE SYSTEM	15
5614-M-3073	1	14	10.2-18	TURKEY POINT PLANT UNIT 4 CONDENSATE SYSTEM	13
5614-M-3073	2	13	10.2-19	TURKEY POINT PLANT UNIT 4 CONDENSATE SYSTEM	15
5614-M-3073	3	16	10.2-20	TURKEY POINT PLANT UNIT 4 CONDENSATE SYSTEM	15
5610-M-3074	1	4	10.2-21	TURKEY POINT PLANT UNITS 3 & 4 FEEDWATER SYSTEM STANDBY STEAM GENERATOR FEEDWATER PUMPS	13
5610-M-3074	2	14	10.2-22	TURKEY POINT PLANT UNITS 3 & 4 FEEDWATER SYSTEM DEMINERALIZED STORAGE AND DEAERATION	15
5613-M-3074	1	11	10.2-23	TURKEY POINT PLANT UNIT 3 FEEDWATER SYSTEM	15
5613-M-3074	2	18	10.2-24	TURKEY POINT PLANT UNIT 3 FEEDWATER SYSTEM	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3074	3	12	10.2-25	TURKEY POINT PLANT UNIT 3 FEEDWATER SYSTEM	13
5613-M-3074	4	16	10.2-41	TURKEY POINT PLANT UNIT 3 FEEDWATER SYSTEM STEAM GENERATOR BLOWDOWN RECOVERY	14
5614-M-3074	1	13	10.2-26	TURKEY POINT PLANT UNIT 4 FEEDWATER SYSTEM	15
5614-M-3074	2	21	10.2-27	TURKEY POINT PLANT UNIT 4 FEEDWATER SYSTEM	13
5614-M-3074	3	13	10.2-28	TURKEY POINT PLANT UNIT 4 FEEDWATER SYSTEM	13
5614-M-3074	4	18	10.2-42	TURKEY POINT PLANT UNIT 4 FEEDWATER SYSTEM STEAM GENERATOR BLOWDOWN RECOVERY	15
5610-M-3075	1	15	9.11-2	TURKEY POINT PLANT UNITS 3 & 4 AUXILIARY FEEDWATER SYSTEM TURBINE DRIVE FOR AFW PUMPS	15
5610-M-3075	2	7	9.11-3	TURKEY POINT PLANT UNITS 3 & 4 AUXILIARY FEEDWATER SYSTEM AUXILIARY FEEDWATER PUMPS	15
5613-M-3075	1	10	9.11-4	TURKEY POINT PLANT UNIT 3 AUXILIARY FEEDWATER SYSTEM STEAM TO AUXILIARY FEEDWATER PUMP TURBINES	15

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3075	2	8	9.11-5	TURKEY POINT PLANT UNIT 3 AUXILIARY FEEDWATER SYSTEM AUXILIARY FEEDWATER TO STEAM GENERATORS	13
5613-M-3075	3	2	9.11-6	TURKEY POINT PLANT UNIT 3 AUXILIARY FEEDWATER SYSTEM NITROGEN SUPPLY TO AFW CONTROL VALVES	13
5614-M-3075	1	8	9.11-7	TURKEY POINT PLANT UNIT 4 AUXILIARY FEEDWATER SYSTEM STEAM TO AUXILIARY FEEDWATER PUMP TURBINES	15
5614-M-3075	2	7	9.11-8	TURKEY POINT PLANT UNIT 4 AUXILIARY FEEDWATER SYSTEM AUXILIARY FEEDWATER TO STEAM GENERATORS	13
5614-M-3075	3	1	9.11-9	TURKEY POINT PLANT UNIT 4 AUXILIARY FEEDWATER SYSTEM NITROGEN SUPPLY TO AFW CONTROL VALVES	13
5613-M-3077	1	10	10.2-47	TURKEY POINT PLANT UNIT 3 CONDENSATE POLISHING SYSTEM DEMINERALIZER	15
5613-M-3077	2	8	10.2-48	TURKEY POINT PLANT UNIT 3 CONDENSATE POLISHING SYSTEM DEMINERALIZER	13
5613-M-3077	3	7	10.2-49	TURKEY POINT PLANT UNIT 3 CONDENSATE POLISHING SYSTEM SPENT RESIN HANDLING SUBSYSTEM	13
5613-M-3077	4	2	10.2-50	TURKEY POINT PLANT UNIT 3 CONDENSATE POLISHING SYSTEM EFFLUENT SAMPLING	13

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5614-M-3077	1	8	10.2-51	TURKEY POINT PLANT UNIT 4 CONDENSATE POLISHING SYSTEM DEMINERALIZER	15
5614-M-3077	2	7	10.2-52	TURKEY POINT PLANT UNIT 4 CONDENSATE POLISHING SYSTEM DEMINERALIZER	13
5614-M-3077	3	5	10.2-53	TURKEY POINT PLANT UNIT 4 CONDENSATE POLISHING SYSTEM SPENT RESIN HANDLING SUBSYSTEM	13
5614-M-3077	4	3	10.2-54	TURKEY POINT PLANT UNIT 4 CONDENSATE POLISHING SYSTEM EFFLUENT SAMPLING	13
5613-M-3078	1	3	10.2-55	TURKEY POINT PLANT UNIT 3 STEAM GENERATOR WET LAYUP SYSTEM	13
5614-M-3078	1	4	10.2-56	TURKEY POINT PLANT UNIT 4 STEAM GENERATOR WET LAYUP SYSTEM	13
5613-M-3081	1	12	10.2-29	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5613-M-3081	2	3	10.2-30	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5613-M-3081	3	15	10.2-31	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3081	4	13	10.2-32	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	15
5613-M-3081	5	6	10.2-33	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5613-M-3081	6	8	10.2-34	TURKEY POINT PLANT UNIT 3 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5614-M-3081	1	18	10.2-35	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	14
5614-M-3081	2	6	10.2-36	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5614-M-3081	3	14	10.2-37	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	15
5614-M-3081	4	14	10.2-38	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	15
5614-M-3081	5	6	10.2-39	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13
5614-M-3081	6	6	10.2-40	TURKEY POINT PLANT UNIT 4 FEEDWATER HEATER SYSTEM FEEDWATER HEATER VENTS & DRAINS	13

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR * REVISION NUMBER
5613-M-3082	1	1	10.2-43	TURKEY POINT PLANT UNIT 3 SECONDARY SYSTEM WET LAYUP SYSTEM LOOP 1	13
5613-M-3082	2	5	10.2-44	TURKEY POINT PLANT UNIT 3 SECONDARY SYSTEM WET LAYUP SYSTEM LOOP 2	13
5614-M-3082	1	3	10.2-45	TURKEY POINT PLANT UNIT 4 SECONDARY SYSTEM WET LAYUP SYSTEM LOOP 1	13
5614-M-3082	2	5	10.2-46	TURKEY POINT PLANT UNIT 4 SECONDARY SYSTEM WET LAYUP SYSTEM LOOP 2	13
5613-M-3087	1	14	10.2-11	TURKEY POINT PLANT UNIT 3 TURBINE LUBE OIL SYSTEM LUBE & CONTROL OIL RESERVOIR	15
5613-M-3087	2	6	10.2-12	TURKEY POINT PLANT UNIT 3 TURBINE LUBE OIL SYSTEM LUBE & CONTROL OIL CONDITIONER	13
5614-M-3087	1	12	10.2-13	TURKEY POINT PLANT UNIT 4 TURBINE LUBE OIL SYSTEM LUBE & CONTROL OIL RESERVOIR	15
5614-M-3087	2	7	10.2-14	TURKEY POINT PLANT UNIT 4 TURBINE LUBE OIL SYSTEM LUBE & CONTROL OIL CONDITIONER	13
5613-M-3089	1	15	10.2-7	TURKEY POINT PLANT UNIT 3 STEAM TURBINE SYSTEMS	15

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5613-M-3089	2	15	10.2-8	TURKEY POINT PLANT UNIT 3 STEAM TURBINE SYSTEMS	13
5614-M-3089	1	15	10.2-9	TURKEY POINT PLANT UNIT 4 STEAM TURBINE SYSTEMS	13
5614-M-3089	2	15	10.2-10	TURKEY POINT PLANT UNIT 4 STEAM TURBINE SYSTEMS	13
5613-M-3094	1	27	9.12-1	TURKEY POINT PLANT UNIT 3 POST-ACCIDENT CONTAINMENT VENT AND SAMPLING SYSTEM FLOW DIAGRAM	15
5614-M-3094	1	20	9.12-2	TURKEY POINT PLANT UNIT 4 POST-ACCIDENT CONTAINMENT VENT AND SAMPLING SYSTEM FLOW DIAGRAM	15
5610-T-D-12A	1	10	7.2-9a	TURKEY POINT PLANT UNITS 3 & 4 ROD CONTROL SYSTEM CONTROL SYSTEM DIAGRAM	15
5610-T-D-12B	1	10	7.2-9b	TURKEY POINT PLANT UNITS 3 & 4 TAVG CONTROL AND INSERTION LIMIT ALARMS CONTROL SYSTEM DIAGRAM	14
5610-T-D-14	1	18	7.3-1	TURKEY POINT PLANT UNITS 3 & 4 REACTOR CONTROL SYSTEM CONTROL SYSTEM DIAGRAM	13
5610-T-D-15	1	20	7.2-12	TURKEY POINT PLANT UNITS 3 & 4 PRESSURIZER LEVEL CONTROL & PROTECTION AND CHARGING PUMP CONTROL CONTROL SYSTEM DIAGRAM	15

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ENGINEERING DRAWING CROSS-REFERENCE	ENGR'G DRWG SHEET	DRWG REVISION IN FSAR	FSAR FIGURE NUMBER	FIGURE TITLE BLOCK	FSAR REVISION NUMBER *
5610-T-D-16A	1	22	7.2-11a	TURKEY POINT PLANT UNITS 3 & 4 PRESSURIZER PRESSURE PROTECTION & OVERPRESSURE MITIGATION SYSTEM CONTROL SYSTEM DIAGRAM	15
5610-T-D-16B	1	11	7.2-11b	TURKEY POINT PLANT UNITS 3 & 4 PRESSURIZER PRESSURE CONTROL CONTROL SYSTEM DIAGRAM	15
5610-T-D-17	1	24	7.2-13	TURKEY POINT PLANT UNITS 3 & 4 STEAM GENERATOR LEVEL CONTROL & PROTECTION CONTROL SYSTEM DIAGRAM	15
5610-T-E-1591	1	55	8.2-2	TURKEY POINT PLANT UNITS 3 & 4 MAIN AC DISTRIBUTION SYSTEM ONE LINE DIAGRAM	15
5610-T-L1	1	8	7.2-10	TURKEY POINT PLANT UNITS 3 & 4 INDEX AND SYMBOLS FOR LOGIC DIAGRAMS	15
5610-T-L1	2	19	7.2-5	TURKEY POINT PLANT UNITS 3 & 4 REACTOR PROTECTION SYSTEM REACTOR TRIP SIGNALS AND BREAKERS LOGIC DIAGRAM	15
5613-T-L1	9A1	2	8.2-18a	TURKEY POINT PLANT UNIT 3 EDG START SIGNALS LOGIC DIAGRAM	13
5614-T-L1	9A1	1	8.2-18L	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL GENERATOR START LOGIC DIAGRAM	13
5613-T-L1	9A2	2	8.2-18b	TURKEY POINT PLANT UNIT 3 EDG ENGINE START LOGIC DIAGRAM	13

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5614-T-L1	9A2	1	8.2-18m	TURKEY POINT PLANT UNIT 4 EMERGENCY DIESEL GENERATOR ENGINE START LOGIC DIAGRAM	13
5613-T-L1	9A3	0	8.2-18c	TURKEY POINT PLANT UNIT 3 EDG VOLTAGE REGULATOR AND ELECTRIC GOVERNOR LOGIC DIAGRAM	13
5614-T-L1	9A3	1	8.2-18n	TURKEY POINT PLANT UNIT 4 DIESEL GENERATOR GOVERNOR & VOLTAGE REGULATOR CONTROL LOGIC DIAGRAM	13
5613-T-L1	9A4	2	8.2-18d	TURKEY POINT PLANT UNIT 3 EDG STOP/ENGINE SHUTDOWN LOGIC DIAGRAM	13
5614-T-L1	9A4	3	8.2-18o	TURKEY POINT PLANT UNIT 4 DIESEL ENGINE & GENERATOR STOP AND LOCKOUT LOGIC DIAGRAM	13
5613-T-L1	9A5	0	8.2-18e	TURKEY POINT PLANT UNIT 3 EDG LOCKOUT AND ENGINE AUXILIARIES LOGIC DIAGRAM	13
5614-T-L1	9A5	2	8.2-18p	TURKEY POINT PLANT UNIT 4 DIESEL GENERATOR BREAKER AND FUEL OIL PUMP CONTROL LOGIC DIAGRAM	13
5613-T-L1	9A6	0	8.2-18f	TURKEY POINT PLANT UNIT 3 EDG BREAKER CONTROL LOGIC DIAGRAM	13
5614-T-L1	9A6	3	8.2-18q	TURKEY POINT PLANT UNIT 4 DIESEL ENGINE & GENERATOR ANNUNCIATION AND INDICATION LOGIC DIAGRAM - SHEET 1	13

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FSAR UPDATE REVISION 15
FIGURE AND ENGR'G DRAWING CROSS-REFERENCES
(FOR DISTRIBUTION WITH FSAR UPDATE)

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reliable source of coolant for removal of decay heat. This system also provides capability for receiving, handling and storage of new fuel.

1.2.6 TURBINE AND AUXILIARIES

The turbine is a tandem-compound, 3-element, 1,800 rpm unit having 44-inch exhaust blading in the low pressure elements. Four combination moisture separator-reheater units are employed to dry and superheat the steam between the high and low pressure turbine cylinders.

A twin-shell deaerating type condenser with semi-cylindrical water boxes bolted to both ends, steam jet air ejectors, three 60% capacity condensate pumps, two 60% capacity motor-driven boiler feed pumps, and six stages of feedwater heaters are provided. Three auxiliary steam-driven feedwater pumps are available in case of a complete loss of normal feedwater.

1.2.7 ELECTRICAL SYSTEM

The main generator is an 1,800 rpm, 3 phase, 60 Hz, hydrogen-cooled unit. The main step-up transformer is a conventional two-winding forced oil-air cooled unit.

The Station Service System consists of startup, auxiliary and C Bus transformers, 4160V switchgear, 480V load centers, 480V motor control centers, 120V AC distribution panels and 125V DC equipment.

Emergency power is supplied by alternate sources including four emergency diesel generators. The emergency diesel generators are capable of operating equipment required for the normal shutdown of one unit plus the equipment required for a postulated loss-of-coolant accident in the second unit assuming a single failure.

