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10 STEAM AND POWER CONVERSION SYSTEM

10.1 DESIGN BASIS

10.1.1 PERFORMANCE OBJECTIVES

The steam and power conversion system is designed to receive steam from the NSSS and convert the steam thermal energy into electrical energy. A closed regenerative cycle condenses the steam from the turbine and returns the condensate as feedwater to the steam generators.

The turbine generator is capable of producing of 888,200 KWe when operating with throttle steam conditions of 762 psia and 512.6 F exhausting at 2.77 inches Hg absolute, zero percent makeup, and six stages of feedwater heating in service. C26

The hydrogen inner-cooled generator is rated at 1,032,000 KVA at 75 psig hydrogen pressure at a power factor of 0.85. C26

The system design provides means to monitor and restrict radioactive releases to the environment such that 10 CFR 20 guidelines are not exceeded.

System design provides sufficient feedwater and auxiliary pumping capacity so that under conditions of loss of power and normal heat sink the required water flow to the steam generators is maintained until power is restored or reactor heat load is reduced by the residual heat removal system.

Components from the steam generators up to and including the main steam isolation valves and normal feedwater isolation valves are designed to Seismic Class I requirements.

The main steam piping between the isolation valves and the turbine is designed to Seismic Class III requirements, as is the remainder of the components and piping.

10.1.2 ELECTRICAL SYSTEM CHARACTERISTICS

The system is designed to accept load step increases of 10% and ramp changes of 5% per minute within the load range of 15% and 100% without reactor trip subject to possible xenon limitations late in core life. Similar steps and ramp load reductions are possible between 100% and 15% load. A load rejection of 50% or less can be sustained without reactor trip with the use of steam dump to condenser.

10.1.3 FUNCTIONAL LIMITS

The system design incorporates backup methods (modulating steam dump to atmosphere and safety valves), of heat removal under any loss of normal heat sink (e.g. main steam isolation valve trip, loss of circulating water flow) to accommodate reactor shutdown heat removal requirements. The unlikely event of a steam generator tube failure is described in Section 14.2.

10.1.4 SECONDARY FUNCTIONS

The steam and power conversion system provides steam for:

a) Turbine gland seal steam
b) Reheaters steam
c) Auxiliary steam requirements
d) Air ejectors
e) Turbine driven auxiliary feedwater pumps

10.1.5 CODES AND CLASSIFICATIONS

The pressure components are designed in accordance with codes tabulated on Table 10.1-1.

TABLE 10.1-1

STEAM AND POWER CONVERSION SYSTEMS COMPONENTS

COMPONENT	DESIGN CODE
Feedwater Heaters	ASME Section VIII
Heater Drain Tanks	ASME Section VIII
Reheater Drain Tanks	ASME Section VIII
Gland Steam Condensers	ASME Section VIII
Reheater Moisture Separators	ASME Section VIII
Blow Down Tank	ASME Section VIII
Main Steam Safety Valves	ASME Section III
Piping	
Main Steam *	ASME Section I
Feedwater *	ASME Section I
Balance of Piping	ASA B31.1

* To First Isolation Valve

10.2 SYSTEM DESIGN AND OPERATION

10.2.1 SCHEMATIC FLOW DIAGRAMS

The main steam, extraction steam, condensate and feedwater, steam generator blowdown, and vent and drain systems are shown in Figures 10.2-1 through 10.2-56.

10.2.2 DESIGN FEATURES

Main Steam Systems

The main steam system is shown on Figures 10.2-1 through 10.2-10. Steam leaves each of the three steam generators through 26" O.D. lines, the three lines join outside containment in a 30" O.D. header and from this header steam flows through two 30" O.D. lines to the turbine stop valves.

(a) Main Steam Safety Valves

Safety valves are provided outside containment on each of the steam generator main steam lines. The safety valves discharge to atmosphere and are in accordance with ASME Boiler and Pressure Vessel Code, Section III.