1.2.8 ENGINEERED SAFETY FEATURES

The Engineered Safety Features provided have redundancy of component and power sources such that under the conditions of a hypothetical loss-of-coolant accident, the systems can, even when operating with partial effectiveness, maintain the integrity of the containment and keep the off site activity levels below the guidelines of 10 CFR 100.

The systems provided are summarized below:

a) The Containment System provides a highly reliable leak-tight barrier against the escape of fission products. The containment penetrations are provided with a leak-test system utilized to check the integrity of those locations which are the most likely sources of containment leakage.

b) The Safety Injection System provides borated water to cool the core be injection into both cold and hot legs of the reactor coolant system.

c) The Containment Spray System provides a spray of borated water to cool and thus depressurize the containment after a loss-of-coolant accident.

d) The Emergency Containment Cooling System provides a heat sink to cool and thus depressurize the containment after a loss-of-coolant accident.

e) The Emergency Containment Filtering System provides a rapid cleanup of iodine from the containment atmosphere after a loss-of-coolant accident.

1.3 GENERAL DESIGN CRITERIA

The general design criteria define or describe safety objectives and approaches incorporated in the design. These general design criteria are addressed explicitly in the pertinent sections in this report. The remainder of this section, 1.3, presents a brief description of related features which are provided to meet the design objectives reflected in the criteria. The description is developed more fully in those succeeding sections of the report indicated by the references.

The parenthetical numbers following the section headings indicate the numbers of the 1967 proposed draft General Design Criteria (GDC).

1.3.1 OVERALL REQUIREMENTS (GDC 1-GDC 5)

All systems and components of the facility are classified according to their importance. Those items vital to safe shutdown and isolation of the reactor or whose failure might cause or increase the severity of an accident or result in an uncontrolled release of excessive amounts of radioactivity are designated Class I. Those items important to operation but not essential to safe shutdown and isolation of the reactor or control of the release of substantial amounts of radioactivity are designated Class III.

Class I systems and components are essential to the protection of the health and safety of the public. Quality standards of material selection, design, fabrication and inspection conform to the applicable provisions of recognized codes, and good nuclear practice.

All systems and components designated Class I are designed so that there is no loss of capability to perform their safety function in the event of the maximum hypothetical seismic ground acceleration acting in the horizontal and vertical directions simultaneously. The working stress for Class I item is kept within code allowable values for the design seismic ground acceleration. Similarly, measures are taken in the design to protect against high winds,

sudden barometric pressure changes, flooding, and other natural phenomena. The Containment and Auxiliary Building are designed to withstand the effects of a tornado.

Reference sections:

Section Title	Section
Site and Environment; Meteorology, Seismology	2.7, 2.9
Reactor Coolant System; Design Bases	4.1
Containment Structure; Design Bases	5.1
Electrical System; Design Bases	8.1
Unit 4 Emergency Diesel Generator Building Structures, Systems and Equipment	5.3.4 Appendix 5A

The fire protection program for the nuclear units is described in the below referenced section:

Reference section:

Section Title	Section
Fire Protection Program	Appendix 9.6A

Certain components of the Auxiliary, Emergency and Waste Disposal Systems are shared by Units 3 and 4. Certain components of shared equipment may be called upon to fulfill either an emergency, or emergency and shutdown function. The design and its evaluation supports the capability to deal with the affected unit, while maintaining safe control of the second unit.

A complete set of as-built drawings is maintained throughout the life of the units. A set of all the quality assurance data generated during fabrication and erection of the essential components is retained.

Reference sections:

Section Title	Section
Records	12.4
Initial Tests and Operation	13
Functional Evaluation of the Components of the Systems which are shared by the two units	Appendix A

1.3.2 PROTECTION BY MULTIPLE FISSION PRODUCT BARRIERS (GDC 6-GDC 10)

The reactor core with its related control and protection system is designed to function throughout its design lifetime without exceeding acceptable fuel limits specified to preclude damage. The core design, together with reliable process and decay heat removal systems, provides for this capability under all expected conditions of normal operation with appropriate margins for uncertainties and anticipated transient situations.

The Reactor Control and Protection System is designed to actuate a reactor trip for any anticipated combination of plant conditions, when necessary, to ensure a minimum Departure from Nucleate Boiling (DNB) ratio equal to or greater than the safety analysis limit value.

Reference sections:

Section Title	Section
Reactor, Design Basis	3.1, 3.2
Instrumentation and Control, Protective Systems	7.2
Safety Analysis	14

The design of the reactor core and related protection systems ensures that power oscillations which could cause fuel damage in excess of acceptable limits are not possible.

The potential for possible spatial oscillations of power distribution for this core has been reviewed. It was concluded that low frequency xenon oscillations may occur in the axial dimension and part length control rods were provided to suppress these oscillations. The core is expected to be stable to xenon oscillations in the X-Y dimension. Out-of-core instrumentation is provided to obtain necessary information concerning power distribution. This instrumentation is adequate to enable the operator to monitor xenon induced oscillations. The part length control rods were removed from the core after the first few cycles of operation. Their removal was based on a determination that their presence was not required, since the control banks provide adequate means for controlling the xenon oscillations.

The moderator temperature and overall power coefficient in the power operating range is maintained negative by inclusion of burnable poison in the first core loading.

Reference section:

Section Title	Section
Reactor Design, Nuclear Design and Evaluation	3.2.1
Reactor Coolant System Pipe Rupture	14.3

The Reactor Coolant System in conjunction with its control and protective provisions is designed to accommodate the system pressures and temperatures attained under all expected modes of operation or anticipated system interactions, and maintain the stresses within applicable code stress limits.

The materials of construction of the pressure boundary of the Reactor Coolant System are protected by control of coolant chemistry from corrosion phenomena which might otherwise reduce the system structural integrity during its service lifetime.

System conditions resulting from anticipated transients or malfunctions are monitored, and appropriate action is automatically initiated to maintain the required cooling capability and to limit system conditions to a safe level.

The system is protected from overpressure by means of pressure relieving devices, as required by Section III of the ASME Boiler and Pressure Vessel Code.

Isolatable sections of the system are provided with overpressure relieving devices to closed systems such that the system code allowable relief pressure within the protected section is not exceeded.

Reference sections:

Section Title	Section
Design Basis, Reactor Coolant System	4.1

The design pressure and temperature of the containment exceeds the peak pressure and temperature occurring as the result of the complete blowdown of the reactor coolant through any pipe rupture of the Reactor Coolant System up to and including the hypothetical severance of a reactor coolant pipe.

Piping systems which penetrate the vapor barrier are anchored at the containment liner. The main steam, feedwater, blow down and sample line penetrations are designed stronger than the piping system so that the containment will not be breached due to a hypothesized pipe rupture. Lines connected to the Reactor Coolant System that penetrate the containment are also anchored at the secondary shield walls. Anchors are designed to withstand the thrust moment and torque resulting from a hypothesized rupture of the attached pipe or the loads induced by the maximum hypothetical earthquake.

Isolation valves are supported to withstand, without impairment of valve operability, the loading of the design basis accident or maximum hypothetical seismic conditions.

Reference section:

Section Title	Section
Containment Structure	5.1

1.3.3 NUCLEAR AND RADIATION CONTROLS (GDC 11 - GDC 18)

The units are equipped with a control room which contains the controls and instrumentation necessary for operation of the reactor and turbine generator under normal and accident conditions.

Sufficient shielding, distance, and containment integrity are provided to assure that control room personnel shall not be subjected to doses for the duration of the hypothetical accident conditions during occupancy of, ingress to and egress from the control room which, in the aggregate would, exceed twenty percent of the 10 CFR 100 guidelines.

Instrumentation and controls essential to avoid undue risk to the health and safety of the public are provided to monitor and maintain within prescribed operating ranges the neutron flux temperatures, pressure, flow, and levels in the Reactor Coolant System, Steam Systems, Containment and Auxiliary Systems.

The quantity and types of instrumentation provided are adequate for safe and orderly operation of all systems and processes over the full operating range of the units.

The operational status of the reactor is monitored from the control room. When the reactor is subcritical the spontaneous neutrons from the irradiated fuel are continuously monitored and indicated by proportional counters located in the instrument wells in the primary shield adjacent to the reactor vessel. The source detector channels are checked prior to operations in which criticality may be approached by the use of in-core sources. Any

appreciable increase in the neutron source multiplication, including that caused by the maximum physical boron dilution rate, is slow enough to give ample time to start corrective action (boron dilution stop and/or emergency boron injection) to prevent the core from becoming critical.

When the reactor is critical, means for showing the relative reactivity status of the reactor is provided by control bank positions displayed in the control room. Periodic samples of the coolant boron concentration are taken. The variation in concentration during core life provides a further check on the reactivity status of the reactor including core depletion.

Instrumentation and controls provided for the protective systems are designed to trip the reactor, when necessary, to prevent or limit fission product release from the core and to limit energy release; to signal containment isolation; and to control the operation of engineered safety features equipment.

During reactor operation in the startup and power modes, redundant safety limit signals will automatically actuate two reactor trip breakers which are in series with the rod drive mechanism coils. This action would interrupt power and initiate reactor trip.

Reference section:

Section Title	Section
Instrumentation and Controls	7.1, 7.2, 7.4, 7.7

If the reactor protection system receives signals which are indicative of an approach to an unsafe operating condition, the system actuates alarms, prevents control rod motion, initiates load cutback, and/or opens the reactor trip breakers.

The basic reactor operating philosophy is to define an allowable region of power and coolant temperature conditions. This allowable range is defined by the primary tripping functions, the overpower ΔT trip, over-temperature ΔT trip, and the nuclear overpower trip. The operating region below these trip settings is designed so that no combination of power, temperatures and pressure could result in DNBR less than the safety analysis limit value with all reactor coolant pumps in operation. Additional tripping functions such as a high pressurizer pressure trip, low pressurizer pressure trip, high pressurizer water level trip, loss of flow trip, steam and feedwater flow mismatch trip, steam generator low-low level trip, turbine trip, safety injection trip, nuclear source and intermediate range level trips, and manual trip are provided to back up the primary tripping functions for specific accident conditions and mechanical failures.

Rod stops from nuclear overpower, overpower ΔT and over-temperature ΔT deviation are provided to prevent abnormal power conditions which could result from excessive control rod withdrawal initiated by a malfunction of the reactor control system or by operator error.

Reference sections:

Section Title	Section
Engineered Safety Features	6.2
Reactor Protection System	7.2

Positive indications in the control room of leakage of coolant from the Reactor Coolant System to the containment are provided by equipment which permits continuous monitoring of the containment air activity. Deviations from normal containment environmental conditions including air particulate activity, radiogas activity, and, in the case of gross leakage, the liquid inventory in the process systems and containment sump, will be detected.

For the case of leakage from the containment under accident conditions the area radiation monitoring system supplemented by portable survey equipment provides adequate monitoring of releases during an accident.

Monitoring and alarm instrumentation are provided for waste storage and fuel handling areas to detect inadequate cooling and to detect excessive radiation levels. Radiation monitors are provided to maintain surveillance over the release of radioactive gases and liquids.

A controlled ventilation system removes gaseous radioactivity from the atmosphere of the fuel storage and waste treating areas of the auxiliary building and discharges it to the atmosphere via the plant vent. Radiation monitors are in continuous service in these areas to actuate high-activity alarms on the control board annunciator, as described in Section 11.2.3.

Reference sections:

Section Title	Section
Engineered Safety Features	6.2, 6.5
Auxiliary Coolant System	9.3
Radiation Protection	11.2

1.3.4 RELIABILITY AND TESTABILITY OF PROTECTION SYSTEMS (GDC 19-GDC 26)

Upon a loss of power to the coils, the full length rod cluster control assemblies are released and free fall into the core. The reactor

internals, fuel assemblies, RCC assemblies and drive system components are designed as Class I equipment. The RCC assemblies are fully guided through the fuel assembly and for the maximum travel of the control rod into the guide tube. Furthermore, the RCC assemblies are never fully withdrawn from their guide thimbles in the fuel assembly. As a result of these design safeguards and the flexibility designed into the RCC assemblies, abnormal loadings and misalignments can be sustained without impairing operation of the RCC assemblies.

Protection channels are designed with sufficient redundancy for individual channel calibration and test to be made during operation without degrading the reactor protection system. Removal of one trip circuit for test is accomplished by placing that channel in a tripped mode. For example, a two-out-of-three logic becomes a one-out-of-two logic. Testing will not cause a trip unless a trip condition exists in a concurrent channel. The trip signal furnished by the two remaining channels would be unimpaired in this event.

In the Reactor Protection System, two reactor trip breakers are provided to interrupt power to the RCCA drive mechanisms. The breaker main contacts are connected in series (with the power supply) so that opening either breaker interrupts power to all full length RCC assemblies permitting the RCCAs to free fall into the core. Each breaker is opened through an undervoltage trip coil. Each protection channel actuates two separate trip logic trains, one for each reactor trip breaker undervoltage trip coil. The protection system is thus inherently safe in the event of a loss of rod control power.

Channel independence is carried throughout the system extending from the sensor to the relay actuating the protective function. The protective and control functions when combined are combined only at the sensor. A failure in the control circuit does not affect the protection channel.

The power supplied to the channels are fed from four instrument buses. All four buses are supplied by inverters.

The initiation of the engineered safety features provided for loss-of-coolant accidents is accomplished from redundant signals derived from reactor coolant system and containment instrumentation. The initiation signal for containment spray comes from the coincidence of two sets of two-out-of-three high containment pressure signals. Upon loss of voltage on a 4160 volt bus, the associated emergency diesel generator will be automatically started and connected to the bus.

The components of the protection system are designed and arranged so that the mechanical and thermal environment accompanying any emergency situation in which the components are required to function does not interfere with that function.

The signal conditioning equipment of each protection channel in service at power is capable of being calibrated and tripped independently by simulated analog input signals to verify its operation without tripping the reactor.

Each reactor trip channel is designed so that trip occurs when the circuit is de-energized; an open circuit or loss of channel power causes the system to go into its trip mode. In two-out-of-three logic, the three channels are equipped with separate primary sensors and each channel is energized from an independent electrical power supply.

The signal for containment isolation is developed from two-out-of-three logic in which each channel is separated and independent. The failure of any channel does not interfere with the proper functioning of the isolation circuit.

Redundancy in emergency power is provided by four emergency diesel-generator sets, each capable of supplying a separate 4160 volt bus. Each unit's A and B train of engineered safety features is powered by a separate emergency diesel generator. Manual swing train D can be powered by either emergency diesel generator of the associated unit. This swing train powers redundant engineered safety features.