(b) Main Steam Line Isolation

One main steam isolation valve is provided outside the containment for each main steam line from the steam generators. Each valve consists of a swing disc held open against flow by a pneumatic cylinder. A check valve is provided down stream of the isolation valve to stop reverse flow from the other two steam lines in the event of a steam break or feedline break, up stream of the isolation valve. C26

The Main Steam Isolation Valves (MSIVs) provide safety related isolation capability for the steam generators for Main Steam Line Breaks (MSLBs) and Steam Generator Tube Ruptures (SGTRs). The MSIVs are maintained open by the Instrument Air System. When the Instrument Air System is isolated or not available, the MSIVs are closed by a spring. Redundant electrical control solenoid valves, powered from redundant 125 VDC power channels, are provided to ensure isolation of instrument air and venting of air from the MSIV air cylinder is achieved for valve closure. C26 This ensures that each MSIV will close in 5 seconds or less under no steam flow conditions if a single solenoid valve fails or one 125 VDC power channel is unavailable. These systems also ensure that the MSIV will remain closed for a minimum of one hour without the need for operator action, independent of the availability of Instrument Air.

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(c) Steam Dump System

The steam dump system consists of a power-operated atmospheric relief valve on each main steam line and four turbine by-pass valves which exhaust to the condenser. The limiting sizing scenario for the atmospheric relief dump valves is the final hour of the condensate storage tank design basis cooldown, where the valves are required to pass approximately 107,955 lb/hr at a steam generator pressure of 120 psia. The total required capacity of the turbine by-pass valves is 27% of full power steam flow. C26

A nitrogen gas back-up to the air supply is provided to the steam dump to atmosphere valves with the associated hand controller in the Control Room. This N_2 system provides an alternate power source to the valves in the event of loss of all A.C. power. The N_2 system is continuously lined up with the pressure regulators set lower than normal instrument air operating pressure. One cylinder will provide sufficient capacity to the controllers to allow continuous operation of the valves for 3 hours and subsequently maintain their position for 8.5 hours. One additional cylinder is added to act as a common source for both units in the event that extended steady state operation is required.

Turbine-Generator

The turbine is a three-element, tandem-compound, four-flow exhaust, 1800 RPM unit. The last stage of the turbine utilizes a 13.9 m^2 damped element Siemens blade design. Moisture separation and live steam reheat occurs between the HP and LP elements. The generator and rotating rectifier exciter are direct-connected to the turbine shaft. C31

There are four, horizontal-axis, cylindrical-shell, combined moisture separator, live-steam re-heater assemblies. Exhaust steam from the High Pressure (HP) Turbine enters the end of the Moisture Separator Re-heater (MSR)s shell and is directed to a stream chute flow distribution. Moisture separation is achieved by chevron separators. The path causes droplets to form which become large enough to fall away and be collected in the chevron drain spout. Re-heater steam flows past the finned 4-pass tubes of the re-heater section. Here the steam on the shell side is superheated approximately 100°F. The “A” and “C” MSRs supply re-heated steam to the north Low Pressure (LP) turbine and the “B” and “D” MSRs supply re-heated steam to the south LP Turbine.

A total of four relief valves, are provided, one on each MSR shell with a nominal setting pressure of 222 psig. These relief valves provide the overpressure protection of the MSRs.

The turbine oil system (see Figures 10.2-11 through 10.2-14) is of a conventional design and supplies all of the oil required for system lubrication during normal operation. Oil is also used to seal the generator glands to prevent hydrogen leakage from the machine. An oil conditioner is used for purifying the oil.

Turbine control including emergency trip function is accomplished with the Electro-Hydraulic Control (EHC) system, which is discussed later in this section.

The proper conditioner level is maintained by a pneumatic level control system.

The turbine is equipped with a slow speed, motor driven, spindle turning gear which is side mounted on an outboard bearing of the low pressure turbine.

Condensate and Feedwater

The condensate system flow diagrams are shown in Figures 10.2-15 through 10.2-20, the feedwater system on Figures 10.2-21 through 10.2-28. The feedwater train is the closed type with deaeration accomplished in the condenser. Condensate is pumped from the condenser hotwell by the condensate pumps through the air ejectors, gland steam condenser and low pressure heaters to the suction of feedwater pumps. The feedwater pumps then deliver feedwater through the high pressure heaters to the steam generators. All feedwater heaters are provided with internal drain coolers except heater No. 5. The No. 1 and 2 low pressure heaters are installed in the condenser neck.