Diesel engine starting is accomplished by compressed air supplied solely for the associated emergency diesel generator. The undervoltage relay scheme is designed so that loss of 4160 volt power does not prevent the relay scheme from functioning properly.

The ability of the emergency diesel generator sets to start within the prescribed time and to carry load can periodically be checked. The emergency diesel generator breaker is not closed automatically after starting during this testing. The generator may be manually synchronized to its associated 4160 volt bus for loading.

Reference sections:

Section Title	Section
Instrumentation and Control; Protection Systems	7.2

1.3.5 REACTIVITY CONTROL (GDC 27-GDC 32)

In addition to the reactivity control achieved by the rod cluster control (RCC) as detailed in Section 7, reactivity control is provided by the Chemical and Volume Control System which regulates the concentration of boric acid solution neutron absorber in the Reactor Coolant System. The system is designed to limit the rate of uncontrolled or inadvertent reactivity changes to a value which provides the operators sufficient time to correct the situation prior to system parameters exceeding design limits.

The reactivity control systems provided are capable of making and holding the core sub-critical from any hot standby or hot operating condition, including those resulting from power changes.

The Rod Cluster Control (RCC) assemblies are divided into two categories comprising control and shutdown rod groups. One control group of RCC assemblies is used to compensate for short term reactivity changes at power such as those produced due to variations in reactor power requirements or in coolant temperature. The chemical shim control is used to compensate for the more slowly occurring changes in reactivity throughout core life such as those due to fuel depletion and fission product buildup and decay.

The shutdown groups are provided to supplement the control groups of RCC assemblies to make the reactor at least one percent sub-critical (k_{eff} = 0.99) following a trip from any credible operating condition to the hot, zero power condition, assuming the most reactive RCC assembly remains in the fully withdrawn position.

Any time that the reactor is at power, the quantity of boric acid retained in the boric acid tanks and ready for injection will always exceed that quantity required to support a cooldown to cold shutdown conditions without letdown. Under these conditions, adequate boration can be achieved simply by providing makeup for coolant contraction from a boric acid tank and the refueling water storage tank. The minimum volume maintained in the boric acid tanks, therefore, is that volume necessary to increase the RCS boron concentration during the early phase of the cooldown of each unit such that subsequent use of the refueling water storage tank for contraction makeup will maintain the required shutdown margin throughout the remaining cooldown. In addition, the boric acid tanks have sufficient boric acid solution to achieve cold shutdown for each unit if the most reactive RCCA is not inserted.

Boric acid is pumped from the boric acid tanks by one of two boric acid transfer pumps to the suction of one of three charging pumps which inject boric acid into the reactor coolant. Any charging pump and either boric acid transfer pump can be operated from diesel generator power on loss of offsite power. Boric acid can be injected by one pump at a rate which takes the reactor to hot standby with no rods inserted in less than forty minutes when

a feed and bleed process is utilized (less than 30 minutes when the available pressurizer volume is utilized). In forty additional minutes, enough boric acid can be injected to compensate for xenon decay although xenon decay below the equilibrium operating level does not begin until approximately 15 hours after shutdown. If two boric acid pumps are available, these time periods are reduced. Additional boric acid injection is employed if it is desired to bring the reactor to cold shutdown conditions.

The Reactor Protection System is capable of protecting against any single anticipated malfunction of the reactivity control system and is designed to limit reactivity transients to DNBR equal to or greater than the safety analysis value due to any single malfunction in the deboration controls.

Limits, which include considerable margin, are placed on the maximum reactivity worth of control rods and on rates at which reactivity can be increased, to ensure that the potential effects of a sudden or large change of reactivity cannot: (a) rupture the reactor coolant pressure boundary; or (b) disrupt the core, its support structures, or other vessel internals so as to lose capability to cool the core.

The control rod cluster drive mechanisms are wired into preselected groups, and are therefore prevented from being withdrawn in other than their respective groups. The rod drive mechanism is of the magnetic latch type and the coil actuation is sequenced to provide variable speed rod travel. The maximum insertion rate is analyzed in the detailed plant analysis assuming two of the highest worth groups to be accidentally withdrawn at maximum speed, yielding reactivity insertion rates of the order of 12×10^{-4} Δk/sec which is well within the capability of the overpower-overtemperature protection circuits to prevent core damage.

Reference sections:

Section Title	Section
Reactor Design Bases	3.1
Protection Systems	7.2
Regulating Systems	7.3
Chemical and Volume Control System	9.2

1.3.6 REACTOR COOLANT PRESSURE BOUNDARY (GDC 33-GDC 36)

The reactor coolant boundary is shown to be capable of accommodating without rupture, the static and dynamic loads imposed as a result of a sudden reactivity insertion such as a rod ejection.

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The operation of the reactor is such that the severity of an ejection accident is inherently limited. Since control rod clusters are used to control load variations only and boron dilution is used to compensate for core depletion, only the rod cluster control assemblies in the controlling groups are inserted in the core at power, and at full power these rods are only partially inserted. A rod insertion limit monitor is provided as an administrative aid to the operator to ensure that this condition is met.

By using the flexibility in the selection of control rod groupings, radial locations and position as a function of load, the design limits the maximum fuel temperature for the highest worth ejected rod to a value which precludes any resultant damage to the system pressure boundary from possible excessive pressure surges.

The failure of a rod mechanism housing causing a rod cluster to be rapidly ejected from the core is evaluated as a hypothetical, though not a credible accident. While limited fuel damage could result from this hypothetical event, the fission products are confined to the Reactor Coolant System and the containment.

The reactor coolant pressure boundary is designed to reduce to an acceptable level the probability of a rapidly propagating type failure.

In the core region of the reactor vessel it is expected that the ductility of the material will change as a result of exposure to fast neutrons. This change is evidenced as a shift in the Nil Ductility Transition Temperature (NDTT) which is factored into the operating procedures in such a manner that full operating pressure is not applied until the vessel material is well above the NDTT.

The value of the DTT is increased during the life of the unit as required by the expected shift in the NDTT, and as confirmed by the experimental data obtained from irradiated specimens of reactor vessel materials.

The design of the reactor vessel and its arrangement in the system permits accessibility during the service life to the entire internal surfaces of the vessel and to the following external zones of the vessel: the flange seal surface, the flange O.D. down to the cavity seal ring, the closure head except around the drive mechanism adapters and the nozzle to reactor coolant piping welds. The reactor arrangement within the containment provides sufficient space for inspection of the external surfaces of the reactor coolant piping, except for the area of pipe within the primary shielding concrete.

Monitoring of the NDTT properties of the core region plates, forgings, weldments and associated heat treated zones are performed in accordance with the version of ASTM E185,"Recommended Practice for Surveillance Tests on Structural Materials in Nuclear Reactors," required by 10 CFR 50, Appendix H. Samples of reactor vessel plate materials are retained and catalogued in case future engineering development shows the need for further testing.

The material properties surveillance program includes not only the conventional tensile and impact tests, but also fracture mechanics tests. The observed shifts in NDTT of the core region materials with irradiation will be used to confirm the calculated limits of startup and shutdown transients.

To define permissible operating conditions below DTT, a pressure range is established which is bounded by a lower limit for pump operation and an upper limit which satisfies reactor vessel stress criteria. Since the normal operating temperature of the reactor vessel is well above the maximum expected DTT, brittle fracture during normal operation is not considered to be credible.

Reference sections:

Section Title	Section
Reactor Coolant System	
System Design and Operation	4.2
Tests and Inspections	4.4
Vessel NDTT	Appendix 4A

1.3.7 ENGINEERED SAFETY FEATURES (GDC 37-GDC 65)

The design, fabrication, testing and inspection of the core, reactor coolant pressure boundary and their protection systems give assurance of safe and reliable operation under all anticipated normal, transient, and accident conditions. However, engineered safety features are provided in the facility to back up the safety provided by these components. These engineered safety features have been designed to cope with any size reactor coolant pipe break up to and including the circumferential rupture of any pipe assuming unobstructed discharge from both ends.

The release of fission products from the reactor fuel is limited by the Safety Injection System which, by cooling the core and limiting the fuel clad temperature, keeps the fuel in place and substantially intact and limits the metal-water reaction to an insignificant amount.

For any rupture of a steam pipe and the associated uncontrolled heat removal from the core, the Safety Injection System adds shutdown reactivity so that with a stuck rod, no off-site power and minimum engineered safety features, there is no consequential damage to the fuel or the primary system and the core remains in place and intact.

The Safety Injection System consists of high and low head centrifugal pumps driven by electric motors, and passive accumulator tanks which are self energized and which act independently of any actuation signal or power source.

The release of fission products from the containment is limited in three ways:

1. Blocking the potential leakage paths from the containment. This is accomplished by:

    a. A steel-lined, concrete containment with testable penetrations.

    b. Isolation of process lines by the Containment Isolation System which imposes double barriers in each line which penetrates the containment.

2. Reducing the fission product concentration in the containment atmosphere by filtration.

3. Reducing the containment pressure and thereby limiting the driving potential for fission product leakage by cooling the containment atmosphere using the following independent systems.

   a. Containment Spray System

   b. Emergency Containment Cooling System

A comprehensive program of testing is formulated for all equipment systems and system control vital to the functioning of engineered safety features and associated secondary components such as the main steam isolation valves and the Auxiliary Feedwater System. The program consists of performance tests of individual pieces of equipment in the manufacturer's shop, integrated tests of the system as a whole, and periodic tests of the actuation circuitry and mechanical components to assure reliable performance. In the event that one of the components should require maintenance as a result of failure to perform during the test according to prescribed limits, the necessary corrections will be made and the unit retested.

The units are supplied with normal, standby and emergency power sources as follows:

1. The normal source of auxiliary power during operation is the generator and switchyard via the C Bus transformer. Power is supplied via the unit auxiliary transformer which is connected to the isolated phase bus of the generator and the C Bus transformer which is connected to the switchyard.

2. Power required during startup, shutdown and after reactor trip is supplied from the plant switchyard via the startup and C-Bus transformers which has multiple lines running to the transmission system.

3. One emergency diesel generator is connected to to each of the safety related 4160V busses to supply emergency power in the event of loss of offsite power. The emergency diesel generators are capable of automatically supplying the engineered safety features load required for any loss-of-coolant accident assuming any credible single failure.

4. Emergency power supply for vital instruments, for control and for emergency lighting is supplied from 125V DC batteries.

The 4160V bus arrangement and logic network provides the capability for certain loads to be powered by either emergency diesel generator of the associated unit following the failure of one diesel generator unit to start.

For engineered safety features as are required to ensure safety in the event of an accident or equipment failure, protection is provided primarily by the provisions which are taken in the design to prevent the generation of missiles. In addition, protection is also provided by the layout of equipment or by missile barriers in certain cases.

Layout and structural design specifically protect safety injection piping leading to unbroken reactor coolant loops against damage as a result of the maximum hypothetical accident. (However, dynamic effects of postulated primary loop pipe ruptures have been eliminated from the Turkey Point design basis based on the resolution of Generic Letter 84-04, "Asymmetric LOCA Loads," in NRC letter dated November 28, 1988.) Injection lines penetrate the missile barrier, and the injection headers are located in the missile protected area between the missile barrier and the containment wall. Individual injection lines, connected to the injection headers, pass through the barrier and then connect to the loops. Movement of the injection line, associated with rupture of a reactor coolant loop, is accommodated by line flexibility and by the design of the pipe supports such that no damage outside the missile barrier is possible.

Each engineered safety feature provides sufficient performance capability to accommodate any single failure of an active component and still function in a manner to avoid undue risk to the health and safety of the public.

All active components of the Safety Injection System (with the exception of some injection line isolation valves) and the Containment Spray System are located outside the containment and not subjected to containment accident conditions.

Instrumentation, motors, cables and penetrations located inside the containment are selected to meet the most adverse accident conditions to which they may be subjected. These items are either protected from containment accident conditions or are designed to withstand, without failure, exposure to the combination of temperature, pressure, radiation and humidity expected during the required operational period.

The reactor is maintained sub critical following a reactor coolant system pipe rupture accident. Introduction of borated cooling water into the core results in a net negative reactivity addition. The control rods insert and remain inserted.

The delivery of cold safety injection water to the reactor vessel following accidental expulsion of reactor coolant does not cause further loss of integrity of the Reactor Coolant System boundary.

Design provisions are made to facilitate access to the critical parts of the reactor vessel internals, injection nozzles, pipes, valves and safety injection pumps for visual or boroscopic inspection for erosion, corrosion and vibration wear evidence, and for non-destructive inspection where such techniques are desirable and appropriate.

The design provides for periodic testing of active components of the Safety Injection System for operability and functional performance. The safety injection pumps can be tested periodically during operation using the minimum flow recirculation lines provided. The residual heat removal pumps are used every time the residual heat removal loop is put into operation, and can be tested periodically on recirculation alignments.

An integrated system test can be performed during unit shutdown. This test would not introduce flow into the Reactor Coolant System but would demonstrate the operation of the valves, pump circuit breakers, and automatic circuitry upon initiation of safety injection.

The accumulator tank pressure and level are continuously monitored during reactor operation and flow from the tanks can be checked at any time using test lines.

The accumulators and the safety injection piping up to the final isolation valve is maintained full of borated water at refueling water concentration while the reactor is in operation. Flow in each of the hot and cold leg injection headers lines and in the main flow line for the residual heat removal pumps is monitored by a flow indicator.

The design provides for capability to test initially, to the extent practical, the full operational sequence up to the design conditions for the Safety Injection System to demonstrate the state of readiness and capability of the system.

These functional tests provide information to confirm valve operating times, pump motor starting times, the proper automatic sequencing of load addition to the diesel-generators, and delivery rates of injection water to the Reactor Coolant System.

The following general criteria are followed to assure conservatism in computing the required containment structural load capacity:

a) In calculating the containment pressure, rupture sizes up to and including a double-ended break of reactor coolant pipe are considered.

b) In considering post-accident pressure effects, various malfunctions of the emergency systems are evaluated including failures of a diesel-generator, an emergency containment cooler and a containment spray pump.

c) The pressure and temperature loadings obtained by analyzing various loss-of-coolant accidents, when combined with operating loads and design wind or seismic forces, do not exceed the load-carrying capacity of the structure, its access openings or penetrations.

The reinforced concrete containment is not susceptible to a low temperature brittle fracture. The containment liner is enclosed within the containment and thus is not exposed to the temperature extremes of the environs. Typically, the containment bulk ambient temperature during operation is between 50°F and 120°F. Operation with elevated normal bulk containment temperatures up to 125°F for short periods of time during the summer months has been evaluated (See Section 14.0). The material for the containment penetrations, which are designed to Subsection B of Section III ASME B&PV Code has a NDT of 0°F.

The reactor coolant pressure boundary does not extend outside of the containment. Isolation valves for all fluid system lines penetrating the containment provide at least two barriers against leakage of radioactive fluids to the environment in the event of a loss-of-coolant accident. These barriers, in the form of isolation valves or closed systems, are defined on an individual line basis. In addition to satisfying containment isolation criteria, the valving is designed to facilitate normal operation, and maintenance of the systems and to ensure reliable operation of other engineered safety features.

After completion of the containment structure an initial integrated leak rate test is conducted at the calculated peak accident pressure, to verify that the leakage rate is not greater than 0.25 per cent by weight of the containment volume per day.

Leak rate tests are performed during unit shutdowns periodically on a frequency determined by the Containment Leakage Rate Testing Program in accordance with the Technical Specifications.

Capability is provided to the extent practical for testing the functional operability of valves and associated apparatus during periods of reactor shutdown.

Initiation of containment isolation employs coincidence circuits which allow checking of the operability and calibration of one channel at a time.

Design provisions are made to the extent practical to facilitate access for periodic visual inspection of important components of the Emergency Containment Cooling and Filtering and Containment Spray Systems.

The containment pressure reducing systems are designed to the extent practical so that the spray pumps, spray valves and spray nozzles can be tested periodically and after any component maintenance for operability and functional performance.

Permanent test lines for all the containment spray loops are located so that all components up to the isolation valves at the containment may be tested. These isolation valves are checked separately.

The air test lines, for checking that spray nozzles are not obstructed, connect downstream of the isolation valves. Air flow through the nozzles is monitored by use of tell-tale devices.

Capability is provided to test initially, to the extent practical, the operational startup sequence beginning with transfer to alternate power sources and ending with near design conditions for the Containment Spray and the Emergency Containment Cooling Systems, including the transfer to the alternate emergency diesel-generator power source.

Reference Sections:

Section Title	Section
Containment	5.1
Engineered Safety Features	6
Electrical System	8.1, 8.2

1.3.8 FUEL AND WASTE STORAGE SYSTEMS (GDC 66-GDC 69)

The new and spent fuel storage racks are designed so that it is impossible to insert assemblies in other than prescribed locations. Borated water is used to fill the spent fuel storage pit at a concentration to match that used in the refueling cavity and refueling canal during refueling operations. The fuel is stored vertically in an array with sufficient center-to-center distance between assemblies to assure $k_{eff} \leq 0.95$. Criticality of the fuel assemblies in the spent fuel rack is prevented by the inherent design of the rack which limits fuel assembly interaction. This is done by fixing the minimum separation between assemblies and inserting neutron poison between the assemblies.

During reactor vessel head removal and while loading and unloading fuel from the reactor, the boron concentration is maintained at not less than that required to shutdown the core to a $k_{eff} = 0.95$. This shutdown margin maintains the core at $k_{eff} < 0.99$, even if all control rods are withdrawn from the core. Periodic checks of refueling water boron concentration ensure the proper shutdown margin.

The design of the fuel handling equipment incorporates built-in interlocks and safety features, the use of detailed refueling instructions and observance of minimum operating conditions provide assurance that no incident could occur during the refueling operations that would result in a risk to public health and safety.

The refueling water provides a reliable and adequate cooling medium for spent fuel transfer. Heat removal is accomplished with an auxiliary cooling heat exchanger.

Adequate shielding for radiation protection is provided during reactor refueling by conducting all spent fuel transfer and storage operations under water. This permits visual control of the operation at all times while maintaining low radiation levels, less than 15 mr/hr, for periodic occupancy of the area by operating personnel. Pit water level is alarmed in the control room and water to be removed from the pit must be pumped out as there are no gravity drains. Shielding is provided for waste handling and storage facilities to permit operation within guidelines of 10CFR20.

Gamma radiation is continuously monitored at various locations in the Auxiliary Building. A high level signal is alarmed locally and is annunciated in the control room.

Auxiliary shielding for the Waste Disposal System and its storage components is designed to limit the dose rate to levels not exceeding 0.5 mr/hr in normally occupied areas, to levels not exceeding 2.5 mr/hr in periodically occupied areas and to levels not exceeding 15 mr/hr in short specific occupancy areas.

All waste handling and storage facilities are contained and equipment designed so that accidental released directly to the atmosphere are monitored and will not exceed the guidelines of 10CFR100; refer also to Section 11.1.2, 14.2.2 and 14.2.3.

The refueling cavity, refueling canal and spent fuel storage pit are reinforced concrete structures with a seam-welded stainless steel plate liner. These structures are designed to withstand the anticipated earthquake loadings as Class 1 structures.

Reference sections:

Section Title	Section
Fuel Handling System	9.4
Waste Disposal System	11.1
Radiation Protection	11.2
Spent Fuel Storage Facility Modification	App 14D & 14E

1.3.9 EFFLUENTS (GDC 70)

Liquid, gaseous, and solid waste disposal facilities are designed so that discharge of effluents and off-site shipments are in accordance with applicable governmental regulations.

Radioactive fluids entering the Waste Disposal System are collected in sumps and tanks until determination of subsequent treatment can be made. They are sampled and analyzed to determine the quantity of radioactivity, with an isotopic identification if necessary. Before discharge, radioactive fluids are processed as required and then released under controlled conditions. The system design and operation are characteristically directed toward minimizing releases to unrestricted areas. Discharge streams are appropriately monitored and safety features are incorporated to preclude releases in excess of 10 CFR 20 guidelines.

The bulk of the radioactive liquids discharged from the Reactor Coolant System are processed and retained inside the plant by the Chemical and Volume Control System recycle train. This minimizes liquid input to the Waste Disposal System which processes relatively small quantities of generally low-activity level wastes.

Radioactive gases are pumped by compressors through a manifold to one of the gas decay tanks where they are held a suitable period of time for decay. Cover gases in the nitrogen blanketing system are re-used to minimize gaseous wastes. During normal operation, gases are discharged intermittently at a controlled rate from these tanks through the monitored plant vent.

Filter cartridges and the spent resins from the demineralizers are packaged and stored on-site until shipment off-site for disposal.

Reference sections:

Section Title	Section
Waste Disposal System	11.1

1.4 DESIGN PARAMETERS AND UNIT COMPARISON

The design parameters of the Turkey Point Units 3 and 4 are presented in tabular form along with the comparisons of the major parameters from the final designs of the H. B. Robinson Unit 2, Indian Point Unit 2 and Ginna plants. The purpose and evaluation of the parameter differences from the plant safety point of view among these plants are appended by reference line number. Refer to Table 1.4-1.

1.4.1 DESIGN DEVELOPMENTS SINCE RECEIPT OF CONSTRUCTION PERMIT

Burnable Poison Rods

In order to reduce the dissolved poison requirement for control of excess reactivity, burnable poison rods or integral burnable poisons are incorporated in the core design so that changes in coolant density have less effect on density of poison and the moderator temperature coefficient of reactivity becomes less positive (See Section 3.2.1).

Safety Injection System

A second high head safety injection system line and header has been added. This arrangement provides a redundant flow path for high head safety injection water to the reactor coolant loops through the hot legs. To avoid the possibility of steam binding due to injection into the hot legs early in any LOCA transient when steam generators are still relatively hot, the valves which control the flow paths to the hot legs are maintained closed by keeping the motor circuit breakers locked open at the motor control centers. This administrative control ensures that automatic or inadvertent manual actions do not result in hot leg injection.

A valved cross-over in the residual heat removal pump discharge has been added, with a valved by-pass around the residual heat exchangers. This is used to maintain a constant flow through the residual heat removal loop and to control cooldown.

An alternative path to the normal low head safety injection path is provided by MOV-872 using the RHR pumps. This alternative flow path is provided for use in the long term post-LOCA operating mode after switchover to the recirculation mode in the event a passive failure occurs in the normal low head flow path.

A fourth high head safety injection pump has been added to provide greater flexibility for the system.

The power sources for the safety injection pumps were modified. Following the modifications, each SI pump is powered by a separate emergency diesel generator, therefore, the failure of an emergency diesel generator will only result in the loss of one SI pump. Following this change, the operating unit is required to have the two SI pumps associated with the unit and one SI pump associated with the other unit operable to assure two SI pumps are operating following a single failure.

Containment Sumps

The single post-MHA containment sump at the bottom of the reactor cavity with two suction lines to the two residual heat removal pumps, has been relocated and increased to two individual, 100% capacity sumps at Elevation 14'-0". Each of the two sumps provides suction to its individual residual heat removal pump through a 14-inch diameter pipe. (See Section 6.2)

Emergency Containment Filtering System

Three emergency containment filtering units have been added. (See Section 6.3)

Safety Injection System Trip Signal

The actuating signal for the Safety Injection System is any of the following signals:

a. Two out of three high containment pressure (approximately 10% design pressure).

b. Two out of three low pressurizer pressure.

Auxiliary Coolant System

Two component cooling headers provide a means to isolate certain passive failures (defined as a 50 gpm leak). A partition has been added to the component cooling surge tank. Each compartment is connected to one component cooling header. Following isolation of the headers, leakage in one header will not communicate through the tank to the intact header.

Waste Disposal System

The boric acid reprocessing train is now part of the Chemical Volume and Control System. The waste disposal system has been designed as purely a waste process system, which includes waste evaporators, demineralizers, waste hold-up tanks, monitor tanks, condensate tank and associated pumps. The system also includes equipment to prepare the waste for disposal. (See Section 11.1.)

Thermal Power Uprate

Appropriate sections of the UFSAR have been revised to reflect thermal power uprate. The thermal power uprate will increase the current rating of 2200 Mwt to 2300 Mwt.

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1.5 DESIGN HIGHLIGHTS

The design of Turkey Point Units 3 and 4 is based upon proven concepts which have been developed and successfully applied in the construction of pressurized water reactor system. In subsequent paragraphs, a few of the design features are listed which represent slight variation or extrapolations from other units, such as San Onofre and Connecticut-Yankee, which were operating at the time of the original license application.

1.5.1 POWER LEVEL

The license application power level of 2200 MWt was larger than the capability of the Connecticut Yankee plant and represented a reasonable increase over power levels of pressurized water reactors operating at the time of the original Turkey Point license application. The capability of the nuclear steam supply system (NSSS) to operate at a thermal uprate core power level of 2300 MWt was verified in accordance with guidelines contained in the Westinghouse Topical Report WCAP-10263; this core power uprate methodology was similarly followed by the North Anna, Salem, Indian Point 2, Callaway, and Vogtle plants for their core power upratings.

1.5.2 REACTOR COOLANT LOOPS

The Reactor Coolant System for the Turkey Point Units 3 and 4 consists of three loops as compared with four loops for Connecticut-Yankee. The use of three loops for the production of 2300 MWt requires an attendant increase in the size and capacity of the Reactor Coolant System components such as the reactor coolant pumps, piping and steam generators. These increases represent reasonable engineering extrapolations of existing proven designs.

1.5.3 PEAK SPECIFIC POWER

The design rating is slightly higher than that licensed in CVTR (17 kw/ft) and slightly lower than that of Saxton (19.1 kw/ft). The maximum overpower condition is 20.0 kw/ft (112%) compared to 20 kw/ft (118%) for CVTR.

1.5.4 FUEL ASSEMBLY DESIGN

The fuel assembly design incorporates the rod cluster control concept in a canless assembly utilizing a spring clip grid to provide support for the 15 x 15 array of fuel rods. This concept incorporates the advantages of the Yankee canless fuel assembly and the Saxton spring clip with the rod cluster control scheme. Extensive out-of-pile tests have been performed on this concept and operating experience is available from the San Onofre and Connecticut-Yankee plants.

1.5.5 ENGINEERED SAFETY FEATURES

The engineered safety features provided are of the same types provided for the Connecticut-Yankee plant augmented by borated water injection accumulators. A Safety Injection System is provided which can be operated from emergency on-site diesel power. An Emergency Cooling and Filtering System is provided for post-loss-of-coolant conditions. A Containment Spray System provides cool, borated water spray into the containment atmosphere for additional cooling capacity.

1.5.6 EMERGENCY POWER

In addition to the multiple ties to offsite power sources, four emergency diesel generators are provided as emergency power supplies for the case of loss of offsite power. The emergency diesel generators are capable of operating sufficient safety injection and containment cooling equipment to ensure an acceptable post-loss-of-coolant pressure transient for any credible single failure.

1.5.7 EMERGENCY CONTAINMENT COOLING AND FILTERING SYSTEMS

Separate and independent cooling and filtering systems are provided to reduce containment pressure and airborne fission products respectively in the containment atmosphere following a loss-of-coolant accident. The three cooling units and three filtering units (2 of 3 are required) can be operated from emergency on-site diesel power.

1.6 RESEARCH AND DEVELOPMENT ITEMS

Research and development (as defined in Section 50.2 of the Code of Federal Regulations) was conducted regarding final core design details and parameters, analytical methods for kinetics calculations, safety injection (emergency core cooling) system, xenon stability, control systems and capability of reactor internals to resist blowdown forces.

1.6.1 INITIAL CORE DESIGN

The detailed core design and thermal-hydraulics and physics parameters have been finalized. The cycle one nuclear design, including fuel configuration and enrichments, control rod pattern and worths, reactivity coefficients and boron requirements are presented in Section 3.2.1 and the final thermal-hydraulics design parameters are in Section 3.2.2. Section 3.2.3 presents the fuel, fuel rod, fuel assembly and control rod mechanical design. The core design incorporates fixed burnable poison rods(1) in the initial loading to ensure a negative moderator reactivity temperature coefficient at operating temperature. This improves reactor stability and lessens the consequences of a rod ejection or loss of coolant accident. The mechanical design is presented in Section 3.2.3. Subsequent cycle specific values are calculated and reviewed prior to each cycle and are presented in Appendices 14A and 14B.

1.6.2 DEVELOPMENT OF ANALYTICAL METHODS FOR REACTIVITY TRANSIENTS FROM ROD EJECTION ACCIDENTS

A control rod ejection accident is not considered credible, since it would require the failure of a control rod mechanism housing. Nevertheless, the reactivity, and associated pressure and temperature transients for this accident have been analyzed.

Rod ejection analyses for this plant were performed using the CHIC-KIN code [2], which uses a point reactor kinetics model and a single channel fuel and coolant description. The rod ejection analysis results are given in Section 14.1 of this report, together with a brief description of the CHIC-KIN code.

Results for ejection of the highest worth rod at both beginning and end of core life and zero and full power are given in Section 14.1. These analyses show that the temperature and pressure transients associated with a rod ejection accident do not cause any consequential damage to the reactor coolant system.