Two, vertical, multi-stage, pit type centrifugal heater drain pumps with vertical motor drives are provided (see Figures 10.2-32 and 10.2-38). These pumps pass collected drains from the drain tank forward to the suction of the steam generator feed pumps. The condenser is the twin shell, double flow, deaerating type with semi-cylindrical water boxes bolted at both ends. It has required manholes, a water gauge glass to indicate the condensate level and one condensate outlet per shell. Expansion joints for all circulating water inlet and outlet connections are provided. There are three multi-stage, vertical, pit-type, centrifugal condensate pumps with vertical motor drives. Normally all three condensate pumps are operating.

C26

C26

The steam-jet air ejector (see Figures 10.2-58, 59) has two first stage elements and two secondary stage elements mounted on the shell of the intermediate and after condensers. The ejector is supplied with steam from the main steam line as is the hogging ejector for the condenser steam space.

Two, horizontal, split case, motor-driven, constant speed, steam generator feedwater pumps are provided and each is equipped with minimum flow protection devices. The design discharge pressure is the required steam generator pressure plus feedwater system losses to include feedwater heaters, piping and valves, feedwater regulator plus static head allowance.

C26

Circulating Water System

The circulating water system is designed to provide water from the canal, regardless of weather conditions, to the suction of the condenser circulating pumps, and intake cooling water pumps. Refer to Figures 10.2-60 through 10.2-65 and 9.6-1 through 9.6-7.

Canal water flows into four separated screen wells through steel trash racks. The trash racks protect the traveling screens against damage from heavy debris. The water passes through traveling screens where the debris is removed. C28

Water from each individual screen well flows to the suction of the motor driven, vertical, mixed flow circulating water pumps. Each of the four circulating water pumps provide a design flow of 156,250 GPM minimum.

An on-line condenser cleaning system using sponge rubber balls is used to prevent scale build-up on condenser tubes, thus helping to maintain the thermal efficiency of the condenser.

The three intake cooling water pumps are also installed in the intake structure. Their capacity is 16,000 GPM each.

Electro-Hydraulic control (EHC) System

The EHC system consists of a skid mounted system with positive displacement pumps which provide high pressure hydraulic fluid to Turbine Control, Turbine Stop, Reheat Stop and Intercept Valves. The High Pressure (HP) header supplies the fluid to the different valves. The HP header is drained by way of the Emergency Trip Header (ETH). The ETH solenoids are de-energized anytime any or all of the turbine trip conditions are received in the Turbine Control System (TCS). A flow path for the fluid is provided when one of two valves in each of two solenoid valves in series opens, providing a flow path from the HP line to the drain.

Overspeed protection is provided by the Overspeed Protection Controller (OPC) header. The speed probes for the high pressure turbine provide speed inputs to the TCS. If the turbine were to reach 103% of rated speed, the OPC header would trip and the hydraulic fluid would drain and the turbine Control and Re-heat Intercept valves would go closed. In the unlikely event that 105% of rated speed was reached, the Emergency Trip Header would dump the HP supply to the drain and all Turbine Control, Turbine Stop, Reheat Stop and Reheat Intercept Valves would go closed.

A separate, redundant overspeed system is also provided by the Woodward Protech 230. This system senses turbine RPM separate from the speed probes and trips the turbine. This causes the turbine control, intercept, and stop valves to close, resulting in an end to the overspeed condition.

Turbine Runback (Load Cutback) Function

As part of the Extended Power Uprate on Unit 3 and Unit 4, a new turbine runback function was implemented. A detailed analysis of steam generator response to five transients to the Condensate and Feed Water systems is provided in calculation CN-CPS-09-67, Steam Generator Water Level Analysis for the Turkey Point Units 3 and 4 Extended Power Uprate. The five analyzed transients are: C29

1. 50% load rejection from full power
2. Loss of one main feedwater pump from full power
3. Loss of one condensate feedwater pump from full power
4. Loss of one heater drain pump (HDP) from full power
5. Complete loss of heater drain flow from full power

The steam generator analysis determined that an automatic turbine runback function is desirable for transients 2 through 5. The analysis showed that transients three, four and five required a new functionality be installed such that a rapid reduction of load on the main turbine occurred in order to ensure that a Steam Generator water level low reactor trip did not occur. For transient two, loss of one main feedwater pump from full power, the analysis determined that even with a rapid turbine load reduction, the low Steam Generator level reactor trip would occur. To prevent this reactor trip, the analysis showed that 78% of nominal full power feed water flow would be required from one main feed water pump. This capability is not available.