The reactor core now contains fixed burnable poison rods or integral burnable poisons. These, by allowing a reduction in the chemical shim concentration, ensure that the moderator coefficient of reactivity is always negative at operating conditions.

A positive moderator coefficient was expected at operating temperatures early in the first fuel cycle in the original core design. The burnable poison rods will be borosilicate glass. Critical experiments have been conducted at the Westinghouse Reactor Evaluation Center using rods containing 12.8 w/o boron and Zircaloy clad UO_2 fuel rods, 2.27% enriched. These values are typical of this reactor also. These experiments showed that standard analytical methods can be used to calculate the reactivity worth of the burnable poison rods. The design basis and critical experiments are described in reference (1). In-core testing completed in the Saxton reactor has shown satisfactory performance of these rods.

The consequences of a rod ejection accident are now lessened because the moderator coefficient of reactivity is always negative at operating conditions. In addition, the effects of rod ejection are inherently limited in this reactor in which boric acid chemical shim is employed since the control rods need only to be inserted sufficiently to handle load changes.

1.6.5 BLOWDOWN CAPABILITY OF REACTOR INTERNALS

The forces exerted on reactor internals and the core, following a loss-of-coolant accident, were originally computed by employing the BLODWN-2 digital computer program developed for the space-time-dependent analysis of multiloop PWR plants. The BLODWN-2 code has been superseded by the MULTIFLEX code. This newer program, the models used, and the results, are discussed in Section 14.3.3.

REFERENCES, Section 1.6

1) Wood, P.M., Baller, E.A., et al, "Use of Burnable Poison Rods in Westinghouse Pressurized Water Reactors," WCAP 7113 (October 1967), NON-PROPRIETARY.

2) Redfield, V.A., "CHIC-KIN...A Fortran Program for Intermediate and Fast Transients in a Water Moderated Reactor," WAPD-TM-479, (January 1, 1965).

3) Poncelet, C.G. and Christie, A.M., "Xenon Induced Spatial Instabilities in Large Pressurized Water Reactors," WCAP-3680-20, (March 1968), NON-PROPRIETARY.

4) McGaugh, J.D., "The Effect of Xenon Spatial Variations and the Moderator Coefficient on Core Stability," WCAP-2983, (August 1966), PROPRIETARY.

5) Westinghouse Report, "Power Distribution Control in Westinghouse PWR's," WCAP-7208, (October 1968), PROPRIETARY. The NON-PROPRIETARY version of this document is WCAP-7811.

6) Westinghouse Report, "Power Maldistribution Investigations", WCAP-7407-L, (January 1970), PROPRIETARY.

1.7 IDENTIFICATION OF CONTRACTORS

Turkey Point Units 3 and 4 are being supplied and constructed under two basic agreements. The first is between the Westinghouse Electric Corporation and Florida Power & Light Company in which Westinghouse has agreed to furnish the Nuclear Steam Supply Systems and associated auxiliary equipment, and the turbine generators with accessories, and technical services. The second is between the Bechtel Corporation and Florida Power & Light Company in which the Bechtel Corporation agreed to perform all phases of construction in accordance with the plans and engineering of Bechtel Associates. Bechtel procures all materials to complete the units.

Florida Power & Light Company reviews specifications, plans and engineering, and inspects and approves the construction.

Operation will be solely by Florida Power & Light Company using Westinghouse and Bechtel advisory and consulting service.

Florida Power & Light Company has engaged many consultants to conduct investigations and studies relative to the natural sciences and they are listed in Section 2.1. Further, Southern Nuclear Engineering, Inc, has been retained as a consultant on safety matters.

1.9 QUALITY ASSURANCE PROGRAM

The following Section 1.9 of this updated FSAR is reflective of the Quality Assurance Program applicable to the design, procurement, and construction of systems, components, and structures of Turkey Point Units 3 and 4 and is maintained here for completeness. Subsequent to the operating license, Florida Power & Light has established and implemented a Quality Assurance Program as described in the FPL Topical Quality Assurance Report which is in compliance with the requirements of Appendix B to 10 CFR 50 and approved by the NRC.

The system, components, and structures to which the Topical QA Report program is applicable were set forth in the Turkey Point Units 3 and 4 Q-List which was approved by Florida Power & Light Nuclear Engineering Department. FPL developed the Total Equipment Data Base (TEDB) in 1986 to expand the fields in the Plant Q-List. The Plant Q-List and the TEDB have been concurrently updated to reflect the latest as-built configuration. Both documents have been used in parallel since the development of the TEDB in 1986. The TEDB was not used as a sole source for design information until the Plant Q-List was replaced with the TEDB in 1990. The TEDB contains as-built and approved alternate information on a component level.

1.9.1 PURPOSE

The purpose of this program is to establish quality assurance requirements for those systems, components, and structures, herein identified, which by reason of their association with the safety requirement of the nuclear units have had criteria and design bases established for them in the A.E.C. license application. The program describes the organization, procedures, and actions taken by Florida Power & Light Company and its consultants, contractors and suppliers to assure that all applicable criteria and design bases have been correctly translated into specifications, plans, and drawings, and that the systems, components, and structures have been fabricated, erected, installed, and constructed in accordance with the design requirements.

1.9.2 APPLICABILITY

The systems and structures to which this program is applicable are set forth below. It is understood that such systems and structures include associated

tanks, pumps, valves, piping, controls, instruments, supports, enclosures, wiring, and power supplies. In general these systems, components, and structures have a vital role in the prevention or mitigation of the consequences of accidents which could cause risk to the health and safety of the public.

1. <u>Reactor Coolant System</u>
   Reactor vessel
   Reactor vessel internals
   RCC assemblies and drive mechanisms
   Steam generators
   Reactor coolant pumps
   Pressurizer and relief tank
   All reactor coolant piping, plus any other lines carrying reactor coolant under pressure

2. <u>Containment System</u>
   Containment structure including polar crane
   Containment penetrations and cooling systems including personnel and equipment access penetrations
   All lines penetrating the containment, up to and including the first isolation valves

3. <u>Main Steam and Feedwater Lines within the Containment</u>

4. <u>Main Steam Safety, Isolation and Atmospheric Dump Valves</u>

5. <u>New Fuel Storage Facilities</u>

6. <u>Auxiliary Feedwater System</u>
   Auxiliary feedwater pumps and turbine drivers
   Condensate storage tank
   Steam, condensate and feedwater lines of auxiliary feedwater system

7. <u>Emergency Diesel Generators, Day Tanks and Storage Tanks and Associated Starting Equipment</u>

8. Containment Polar Crane and Rail Support (Unloaded)

9. Refueling Water Storage Tanks

10. Emergency Containment Cooling and Filtering Units

11. Intake Cooling Water Systems
   Intake structure and crane supports
   Intake cooling water pumps and motors
   Intake cooling water piping, from pumps to component cooling water heat exchanger inlets

12. Component Cooling System
   Component cooling heat exchangers
   Component cooling pumps and motors
   Residual heat removal pumps and motors (low-head safety injection pumps)
   Residual heat removal heat exchanges
   Component cooling surge tanks
   Component cooling head tank (Unit 4 only)

13. Spent Fuel Storage Facilities
   Spent fuel pit and racks
   Spent fuel pit pump and motor
   Spent fuel pit heat exchanger
   Spent fuel pit demineralizer

14. Safety Injection System
   Containment spray pumps and motors
   Low-head safety injection pumps and motors (residual heat removal pumps)
   High-head safety injection pumps and motors
   Containment spray headers

   Accumulator system
   Containment recirculation sumps

15. Chemical and Volume Control System
    Charging pumps
    Volume control tank
    Boric acid blender
    Boric acid tanks
    Boric acid transfer pumps
    Boric acid filters
    Heat exchangers
    Primary water storage tank

16. Fuel Transfer Tube

17. Motor-Driven Fire Pumps

18. Instrument Air System
    Dryers
    Receivers

19. Auxiliary Building Exhaust System

20. Control Building Ventilating System

21. Fuel Handling System

22. Vessel and Internals Lifting Devices

23. Electrical System

1.9.3 ORGANIZATION

Charts of the Turkey Point Quality Assurance organization are attached hereto as Figures 1.9-1, 1.9-2 and 1.9-3. Responsibility for quality assurance rests with Florida Power & Light Company's Vice President of Power Plant Engineering and Construction. Reporting to him is the Manager of Power Plant Engineering who is responsible for administration of all Florida Power & Light Company power plant engineering functions. A project Manager has been assigned to the Turkey Point Units No. 3 and 4 project. The

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2.1 SUMMARY

Data are presented in this section which provide a basis for the selection of design criteria for hurricane, tornado, flood and earthquake protection, and to state the adequacy of concepts for controlling routine and accidental release of radioactive liquids and gases to the environment. Field programs to investigate geology, seismology, hydrology, have been completed. A meteorological field program was in effect until mid 1970. A modified program will continue throughout the nuclear unit operation. Additional information on site characteristics and meteorology is provided in licensing correspondence concerning Turkey Point Units 3 & 4 compliance with 10 CFR Part 50 Appendix I. [(1)] [(2)]

The site is on the shore of Biscayne Bay, about 25 miles south of Miami, Florida. The area immediately surrounding the site is low and swampy, very sparsely populated and unsuited for construction without raising the elevation with fill. The nearest farming area lies in the northwest quarter of a five mile arc from the site.

The immediate area surrounding the nuclear units is flat and rises very gently from sea level at the shoreline of Biscayne Bay to an elevation of about 10 ft. above Mean Sea Level (MSL) at a point some 8 to 10 miles west of the site. To the east, 5 to 8 miles across Biscayne Bay, is a series of offshore islands running in a northeast-southwest direction between the Bay and the Atlantic Ocean, the largest of which is Elliott Key. These islands are undeveloped with the exception of approximately 60 part-time residents scattered throughout the Keys. A Dade County public park is located eight tenths of a mile north of the northern containment (Unit 3) and is occupied on a day time transient basis.

(1) Letter L-76-212, "Appendix I Evaluation", dated June 4, 1976 from R. E. Uhrig of Florida Power and Light to D. R. Muller of the USNRC.
(2) Letter L-76-358, "Appendix I Additional Information", dated October 14, 1976 from R. E. Uhrig of Florida Power and Light to G. Lear of USNRC Branch No. 3.

Air movement at the site prevails almost 100 percent of the time. Prevailing winds are out of the southeast. The atmosphere in the area is generally unstable with diurnal inversions occurring fairly frequently. Inversions are almost invariably accompanied by continually shifting wind directions most of which are from the off-shore quadrants.

The Miami area has experienced winds of hurricane force periodically, and the plant may be subjected to flood tides of varying heights. External flood protection is described in Appendix 5G.

Circulating water and intake cooling water discharged from Units 1, 2, 3 and 4 flows to a closed cooling system as described in Section 2.3.3 of the Environmental Report Supplement submitted to the AEC on November 8, 1971, with interim flow to Biscayne Bay and Card Sound, in accordance with the Final Judgement, Civil Action No. 70-328-CA in the United States District Court for the Southern District of Florida of September 10, 1971 (Appendix 6 in the Environmental Report Supplement).

The normal direction of natural drainage of surface and ground water in the area of the site is to the east and south toward Biscayne Bay and will not affect off-site wells. The Pre-Operational Surveillance Plan, which is a radiological background study of the Turkey Point area, was initiated prior to initial startup of Unit 3. Samples of air, soil, water, marine life, vegetation, etc. in the area were collected and studied.

The site has underlying limestone bedrock on which has been placed compacted limestone rock fill to elevation + 18 MLW. The major structures have been founded on this fill. The bedrock beneath is competent with respect to

foundation conditions for the nuclear units. The area is in a seismologically quiet region, as all of Florida is classified Zone 0 (the zone of least probability of damage) by the Uniform Building Code, published by International Conference of Building Officials. Despite the lack of any substantiating earthquake history, the units have been designed for an earthquake of .05g and all safety features have been checked to determine that no loss of function will occur in case of an earthquake of .15g horizontal ground acceleration.

The following specialists in environmental sciences have participated in developing site information:

First Research Corporation of Miami, Fla.	Population and Land Use (Sections 2.4 and 2.5)
Professor Homer W. Hiser Mr. Harold P. Gerrish Professor Harry V. Senn All from Radar Meteorological Laboratory, University of Miami, Institute of Marine Science	Climatology Section 2.6
Mr. Richard O. Eaton, P.E., Hydraulic Engineer Mr. Theodore E. Haeussner, Hydraulic Engineer U. S. Corps of Engineers Mr. J. W. Johnson, University of California	Hurricane Flooding and Wave Run Up Section 2.6 and Appendix 2B
Mr. Lester A. Cohen Mr. John A. Frizzola Meteorologists, Brookhaven National Laboratory	Meteorology, On Site and Diffusion Section 2.6 and Appendix 2A
Dames & Moore, Atlanta, Georgia Professor John A. Stevens, Associate Professor Civil Engineering, University of Miami	Hydrology, Geology, Seismology and Foundations Sections 2.7, 2.9, 2.10, 2.11
Dr. William S. Richardson, Associate Professor of Oceanography, University of Miami Institute of Marine Science Dr. Donald W. Pritchard and Dr. James Carpenter, both of Johns Hopkins University, Cheasapeake Bay Institute Dr. Robert Dean University of Florida Marine Acoustical Services, Oceanographers of Miami	Hydrology, Biscayne Bay and Oceanography Sections 2.7, 2.8 and Appendix 2C
Dr. George W. Housner, Consultant California Institute of Technology	Earthquakes Section 2.11

Dr. James B. Lackey, Professor Emeritus, University of Florida Dr. Charles B. Wurtz, LaSalle College Dr. Joseph Davis, University of Florida Dr. Edwin S. Iverson Dr. C. P. Idyll Dr. Durbin Tabb Dr. E. J. Ferguson Wood Mr. Richard Nugent All of the University of Miami, Institute of Marine Science	Ecology: Plankton Invertibrates Marine botany Vegetation (bay) Fish & food chain
Dr. Roger Yorton, University of Florida	Chemistry, Bay Water
Bechtel Associates, Gaithersburg, Md. Bechtel Corporation, Various U.S. offices Southern Nuclear Engineering, Inc. Dunedin, Florida; Washington, D.C. Westinghouse Electric Corporation Atomic Power Division, Pittsburgh, Pa.	General
Ebasco Services Incorporated, New York, NY	Subsurface Conditions Section 2.9.4

2.1.1 DESIGN CRITERIA

Performance Standards

Criterion: Those systems and components of reactor facilities which are essential to the prevention or to the mitigation of the consequences of nuclear accidents which could cause undue risk to the health and safety of the public shall be designed, fabricated, and erected to performance standards that will enable such systems and components to withstand, without undue risk to the health and safety of the public the forces that might reasonably, be imposed by the occurrence of an extraordinary natural phenomenon such as earthquake, tornado, flooding condition, high wind or heavy ice. The design bases so established shall reflect: (a) appropriate consideration of the most severe of these natural phenomena that have been officially recorded for the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design. (GDC 2)

The forces that might be imposed by postulated extraordinary natural phenomenon such as earthquakes, storms and flooding have been analyzed and used in the design as discussed in detail in Section 5.

FINAL SAFETY ANALYSIS REPORT

FIGURE 2.2-3

REFER TO ENGINEERING DRAWING

5610-C-1168, SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNITS 3 & 4

GENERAL SITE FEATURES

FIGURE 2.2-3

2.4 POPULATION DISTRIBUTION

This section presents updated population estimates for the area surrounding the Turkey Point Nuclear Power Plant. The 1990 population estimates for the 10- and 50-mile areas surrounding the Turkey Point nuclear units are based on 1990 US Census figures. The 1995 population estimates are based on population changes from the 1980 Census and 1985 Dade County Traffic Analysis Zones (TAZs) data, and projections to 1995. In addition, county-wide projections for each of the counties within 50 miles of the plant were used to estimate populations in the years 2000, 2005, 2010, and 2013. The methodologies employed and results of these studies are detailed in the following sections.

2.4.1 POPULATION WITHIN 10 MILES

The Turkey Point Nuclear Power Plant, located in Dade County, Florida, has an estimated 105,679 people who reside within 10 miles of the plant. Figure 2.4-1 and Table 2.4-1 show the sector distribution of the resident population within 10 miles, in rose and tabular form, respectively. All of the resident population within 10 miles of Turkey Point live between 5 and 10 miles.[1,3]

The damage to South Dade County caused by Hurricane Andrew in 1992 resulted in a population shift of some residents of the area to the upper keys, North Dade and South Broward Counties. This population shift is expected to be temporary with relocation back to the area occurring as rebuilding progresses.

Cities, Towns and Settlements

Most of the area within 10 miles of the plant is in Dade County. A small portion of the 10-mile area, south and southeast of the plant, is in Monroe County. The largest population center within 10 miles is the city of Homestead in Dade County. The city of Homestead lies west and west-northwest of the plant. Most of its area is located between 5 and 10 miles of the plant, except for a small portion which extends beyond 10 miles from the plant. The 1990 resident population in Homestead is estimated to be 26,866.[1] The city has experienced a population growth of about 30% over its 1980

population of 20,668.[13] This represents an average annual increase of about 3%. Florida City lies immediately south of Homestead. Approximately 90% of Florida City's land area is within 10 miles of the plant. In 1980, this city's population was 6,174.[13] Since that time, the number of persons residing in this community has decreased about 6% to 5,806,[1] according to 1990 Census figures.

The remainder of Turkey Point's 10-mile area is unincorporated. Most of the area south and southwest of the plant consists primarily of marshland and glades, and contains no resident population. The area west and northwest within 5 miles of Turkey Point consists mainly of agricultural land. Homestead Bayfront Park and the Biscayne National Park Headquarters are located approximately two miles north-northwest of the plant. There are no permanent residents within 5 miles of the plant. Northwest of the plant between 5 and 10 miles is the Homestead Air Force Base. Most of the Base is located in sector NW 5-10. The area along the perimeter of the Base is intensively developed with air force personnel housing.

All of the residential development within 10 miles has occurred in sectors W 5-10 through N 5-10. The population in these sectors is concentrated on either side of US Highway 1, from Homestead/Florida City to the southern Miami suburbs.

That portion of Monroe County within Turkey Point's 10-mile radius includes the northern tip of Key Largo. Virtually all of the residents in this area can be found at the Ocean Reef Club. The Ocean Reef Club is a privately-owned community, used both as year-round and seasonal residences. The distinction between a year-round and seasonal residence is not clear, since many people may reside at the Club for six months out of the year. The 1990 Census data includes about half of the population at the Club as residents. About 1,427 residents at the Club were estimated to be located within 10 miles of the plant.[1]

Population by Annular Sectors

The most heavily populated annular sector within 10 miles of Turkey Point is sector WNW 5-10, with an estimated 37,006 residents in 1990. This annular sector includes the majority of Homestead's population, as well as a densely developed area off U.S. Highway 1 on the outskirts of Homestead, known as Leisure City.

Population by Annuli

The annuli within 5 miles of the plant contain no residents. All of the

resident population is situated in the 5- to 10-mile annulus, with a total population of 105,679.

Population by Sectors

Of the six sectors which have resident population, sector WNW has the highest population, with 37,006 people. The second highest is sector NW, with a total of 24,813 residents. This sector includes most of the residential developments at Homestead Air Force Base and dense developments off U.S. Highway 1, primarily along the southeast side of the highway.

Projected Population for the Year 1995

The population within 10 miles of the Turkey Point plant is projected to increase by a little more than 4% over the next 5 years. The 1995 resident population is projected to be 110,037, based on trends experienced in the past 5 to 10 years. Figure 2.4-2 and Table 2.4-2 show the distribution of the 1995 population in rose and tabular form, respectively.

Growth in the vicinity of Homestead is expected to increase at a slightly faster rate than the 10-mile area as a whole. These projections are based on 1980 Census, 1985 TAZ, and 1990 Census figures.[1,12,13,19]

There are several new and expanding residential developments in the 10-mile area which may account for a portion of the area's moderate growth in the past and its projected growth over the next five years. The largest new development identified during a 1988 field study was Keys Gate at the Villages of Homestead, where 6,200 units are planned over a 12-year period.[33] This residential development is located in sector WNW 5-10. Sector NNW 5-10 includes the Cutler Landings and Hartford Square developments. In 1988, these two developments included about 1,280 residences, with 326 more units planned.[35,40] Another new development in sector N 5-10 is Lakes by the Bay, off of Cutler Road.[41] Sectors S, SSW, SW, and WSW out to 10 miles are not projected to be developed. This area includes primarily swamp land.

2.4.2 POPULATION WITHIN 50 MILES

An estimated 2,613,535 people reside within 50 miles of the plant.[1] Figure 2.4-3 and Table 2.4-3 show the sector distribution of the resident population within 50 miles, in rose and tabular form, respectively.

Cities, Towns and Settlements

Four counties fall within 50 miles of the plant: Dade, Monroe, Broward and Collier. Dade County is entirely within the 50-mile boundary. A large majority of Monroe and Broward Counties also lie within the area, while only a small portion of Collier County falls in the 50-mile area. The largest population center within 50 miles of the plant is the City of Miami in Dade County. It extends out over the northern, northwestern, and northeastern sectors. The 1990 resident population in Miami City is 358,548.[1] The city has experienced a population growth of about 3% over its 1980 population of 346,865.[13] A more substantial growth has occurred in the area of Key Largo, in Monroe County, located in the southern and southwestern sectors. The population of Key Largo in 1990 is estimated to be 11,336.[1] This is a 52% growth over the 1980 population of 7,447.[13] The largest city in Broward County, with a population of 143,444[1] in 1990, located within 50 miles of the plant is Fort Lauderdale. The population in this city experienced a 6% decrease over the 1980 population of 153,279 based on Census information.[13] Collier County contains no population within 50 miles of the plant.

Most of the area west and southwest of the plant between 10 and 50 miles consists primarily of marshland and glades, and contains little population. The eastern, southeastern, and northeastern sectors consist primarily of Atlantic Ocean. Aside from boaters and park visitors, there is no resident population in these sectors.

Population by Annular Sectors

The most heavily populated annular sector within 50 miles of Turkey Point is sector N 20-30, with an estimated 430,335 residents in 1990. This annular sector includes the majority of Miami's population, and Miami Beach.

Population by Annuli

The 20- to 30-mile annulus contains the largest population, with 902,461 residents. The second highest annulus with a population of 707,175 is from 30 to 40 miles. Again, this is due primarily to the intensive development north of the plant in the area of Miami and its suburbs.

Population by Sectors

Of the 11 sectors which have resident population, sector N has the highest population, with 1,330,570. The second highest is sector NNE, with a total of 972,816 residents. These sectors contain all of Miami's residents.

Projected Population for the Year 1995

The population between 10 and 50 miles of the Turkey Point plant is projected to increase by approximately 11% over the next five years. The 1995 resident population, based on this growth rate and the 0-10 mile growth rate, is projected to be 2,893,758. The Census population from 1980 and 1990 as well as the percent growth rate for the four counties located within 50 miles is presented below.

County	1980 Census Data	1990 Census Data	% Growth (10 Years)
Broward	1,018,257	1,255,488	+23.3
Collier	85,971	152,099	+76.92
Dade	1,625,724	1,937,094	+19.15
Monroe	63,188	78,024	+23.48
TOTAL	2,793,140	3,422,705	+ 22 Average

Collier County does not contribute any population in the 50 mile area and, therefore, its growth rate does not affect these projections.

The population within 50 miles is projected to grow by an average annual rate of a little more than 2% over the next 5 years. Growth in Monroe and Broward County is expected to increase at a slightly faster rate, while Dade County will increase at a slower rate than the 50-mile area as a whole.[1,13]

2.4.3 TRANSIENT POPULATION FOR YEARS 1990 AND 1995

The transient population includes both seasonal visitors staying at overnight accommodations and daily transients. Daily visitors may include persons attending special events and visiting local attractions. Persons attending colleges and major employment facilities constitute daily transients as well. However, many of the daily visitors are also residents in the area, and it is difficult to determine how many of these visitors are also residents.

The population associated with each of the sources listed above was estimated during a 1988 study and projected to 1993. The population figures presented in this report are based on the 1988 data. The estimated peak 1990 number of transients expected within 10 miles of Turkey Point is about 21,019. This is presented in Figure 2.4-5 and Table 2.4-5, in rose and tabular form, respectively. The resultant 1995 transient population within 10 miles is presented in Figure 2.4-6 and Table 2.4-6. The transient population in the 50-mile area was not determined in this study. The transient population components are listed below.

The rebuilding of South Dade County, necessitated by the damage caused by Hurricane Andrew in 1992, has resulted in the temporary influx of construction personnel. These individuals are, in many cases, in the area only during daylight hours. As rebuilding progresses, it is expected that their numbers will diminish.

Tourists and Seasonal Visitors

The Turkey Point 10-mile area does not experience a significant influx of transient visitors during the winter months. The area does not particularly cater to tourists, since the lack of usable shoreline (i.e., sandy beaches) has prevented the development of major resort facilities. The largest influx of seasonal residents can be found at the Ocean Reef Club in Key Largo. The Ocean Reef Club is a private resort located on the northern tip of Key Largo in Monroe County. It is in annular sector SSE 5-10. The resort has about 1,200 single-family, multi-family, and tourist accommodations.[12,23] In 1988, the Ocean Reef Club was the only resort within 10 miles of Turkey Point.

There are a number of hotel/motel accommodations within 10 miles of Turkey Point in Dade County, most of these being in the Homestead/Florida City area. There are also several campgrounds in the area for visitors using recreational vehicles. The number of seasonal visitors staying at private residences in the 10-mile area was estimated based on the percentage of seasonal units as published in the 1980 U.S. Census of Housing.[14] Since the nature of the area

has not changed significantly in the past few years, this approach was deemed to be appropriate for the Turkey Point area. The total number of overnight tourist and seasonal visitors within 10 miles of the plant is estimated to be 7,396 in 1990. In 1995, the number of seasonal visitors is projected to increase to 8,129. Many of the residents at the Club are accounted for as permanent residents and are included in Section 2.4.1. The remaining were considered to be seasonal residents.

Major Attractions and Events

The Homestead Bayfront Park and Biscayne National Park are the two major recreational parks in the Turkey Point 10-mile area. Both parks, located adjacent to one another are in annular sectors N 1-2 and NNW 1-2. Homestead Bayfront Park is a large recreational park south of the North Canal on Biscayne Bay which also includes a marina. Over 6,000 visitors may attend this park during one week.[37] On the northern side of the Canal is the Biscayne National Park Headquarters. Biscayne National Park includes much of the shoreline from Turkey Point north to Key Biscayne, Biscayne Bay and a number of outer islands. Elliot Key, one of the park's islands, includes a recreational area with a visitor center and camping facilities. In 1987, almost 608,000 visitors attended Biscayne National Park.[36] The Homestead MotorSports Complex, located approximately 5.1 miles west of the plant, currently plans to host at least three major events each year, in addition to several dozen smaller events throughout the year. The complex has a maximum capacity of 65,000 people. Table 2.4-7 shows the estimated 1990 and 1995 population associated with the recreational facilities identified within 10 miles of Turkey Point. A ballpark is located approximately 8 miles west of the plant.

The population associated with major special events is listed in Table 2.4-8. The largest events are those associated with the Homestead MotorSports Complex which occur approximately 6 days per year. These events attract about 65,000 visitors. In addition, Homestead Frontier Days attracts about 50,000 visitors during two weeks in January and February. During the two weeks, a number of special attractions are open to the public including the Homestead Rodeo, BMX National Bicycle Race and the Antique Car Show.[18] These individual events

attract thousands of visitors to the area. It is difficult to distinguish between those visitors that live inside the 10-mile radius and those that live outside of it. For the purposes of this study, the peak one-day attendance associated with the Homestead Rodeo has been included in the daily transient population, assuming that 50% of the visitors live beyond the 10-mile radius.

Population at Major Industrial Facilities

Major employment facilities within 10 miles of the plant were identified in 1988 from industrial directories.[7,8] Facilities with at least 50 employees were included in this population segment. Table 2.4-9 lists the employment facilities identified. The Homestead Air Force Base is the largest employer in the Turkey Point 10-mile area, employing about 1,900 non-military personnel in 1988.[20] It is reasonable to assume that many of the employees within 10 miles are probably also residents of the area. For this reason, it was assumed that about half of the employees live beyond the plant's 10-mile radius and would therefore contribute to the transient population segment.

Population at Major Colleges

Table 2.4-10 lists the major colleges identified within the Turkey Point 10-mile radius. In 1988, the Homestead Air Force Base, in annular sector NW 5-10, had four college branches on-site.[45,46,47,48] These campuses are open to both military personnel and civilians. In addition to the Base branch, Miami Dade Community College also has a Homestead branch. The 1990 student population was estimated based on the 1988 enrollment levels presented in Table 2.4-10. The estimated 1990 student population is about 2,120 students. In 1995, the number of students is projected to increase to almost 2,800 based on the 1988 study data. As with employees, students attending colleges in the area were included in the transient population segment assuming that 50% of them live beyond the 10-mile area.