In order to achieve the desired transient response, the turbine runback function is implemented using a medium rate load reduction runback of 50% turbine load per minute and the fast rate load reduction runback of 200% turbine load per minute. These are implemented as follows:

1. Loss of one main feed water pump (contact off pump supply breaker) with turbine power greater than 60% equivalent power: 200%/minute
2. Control room switch initiates runback with turbine power greater than 60% equivalent power: 200%/minute
3. With three Condensate Pumps running and one condensate pump breaker opens with turbine power greater than 88% equivalent power: 50%/ minute
4. With two HDPs running and one HDP breaker opens with turbine power greater than 88% equivalent power: 50%/minute C31

Trip of the turbine-generator initiates a reactor trip when power is greater than 10% (P-7) to prevent excessive reactor coolant temperature and/or pressure caused by a sudden reduction of steam flow.

10.2.3 SHIELDING

No radiation shielding will be required for the components of the steam and power conversion system. Continuous access to the components of this system will be possible during normal operation.

10.2.4 CORROSION PROTECTION

10.2.4.1 CHEMICAL ADDITION

Ammonium Hydroxide, oxygen scavengers (e.g, Hydrazine, carbohydrazide) or an alternate amine is added to the secondary to control secondary chemistry parameters.

Polyacrylic Acid (PAA) is added as a dispersant to promote the suspension of loosely adhered iron for subsequent removal via the Steam Generator Blowdown (SGBD) system. C32

10.2.4.2 DELETED

10.2.4.3 STEAM GENERATOR BLOWDOWN RECOVERY SYSTEM

A steam generator blowdown recovery system is installed to assist in maintaining required steam generator water chemistry by providing a means for removal of foreign matter which concentrates in the evaporator section of the steam generator.

The steam generator blowdown recovery system is shown on Figures 10.2-41 and 10.2-42. The system is fed by three independent blowdown lines (one per steam generator) which tie into a common blowdown flash tank. The steam generator blowdown is continuously monitored for radioactivity during plant operation. A radiation monitor is provided for the steam generator blowdown sample lines in each unit. The isolation and control functions of this monitor are described in Section 11.2. The blowdown sample lines can be isolated using the manual isolation valves downstream of the motor operated isolation valves.

The Steam Generator Blowdown Isolation By-pass valves have their operators removed, and are maintained in a permanently closed position. This design maintains containment integrity and prevents a loss of steam generator inventory after an auxiliary feedwater system start. See Figures 10.2-41 and 10.2-42.

On-line Chemistry Monitoring instrumentation is connected to each blowdown sample line. The instrumentation provides a means by which the various levels of pH, cation conductivity, specific conductivity, dissolved oxygen, sodium, and chloride can be monitored (see Section 4.2.5).

Blowdown condensate from the flashtank is dumped to the discharge canal.

10.2.4.4 SECONDARY WET LAY-UP SYSTEM

A secondary wet lay-up system is provided to recirculate water through the condenser, condensate system, and feedwater system, including the shell side of the feedwater heaters, to prevent stratification and add chemicals to prevent any excursions of water quality in the secondary system during extended unit shutdowns. Maintaining a water solid condition during recirculation would minimize the presence of harmful gases to wetted surfaces. This system is shown on Figures 10.2-43 through 10.2-46.

The secondary system wet lay-up system consists of two closed loops which circulate the contents of the secondary system. Cleanup of the secondary system is provided through the condensate filter/demineralizers.

Chemicals are added to each loop via a common chemical feed pot.

10.2.4.5 STEAM GENERATOR WET LAYUP SYSTEM

A steam generator wet layup system is provided to recirculate water through the secondary side of the steam generators to prevent stratification and to provide a means for adding chemicals to prevent excursions of water quality in the steam generators during extended unit shutdowns (see Figures 10.2-55 and 10.2-56).

The steam generator wet layup system consists of three independent loops - one for each steam generator. The normal flow path in each loop is to take suction from the main feedwater line and return to the steam generator via the blowdown line. The flow may be reversed by changing the valve line up to take suction from the blowdown line and return to the steam generator via the feedwater line. The three loops are connected by a common header to provide versatility in the system. A chemical addition tank is common to all three loops. A nitrogen addition connection is included for maintaining a nitrogen blanket in the portion of the system not filled with water.

10.2.4.6 FEEDWATER RECIRCULATION SYSTEM

A feedwater recirculation system is provided to operate during normal plant shutdown or start-up to provide flow paths required to create a closed loop between the feedwater system and the condenser for wet layup and flushing of the secondary system (see Figures 10.2-15, 10.2-18, 10.2-23, and 10.2-26). Circulation is provided by a condensate pump. Poor quality feedwater can be dumped from the feedwater recirculation line directly to the discharge canal.

10.2.5 RADIOACTIVITY

Under normal operating conditions, there are no radioactive contaminants present in the steam and power conversion system unless steam generator tube leaks develop. In the event of steam generator tube leakage the following equipment provides monitoring of the steam generator shell-side:

- Steam Generator Liquid Sample Monitor, R-*-19 provides for monitoring of samples from each steam generator.
- Main Steam Line Monitor RAD-6426 provides for high-range monitoring of the main steam lines.
- Condenser Air Ejector Monitor R-*-15 provides for low range monitoring of steam jet air ejector exhaust.
- Plant Vent Monitor SPING RAD-6304 provides high-range monitoring of steam jet air ejector exhaust. C31

These will detect any contamination to permit calculation of activity released to the environment.

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-1

REFER TO ENGINEERING DRAWING

5613-M-3072 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

MAIN STEAM SYSTEM

FIGURE 10.2-1

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-2

REFER TO ENGINEERING DRAWING

5613-M-3072 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

MAIN STEAM SYSTEM

FIGURE 10.2-2

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-3

REFER TO ENGINEERING DRAWING

5613-M-3072 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY **TURKEY POINT PLANT UNIT 3**
MAIN STEAM SYSTEM MSIV CONTROL **FIGURE 10.2-3**

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-4

REFER TO ENGINEERING DRAWING

5614-M-3072 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

MAIN STEAM SYSTEM

FIGURE 10.2-4

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-5

REFER TO ENGINEERING DRAWING

5614-M-3072 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

MAIN STEAM SYSTEM

FIGURE 10.2-5

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-6

REFER TO ENGINEERING DRAWING

5614-M-3072 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY **TURKEY POINT PLANT UNIT 4**
MAIN STEAM SYSTEM MSIV CONTROL **FIGURE 10.2-6**

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-7

REFER TO ENGINEERING DRAWING

5613-M-3089 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

STEAM TURBINE SYSTEMS

FIGURE 10.2-7

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-8

REFER TO ENGINEERING DRAWING

5613-M-3089 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY **TURKEY POINT PLANT UNIT 3**
STEAM TURBINE SYSTEMS **FIGURE 10.2-8**

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-9

REFER TO ENGINEERING DRAWING

5614-M-3089 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

STEAM TURBINE SYSTEMS

FIGURE 10.2-9

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-10

REFER TO ENGINEERING DRAWING

5614-M-3089 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

STEAM TURBINE SYSTEMS

FIGURE 10.2-10

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-11

REFER TO ENGINEERING DRAWING

5613-M-3087 , SHEET 1

Revised 04/17/2013

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

TURBINE LUBE OIL SYSTEM

LUBE OIL

RESERVOIR

FIGURE 10.2-11

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FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-12

REFER TO ENGINEERING DRAWING

5613-M-3087 , SHEET 2

Revised 04/17/2013

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

TURBINE LUBE OIL SYSTEM
LUBE OIL
CONDITIONER
FIGURE 10.2-12

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FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-13