2.4.4 LOW POPULATION ZONE

There are no residents within the Turkey Point low population zone (LPZ), based on 1990 Census data. Homestead Bayfront Park is the closest recreational area to the plant and is about two miles north of the plant. About 900 visitors may be present during a peak day at the park. Immediately north is the Biscayne National Park Headquarters in annular sectors N 1-2 and NNW 1-2.

2.4.5 POPULATION CENTER

The closest population center of 25,000 residents or more, is the city of Homestead. Homestead has a 1990 population of about 26,866.[1] Homestead's political boundary is about five miles from the plant at its closest point.[26] However, no resident population exists at this distance from the plant. The nearest populated area of the city of Homestead lies about 8.5 miles west of the plant.

2.4.6 POPULATION DENSITY

The cumulative population densities within 10 miles and 50 miles of the Turkey Point plant are presented in Tables 2.4-11 and 2.4-12, respectively. Sector WNW has the highest cumulative population density with an average of 1,885 persons/square mile in the 10-mile area and sector N in the 50-mile area with 2,711. A large portion of the city of Homestead is located within the WNW sector in the 10-mile area and a large portion of Miami is in the N sector. The cumulative population densities presented in Tables 2.4-11 and 2.4-12 show that in 1990, of the six sectors within 10 miles which contain residents, five annular sectors exceed 500 persons/square mile. Sixteen annular sectors in the 50-mile area exceed 500 persons/square mile.

2.4.7 METHODOLOGY FOR ESTIMATING THE 1990/1995 RESIDENT POPULATION

The methodology used to estimate the 1990 and project the 1995 resident population within 10 miles of the Turkey Point Nuclear Power Plant are outlined below:

1. 1990 population and 1980 population and housing information was collected from the U.S. Census Bureau,[1,12,13,14] and the State of Florida Division of Population Studies.[3,4] In addition, the 1985 population by Traffic Analysis Zone was obtained from the Metro-Dade Transit Agency.[19,25]

2. U.S. Geological Survey (USGS) maps[2] and Census Bureau maps[1] were obtained. The site's reactor center was used as the centerpoint for both the 10- and 50-mile area population estimates. Computer-generated

circles at distances of 1, 2, 3, 4, 5, and 10 miles from the plant were overlayed onto maps for the 10-mile estimate and at 10, 20, 30, 40, and 50 miles for the 50-mile estimate. These computer generated circles were also divided into 22.5 degree sectors representing the 16 cardinal compass points.

3. The final 1990 resident population distribution for the 10- and 50-mile areas was estimated and disaggregated to sectors based on 1990 Census tract boundaries for Dade, Monroe, Broward, and Collier counties. The total population within each Census Tract was disaggregated to sectors based on the estimated percentage of population within each sector, as determined through further breakdown of Census Blocks.

4. The 1995 resident population within 10 miles was projected based on the growth trends of the 10-mile area in the past 5 to 10 years. The 1985 Traffic Analysis Zone boundaries falling within each 1990 Census Tract were examined to estimate the 1985 population within each Census Tract. The growth rate between 1985 and 1990 was then calculated. An average growth rate for each sector was then calculated based on the Census Tracts included within a particular sector. The only exception to this was a slightly different methodology used for the Western sector, where TAZ and Census Tract boundaries could not be easily correlated with each other. In this case, the average growth rate of the combined populations of Homestead and Florida City, based on the 1980 and 1990 Census, was applied since these two municipalities make up essentially all of the population within the Western sector.

   The 1995 resident population for the 10- to 50-mile area was projected based on the average growth rate of the counties within 50 miles of the plant, as determined through 1980 and 1990 U.S. Census figures. A calculated growth rate of 11% was applied to the 1990 estimate, for developing the 1995 projections. The same distribution used for 1990 was applied to the 1995 projections.

2.4.8 METHODOLOGY FOR ESTIMATING THE 1990/1995 TRANSIENT POPULATION

The transient population within 10 miles of the plant was estimated based on the number of seasonal overnight visitors and daily visitors. Overnight visitors include seasonal residents, and persons on vacation staying at hotels/motels, campgrounds or with friends. Daily visitors may include those persons attending special events, visiting major attractions, working in the area, or attending major colleges.

In 1988, a field and telephone survey was conducted for the 10-mile area to identify facilities and events associated with the transient population. At that time, the transient population was also projected to 1993 based on the overall growth rate of the 10-mile area. The 1990 transient population presented in this report is based on the information collected in 1988. The 1990 figures were interpolated from the 1988 and 1993 estimates. The 1995 projections for the transient population were also based on the 1988 data, and extend the 1993 projections for two additional years. Each component of the transient population is discussed in more detail below. The methodologies described below outline the procedures carried out during the 1988 study. Where appropriate, additional explanations are provided based on 1990 data.

Overnight Population

The number of seasonal visitors staying at hotels and motels within 10 miles of the plant was calculated based on the number of units at each facility and the specific location of them. The total number of units was multiplied by an average occupancy rate of 2.0 persons per room to calculate the total population associated with these overnight accommodations. Sources used to identify these tourist accommodations included telephone directories,[11] Chamber of Commerce publications,[21,22] and a field survey conducted in 1988.[5]

The number of seasonal visitors at the Ocean Reef Club on Key Largo was calculated based on the estimated number of units at the Club and using an average occupancy factor of 2.0 persons per unit. Approximately half of these residents were counted by the 1990 U.S. Census as permanent residents. The remaining residents were considered seasonal for the purposes of this study.

Since the 10-mile area within Dade County does not provide much in the way of tourist amenities, the number of visitors staying at private residences was not considered to be significant. According to the 1980 U.S. Census of Housing, approximately 0.5% of all housing units in the area were used by seasonal visitors.[14] This same percentage was applied to the 1990 resident estimates to calculate the number of seasonal visitors staying at private residences.

Transient Population at Recreational Attractions and Events

In order to estimate the population at the two major recreational areas within 10 miles of the plant, Biscayne National Park and Bayfront Park, personnel at each of these facilities were contacted.[36,37] At Biscayne National Park, the yearly attendance level was divided by 365 days to estimate a daily attendance at the park. The number of visitors at Elliot Key was estimated based on the yearly number of persons counted at the Visitor Center, the maximum capacity of boat tours to the island[42] and the number of campsites available. At Bayfront Park, a weekly visitor total was divided by seven days to estimate the daily attendance at the park.

The capacity of the Homestead MotorSports Complex (HMC) is 65,000 people, and this complex is expected to be near capacity approximately 6 days per year.

The capacity of the Homestead Baseball Stadium is approximately 9500.

The highest average daily attendance for a single event (Rodeo) during Homestead Frontier Days in Homestead was used to calculate the daily transient population associated with this major recreational event. Since many of the visitors to this yearly event may also be residents, it was assumed that 50% of these visitors contribute to the transient population and the other 50% are already accounted for in the resident or overnight population.

Transient Population at Major Employment Facilities

The largest employers in the 10-mile area have been listed in Table 2.4-9, along with the number of employees at these facilities as determined during the 1988 field study.[7,8] It is reasonable to assume that many of these

2.4.10 REFERENCES (Cont'd)

31. Manager, Park Motel, Personal Communication, February 1988.

32. Manager, Lucy's Motel, Personal Communication, February 1988.

33. Manager, Keys Gate at the Village of Homestead, Homestead, Personal Communication, February 1988.

34. Manager, San Remo Townhomes, Homestead, Florida, Personal Communication, February 1988.

35. Manager, Hartford Square, Personal Communication, February 1988.

36. Supervisory Park Ranger, Biscayne National Park, Personal Communication, February 1988.

37. Manager, Homestead Bayfront Park and Marina, Personal Communication, February 1988.

38. Manager, Royal Colonial Mobile Home Estates, Personal Communication, February 1988.

39. Manager, Goldcoaster Mobile Home and Travel Trailer Park, Personal Communication, February 1988.

40. Manager, Cutler Landings, Personal Communication, February 1988.

41. Manager, Lakes By the Bay, Florida Personal Communication, February 1988.

42. Boat Captain, Biscayne Aqua Center, Personal Communication, February 1988.

43. Management Information Services, Florida Department of Education, Tallahassee, Florida; Personal Communication, February 1988.

44. Branch Manager, American Red Cross, Greater Miami Chapter, Personal Communication, March 1988.

45. Student Information. Barry University, Homestead Air Force Base Center, Homestead, Florida, Personal Communication, March 1988.

46. Student Information. Miami Dade Community College, Homestead Branch, Personal Communication, March 1988.

2.4.10 REFERENCES (Cont'd)

47. Student Information. Saint Leo College, Homestead Air Force Base, Personal Communication, March 1988.

48. Student Information. Embry Riddle Aeronautical University, Homestead Air Force Base Branch, Personal Communication, March 1988.

TABLE 2.4-1

1990 RESIDENT POPULATION
WITHIN 10 MILES
OF TURKEY POINT PLANT*

	DISTANCE (MILES)						TOTAL
DIRECTION	0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	0	0	0	0	15,799	15,799
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	1,427	1,427
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	10,641	10,641
WNW	0	0	0	0	0	37,006	37,006
NW	0	0	0	0	0	24,813	24,813
NNW	0	0	0	0	0	15,993	15,993
TOTAL	0	0	0	0	0	105,679	105,679

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* Based on the 1990 U.S. Census.

TABLE 2.4-2

1995 PROJECTED RESIDENT POPULATION
WITHIN 10 MILES
OF TURKEY POINT PLANT*

	DISTANCE (MILES)						TOTAL
DIRECTION	0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	0	0	0	0	16,115	16,115
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	1,783	1,783
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	11,812	11,812
WNW	0	0	0	0	0	38,856	38,856
NW	0	0	0	0	0	24,838	24,838
NNW	0	0	0	0	0	16,633	16,633
TOTAL	0	0	0	0	0	110,037	110,037

* Based on trends from 1985 TAZ population and 1990 U.S. Census population, and general trends in Homestead and Florida City between 1980 and 1990.

TABLE 2.4-9

MAJOR EMPLOYMENT FACILITIES
WITHIN 10 MILES
OF TURKEY POINT PLANT

		NUMBER OF EMPLOYEES
Homestead	Sector	1988 Study
Atlantic Fertilizer & Chemical Co.	NW 5-10	65
Coca Cola Bottling Company of Homestead	W 5-10	50
Florida Rock & Sand	SW 5-10	175
South Dade News Leader	WNW 5-10	100
Homestead Air Force Base (Civilian)	NW 5-10	1,900
TOTAL POPULATION 1988		2,290
POPULATION ESTIMATE 1990		2,407 (1)
PROJECTED POPULATION ESTIMATE 1995		2,700 (1)

NOTES:

1. Estimates based on 1988 and 1993 projected figures determined in the 1988 study.

TABLE 2.4-10

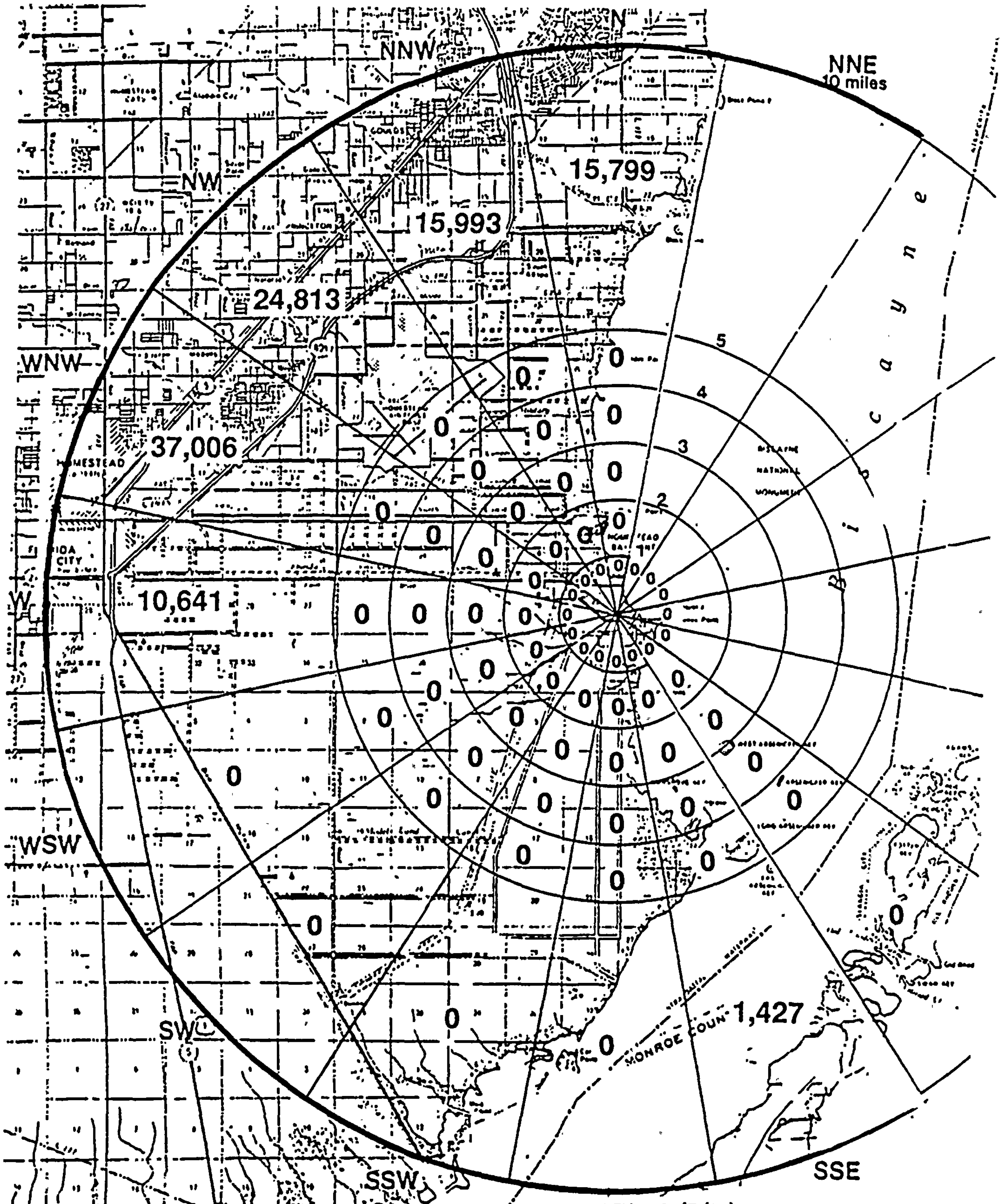
MAJOR COLLEGES
WITHIN 10 MILES
OF TURKEY POINT PLANT

College Name	Location	Sector	STUDENT POPULATION 1988 Study[1]	1990 Estimate[2]	1995 Estimate[2]
Barry University	Homestead Air Force Base	NW 5-10	450	473	531
Embry Riddle Aeronautical University	Homestead Air Force Base	NW 5-10	150	158	177
Miami Dade Community College	Homestead Branch &	WNW 5-10	323	402	599
	Homestead Air Force Base Branch	NW 5-10	578	719	1,071
Saint Leo College	Homestead Air Force Base	NW 5-10	350	368	413
TOTAL			1,851	2,120	2,791

NOTES:

1. Based on information from each facility; includes both civilians and military personnel.

2. Based on 1988 and 1993 projection figures determined in 1988 study.



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TURKEY POINT PLANT UNITS 3&4

1990 RESIDENT POPULATION
WITHIN 10 MILES
OF TURKEY POINT PLANT

FIGURE 2.4-1

2.5 LAND USE

2.5.1 REGIONAL LAND USE

Dade County

An analysis of Dade County's economic base is presented as an introduction to the discussion of land use patterns. In spite of the continuing diversification of its economic base, Dade County's economy is dominated by tourism. It is currently estimated that Dade County is visited by a total of approximately 5 million visitors, on a year-round basis.