REFER TO ENGINEERING DRAWING

5614-M-3087 , SHEET 1

Revised 04/17/2013

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

TURBINE LUBE OIL SYSTEM
LUBE OIL
RESERVOIR
FIGURE 10.2-13

C26

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-14

REFER TO ENGINEERING DRAWING

5614-M-3087 , SHEET 2

Revised 04/17/2013

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

TURBINE LUBE OIL SYSTEM
LUBE OIL
CONDITIONER

FIGURE 10.2-14

C26

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-15

REFER TO ENGINEERING DRAWING

5613-M-3073 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE SYSTEM

FIGURE 10.2-15

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-16

REFER TO ENGINEERING DRAWING

5613-M-3073 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE SYSTEM

FIGURE 10.2-16

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-17

REFER TO ENGINEERING DRAWING

5613-M-3073 , SHEET 3

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE SYSTEM

FIGURE 10.2-17

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-18

REFER TO ENGINEERING DRAWING

5614-M-3073 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

CONDENSATE SYSTEM

FIGURE 10.2-18

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-19

REFER TO ENGINEERING DRAWING

5614-M-3073 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE SYSTEM

FIGURE 10.2-19

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-20

REFER TO ENGINEERING DRAWING

5614-M-3073 , SHEET 3

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE SYSTEM

FIGURE 10.2-20

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-21

REFER TO ENGINEERING DRAWING

5610-M-3074 , SHEET 1

REV. 13 (10/96)

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

FEEDWATER SYSTEM
STANDBY STEAM GENERATOR
FEEDWATER PUMPS
FIGURE 10.2-21

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-22

REFER TO ENGINEERING DRAWING

5610-M-3074 , SHEET 2

REV. 13 (10/96)

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

FEEDWATER SYSTEM
DEMINERALIZED STORAGE
AND DEAERATION
FIGURE 10.2-22

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-23

REFER TO ENGINEERING DRAWING

5613-M-3074 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM

FIGURE 10.2-23

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-24

REFER TO ENGINEERING DRAWING

5613-M-3074 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM

FIGURE 10.2-24

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-25

REFER TO ENGINEERING DRAWING

5613-M-3074 , SHEET 3

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM

FIGURE 10.2-25

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-26

REFER TO ENGINEERING DRAWING

5614-M-3074 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM

FIGURE 10.2-26

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-27

REFER TO ENGINEERING DRAWING

5614-M-3074 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM

FIGURE 10.2-27

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-28

REFER TO ENGINEERING DRAWING

5614-M-3074 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM

FIGURE 10.2-28

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-29

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-29

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-30

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-30

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-31

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-31

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-32

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 4

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-32

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-33

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 5

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM

FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-33

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-34

REFER TO ENGINEERING DRAWING

5613-M-3081 , SHEET 6

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-34

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-35

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM

FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-35

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-36

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-36

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-37

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-37

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-38

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 4

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY **TURKEY POINT PLANT UNIT 4**
FEEDWATER SYSTEM FEEDWATER HEATER VENTS & DRAINS **FIGURE 10.2-38**

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-39

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 5

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-39

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-40

REFER TO ENGINEERING DRAWING

5614-M-3081 , SHEET 6

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM
FEEDWATER HEATER VENTS & DRAINS

FIGURE 10.2-40

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-41

REFER TO ENGINEERING DRAWING

5613-M-3074 , SHEET 4

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

FEEDWATER SYSTEM

STEAM GENERATOR BLOWDOWN

RECOVERY

FIGURE 10.2-41

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-42

REFER TO ENGINEERING DRAWING

5614-M-3074 , SHEET 4

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

FEEDWATER SYSTEM
STEAM GENERATOR BLOWDOWN
RECOVERY
FIGURE 10.2-42

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-43

REFER TO ENGINEERING DRAWING

5613-M-3082 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

SECONDARY SYSTEM

WET LAYUP SYSTEM

LOOP 1

FIGURE 10.2-43

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-44

REFER TO ENGINEERING DRAWING

5613-M-3082 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

SECONDARY SYSTEM
WET LAYUP SYSTEM
LOOP 2
FIGURE 10.2-44

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-45

REFER TO ENGINEERING DRAWING

5614-M-3082 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

SECONDARY SYSTEM
WET LAYUP SYSTEM
LOOP 1
FIGURE 10.2-45

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-46

REFER TO ENGINEERING DRAWING

5614-M-3082 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

SECONDARY SYSTEM

WET LAYUP SYSTEM

LOOP 2

FIGURE 10.2-46

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-47

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE POLISHING SYSTEM
DEMINERALIZER

FIGURE 10.2-47

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-48

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE POLISHING SYSTEM
DEMINERALIZER

FIGURE 10.2-48

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-49

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE POLISHING SYSTEM
SPENT RESIN HANDLING SUBSYSTEM

FIGURE 10.2-49

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-50

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSATE POLISHING SYSTEM
EFFLUENT SAMPLING

FIGURE 10.2-50

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-51

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE POLISHING SYSTEM
DEMINERALIZER

FIGURE 10.2-51

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-52

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE POLISHING SYSTEM
DEMINERALIZER

FIGURE 10.2-52

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-53

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE POLISHING SYSTEM
SPENT RESIN HANDLING SUBSYSTEM

FIGURE 10.2-53

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-54

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSATE POLISHING SYSTEM
EFFLUENT SAMPLING

FIGURE 10.2-54

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-55

REFER TO ENGINEERING DRAWING

5613-M-3078 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

STEAM GENERATOR
WET LAYUP SYSTEM

FIGURE 10.2-55

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-56

REFER TO ENGINEERING DRAWING

5614-M-3078 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

STEAM GENERATOR
WET LAYUP SYSTEM

FIGURE 10.2-56

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-57

REFER TO ENGINEERING DRAWING

5610-M-3065 , SHEET 2

REV. 13 (10/96)

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

NITROGEN & HYDROGEN SYSTEMS
NITROGEN CAP SYSTEM

FIGURE 10.2-57

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-58

REFER TO ENGINEERING DRAWING

5613-M-3014 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CONDENSER SYSTEM

FIGURE 10.2-58

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-59

REFER TO ENGINEERING DRAWING

5614-M-3014 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CONDENSER SYSTEM

FIGURE 10.2-59

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-60

REFER TO ENGINEERING DRAWING

5613-M-3010 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CIRCULATING WATER SYSTEM

FIGURE 10.2-60

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-61

REFER TO ENGINEERING DRAWING

5613-M-3010 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CIRCULATING WATER SYSTEM
CONDENSER WATER BOX PRIMING

FIGURE 10.2-61

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-62

REFER TO ENGINEERING DRAWING

5613-M-3010 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

CIRCULATING WATER SYSTEM
LUBE WATER TO CIRCULATING
WATER PUMPS
FIGURE 10.2-62

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-63

REFER TO ENGINEERING DRAWING

5614-M-3010 , SHEET 1

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CIRCULATING WATER SYSTEM

FIGURE 10.2-63

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-64

REFER TO ENGINEERING DRAWING

5614-M-3010 , SHEET 2

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

CIRCULATING WATER SYSTEM
CONDENSER WATER BOX PRIMING

FIGURE 10.2-64

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-65

REFER TO ENGINEERING DRAWING

5614-M-3010 , SHEET 3

REV. 13 (10/96)

FLORIDA POWER & LIGHT COMPANY **TURKEY POINT PLANT UNIT 4**
CIRCULATING WATER SYSTEM LUBE WATER TO CIRCULATING WATER PUMPS **FIGURE 10.2-65**

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-66

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 3

ELECTRO-HYDRAULIC CONTROL (EHC) FLUID SYSTEM

FIGURE 10.2-66

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-67

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

ELECTRO-HYDRAULIC CONTROL (EHC)
FLUID SYSTEM SKID

FIGURE 10.2-67

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-68

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 3

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

ELECTRO-HYDRAULIC CONTROL (EHC)
RE-HEAT STOP and INTERCEPT VALVES

FIGURE 10.2-68

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-69

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 4

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

ELECTRO-HYDRAULIC CONTROL (EHC)
TURBINE CONTROL and STOP VALVES

FIGURE 10.2-69

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-70

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 5

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
TRIP BLOCK ASSEMBLY

FIGURE 10.2-70

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-71

REFER TO ENGINEERING DRAWING

5613-M-3086 , SHEET 6

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 3

ELECTRO-HYDRAULIC CONTROL (EHC)
SPEED PROBES and THURST BEARING
PROBES

FIGURE 10.2-71

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-72

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 1

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
FLUID SYSTEM

FIGURE 10.2-72

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FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-73

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 2

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FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
FLUID SYSTEM SKID

FIGURE 10.2-73

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-74

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 3

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FLORIDA POWER & LIGHT COMPANY

TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
RE-HEAT STOP and INTERCEPT VALVES

FIGURE 10.2-74

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-75

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 4

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
TURBINE CONTROL and STOP VALVES