Since tourism involves a great number of people making varying expenditures in a variety of ways, its impact upon the economy of an area is extremely difficult to measure and analyze statistically. One of the most reliable methods is to relate total number of lodging units to the ratio of tourist expenditures per lodging unit. It is estimated that on a statewide basis, an average of $9,360 per lodging unit was expended annually by Florida tourists in 1967. Based on these factors, it can be concluded that about $1.7 billion is currently being spent by tourists in Dade County annually. As Dade County's wealth increases, and as it constructs new and improved tourist facilities and services, tourism should remain one of the major foundations of Dade County's economic structure.

As to the overall industrial growth, one of the most notable characteristics in Dade County is the continuing development of manufacturing activities. Table 2.5-1, presents a breakdown of total nonagricultural employment in the county, by type of industry. As indicated, manufacturing accounted for 15.6 percent of total nonagricultural employment in 1967.

According to the Dade County Development Department, the county is already the home of 3,233 manufacturing plants (1966 figure). It is of special

significance that 1,670 of these plants have moved into the area in the past 12 years. In fact, the number of manufacturing firms has increased by 106.8 percent in 12 years - from 1,563 in 1954 to 3,233 in 1966. Manufacturing employment has increased at an even greater rate during the period.

Dade County manufacturing is essentially of the light industry type. This is generally the case in young, rapidly growing areas during their early years of industrial development. Table 2.5-2, lists Dade County's manufacturing firms by 20 industrial groups as of 1954 and 1966. This table indicates the concentration of manufacturing and light industries, such as furniture and fixtures, aluminum products, apparel, and food products.

As is also indicated in Table 2.5-1, those industrial categories which are most directly influenced by tourism such as trade and services, occupy a significant position within the overall industrial framework of Dade County. These two categories (trade and services) combined accounted for 47.9 percent of total nonagricultural employment in Dade County during 1967. The remainder of nonagricultural employment in the county is allocated to government (13.0 percent), transportation, communications and public utilities (11.1 percent), finance, insurance and real estate (6.6 percent), and contract construction (5.8 percent).

While tourism and manufacturing have enjoyed notable development in Dade County, it is significant that agriculture's contribution to the county's economy has also increased. Acreage devoted to agriculture has increased in recent years in spite of the fact that a phenomenally expanding residential and commercial consumption of land has transformed dairy farms, truck farms and avocado groves into residential subdivisions, industrial plants and shopping centers in an extremely short period of time.

2.6 METEOROLOGY

2.6.1 GENERAL CLIMATOLOGY

The general climatological features of the site area were obtained from weather records from Miami International Airport 25 miles N, Miami Beach 26 miles NNE, Homestead Air Force Base 5 miles NW and Homestead Experiment Station 12 miles WNW and others.[(1)] The climate is subtropical with long warm summers accompanied by abundant rainfall and mild dry winters. The year has been divided into two seasons, the "wet" (May-Oct.) and the "dry" (Nov.-April). Marine influences predominate including land-sea breeze and other coastal effects. There are also night time and early morning inversions and important local differences between stations. East and southeast winds predominate during most of the year, but north and northwest winds become important at night and during the winter. Frontal activity and cold air masses penetrate the area in winter but are quickly moderated. Tropical storms visit the area about once every two years and hurricane winds are felt once every seven years.

The variation in climate as one progresses inland from the coast line can be seen in Table 2.6-1. The daily maximum air temperatures in this area are warmer than the ocean in all months, except at Miami Beach in the summer. Sea breezes temper the daily range of temperatures to 8-10 degrees at the beach but 10 miles inland the range is 20-25 degrees. The annual number of days with temperatures of 90 degrees F or greater is 14 at Miami Beach and 96 at Homestead Experiment Station. These statistics show the sharp reduction in maritime influence inland. The monthly temperature data show a single maximum in August with peak of 91 F at HMST. Humidities at Miami Airport at 7:00 A.M. Eastern Standard Time vary from 80-88 per cent,

(1) Letter L-78-171, "Meteorological Facility", dated May 15, 1978 from R. E. Uhrig of Florida Power and Light to A. Schwencer of USNRC Branch No. 1, describes the use of the South Dade Plant facility, located approximately 8 miles southwest of the Turkey Point site.

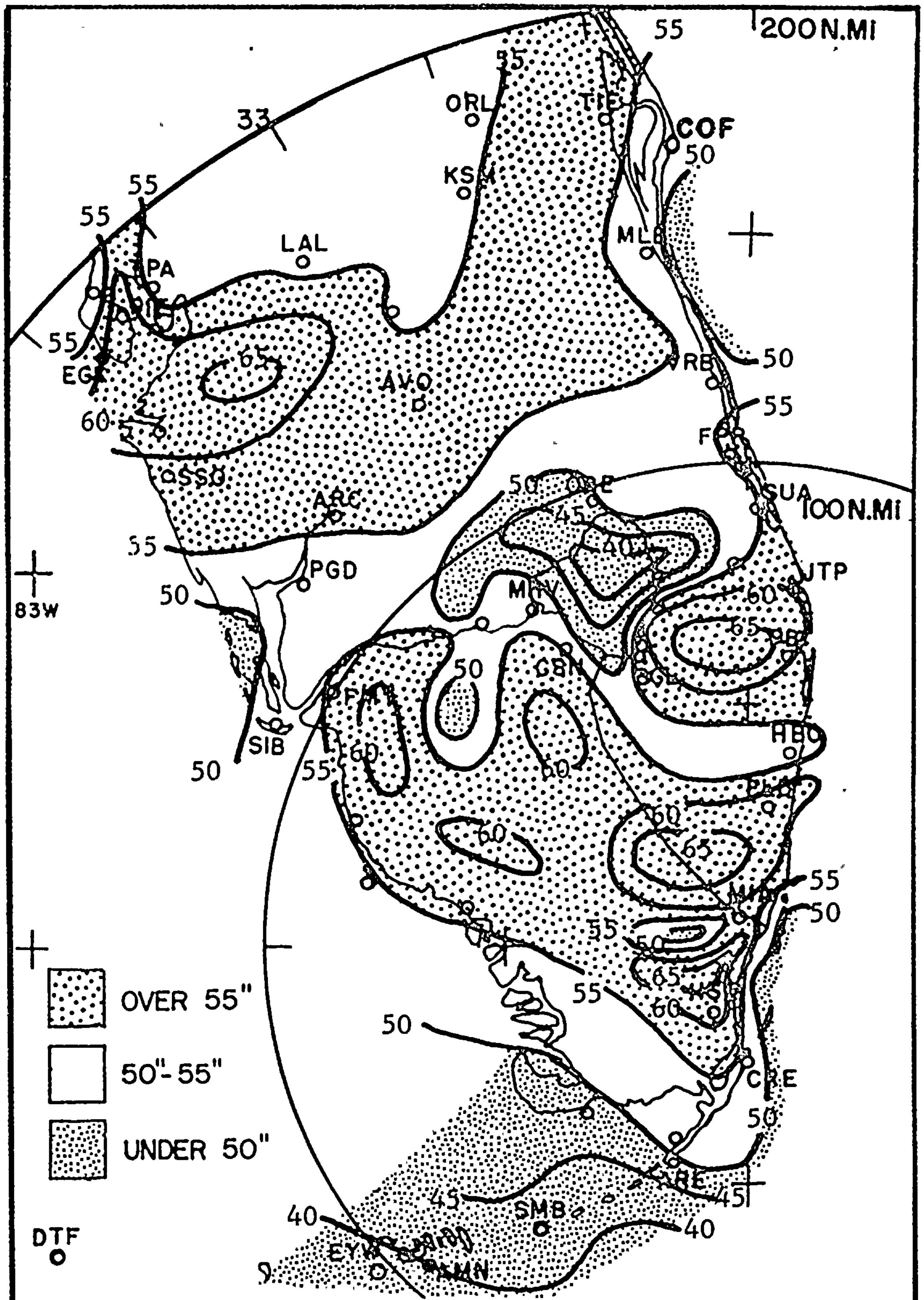
and at 1:00 P.M., vary from 56-66 per cent. Higher humidities than these can be expected at Turkey Point during the day. Fogs in this part of the state occur during the night and very early morning hours in the order of a dozen times a year and dissipate soon after sunrise. The mean cloud cover, including high thin types at Miami Airport is 5.7 tenths. Most of the rain is derived from showers of short duration. Some of the showers are quite heavy with thunderstorms occurring 77 times per year at Miami Airport. Yearly precipitation varies from 46 inches at Miami Beach to 63 inches at Homestead Experiment Station 10 miles inland, with monthly maximums in June and September.

2.6.2 SURFACE WINDS

Five years of hourly surface wind observations, 1960-1964 inclusive, at Homestead Air Force Base and Miami Airport have been analyzed to provide the general characteristics of surface winds in the area. These "mean hourly" observations in Table 2.6-1, represent 1-minute sample periods approximately on the hour and as such do not reflect higher or lower speeds or shifts in directions that may have occurred at other times during the hour. The average of these observations should compare favorably with the average of the mean speeds taken over the whole hour.

Wind Roses

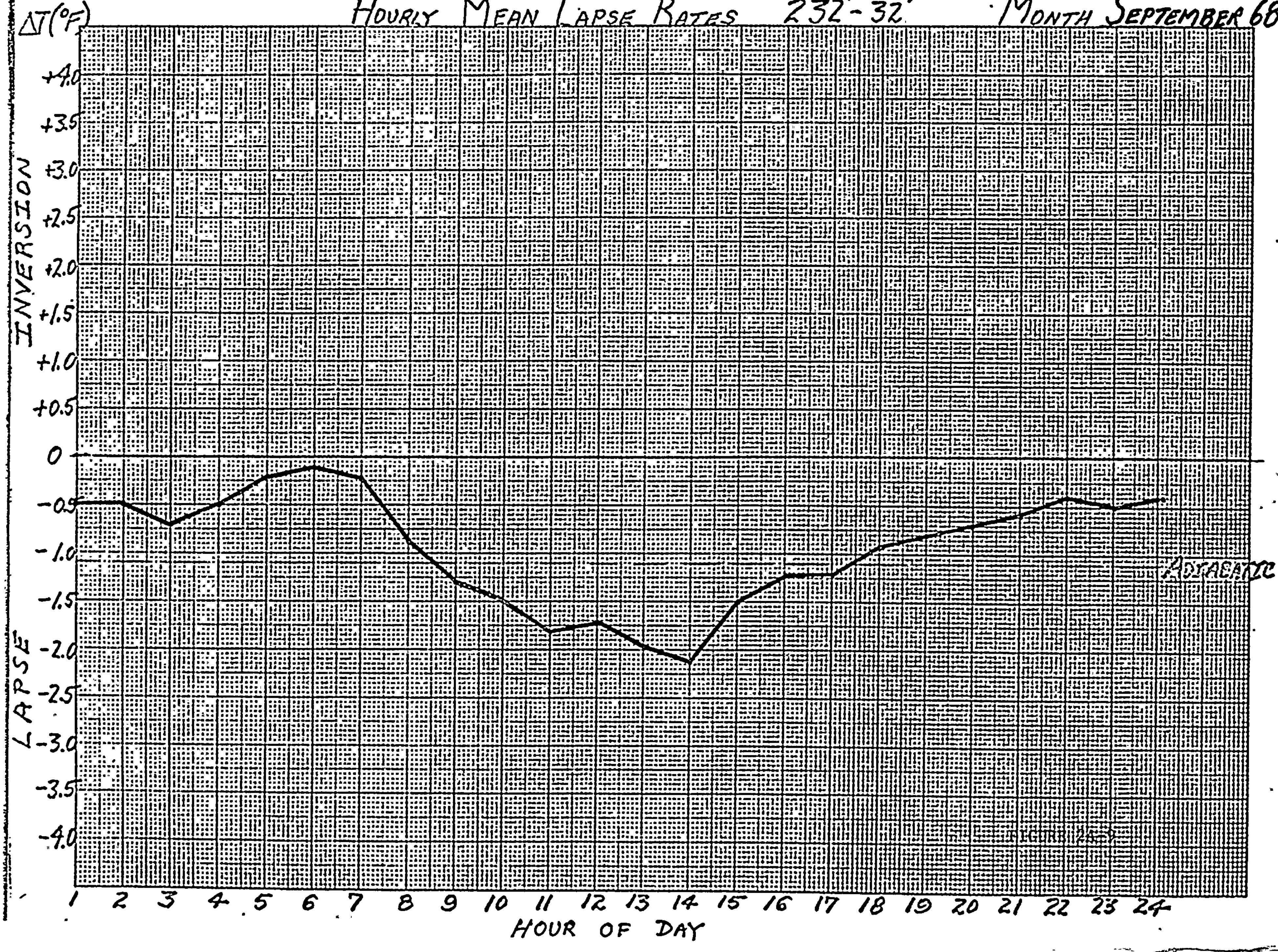
Figures 2.6-1 and 2.6-2 present wind direction roses for Homestead Air Force Base and Miami Airport for: all weather conditions (rain or sunshine), all hours, all seasons; the daytime (7AM-6PM) rainy season (May-Oct.); the nighttime (7PM-6AM) rainy season; the daytime (7AM-6PM) dry season (Nov.-Apr.); and the nighttime (7PM-6AM) dry season. Figures 2.6-3 and 2.6-4



MEAN ANNUAL RAINFALL IN INCHES, SOUTH AND SOUTH CENTRAL FLORIDA, 1952-1962 INCL.

TURKEY POINT, FLORIDA

HOURLY MEAN LAPSE RATES 232'-32' MONTH SEPTEMBER 68



TURKEY POINT, FLORIDA

HOURLY MEAN LAPSE RATES 232'-32' MONTH OCTOBER 68