FIGURE 10.2-75

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-76

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 5

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC)
TRIP BLOCK ASSEMBLY

FIGURE 10.2-76

FINAL SAFETY ANALYSIS REPORT

FIGURE 10.2-77

REFER TO ENGINEERING DRAWING

5614-M-3086 , SHEET 6

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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT PLANT UNIT 4

ELECTRO-HYDRAULIC CONTROL (EHC) SPEED PROBES and THURST BEARING PROBES

FIGURE 10.2-77

10.3 SYSTEM EVALUATION

10.3.1 SAFETY FEATURES

Variable Limit Functions

Trips, automatic control actions and alarms will be initiated by deviations of system variables within the steam and power conversion system. In the case of automatic corrective action in the steam and power conversion system, appropriate corrective action will be taken to protect the reactor coolant system. The more significant malfunctions or faults which cause trips, automatic actions or alarms in the steam and power conversion system are:

(a) Turbine Trips

1. Generator/electrical faults
2. Low condenser vacuum C26
3. Thrust bearing failure
4. Low lubricating oil pressure
5. Turbine overspeed
6. Reactor trip
7. Manual trip
8. MSR Hi-Hi Level*

* The Hi-Hi level in MSR is relayed to the Turbine Control System (TCS) via output as "Turbine Trip" signal to protect turbine from water injection due to high liquid level in the MSR. C26

(b) Automatic Control Actions

1. Water level in each steam generator is controlled by a three-element feedwater regulator incorporating signals from water level, steam flow and water flow.

2. The steam bypass to the condenser is initiated by an average temperature value of the reactor coolant at the inlet and outlet of the steam generators.

(c) Principal Alarms

1. Low pressure at feedwater pump suction
2. Low vacuum in condenser
3. High or low water level in condenser hotwell
4. High temperature in LP exhaust hood
5. Turbine supervisory instrument signal

Transient Effects

A reactor trip from power requires subsequent removal of core decay heat. Core decay heat can be continuously dissipated via the steam bypass to the condenser as feedwater in the steam generator is converted to steam by heat absorption. Normally, the capability to return feedwater flow to the steam generators is provided by operation of the turbine cycle feedwater system.

In the unlikely event of complete loss of electrical power to the station, decay heat removal would continue to be assured by the availability of three steam-driven, auxiliary feedwater pumps, and steam discharge to atmosphere via the main steam safety valves and main steam dump to atmosphere (SDTA) valves. In this case feedwater is available from the condensate storage tank by gravity feed to the auxiliary feedwater pumps as described in Section 9.11.

The analysis of the effects of loss of full load on the reactor coolant system is discussed in 14.1.10. Analysis of the effects of partial loss of load on the reactor coolant system is discussed in Section 7.3.

10.3.2 SECONDARY-PRIMARY INTERACTIONS

Following a turbine trip, the control system reduces reactor power output immediately by a reactor trip.

In the event of failure of one feedwater pump the feedwater pump remaining in service will carry approximately 60 percent of full load feedwater flow. If both normal feedwater pumps fail, the turbine will be tripped, and the emergency feedwater pumps will start automatically.

10.3.3 PRESSURE RELIEF

Pressure relief is required at the system design pressure of 1085 psig, and the first safety valve is set to relieve at this pressure. Additional safety valves are set at pressures up to 1105 psig. A 1% tolerance on the "As left" safety valve setpoint is allowed. Manual means are provided for operating the 10% steam dump to atmosphere valves. The SDTA valves are designed to operate in the unlikely event of complete loss of electrical power and/or instrument air. C26

The pressure relief capacity is equal to the steam generation rate of maximum calculated conditions.

10.3.4 SYSTEM INCIDENT POTENTIAL

The evaluation of the capability to isolate a steam generator to limit the loss of radioactivity is presented in Section 14.2.4. The steam line break accident analysis is presented in detail in Section 14.2.5.

10.4 TEST AND INSPECTIONS

The main steam isolation valves shall be tested at refueling intervals. Closure time shall be verified.

On a monthly basis, the auxiliary feedwater pumps will be operated to verify their operability. The auxiliary feedwater system is tested in accordance with Plant Technical Specifications and inservice testing procedures.

Proper functioning of the steam admission valve and subsequent pump start will demonstrate the integrity of the system. Verification of correct operation will be made both from instrumentation within the control room and direct visual observation of the pump.