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SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards changes to initial test program for approval by 840416.Test objective revised to clarify which piping sys are to be tested,Change justifications listed.

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APR 0 6 1984

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
MAJOR MODIFICATION TO INITIAL
TEST PROGRAM FOR UNIT 2
ER 100508 FILE 841-1
PLA-2155 Docket No. 50-388

Dear Mr. Schwencer:

Enclosed are changes to the Initial Test Program for Susquehanna SES Unit 2. In accordance with License Condition 2.C.5 of Facility Operating License NPF-22, we request your approval of these changes.

The justification of the changes are as follows:

- o ST-2

  The Test Method has been revised to clarify when surveys of background radiation are to be taken and to make designation consistent with Figure 14.2-5. The existing wording would have a survey taken immediately after fuel load. This survey is meaningless since a survey was taken just prior to fuel load and all fuel bundles have been inspected prior to fuel load.

- o ST-21

  The Test Method was revised to delete the simulation of a failure of the pressure regulator. Step changes are sufficient to demonstrate core response to pressure changes. This change was made to reflect the latest comments from G.E. on the Startup Test Program.

- o ST-25

  The Test Objectives have been revised to clarify that this test is to demonstrate the maximum power at which a single valve closure can be made without a scram. All MSIV's are used to demonstrate the maximum power level.

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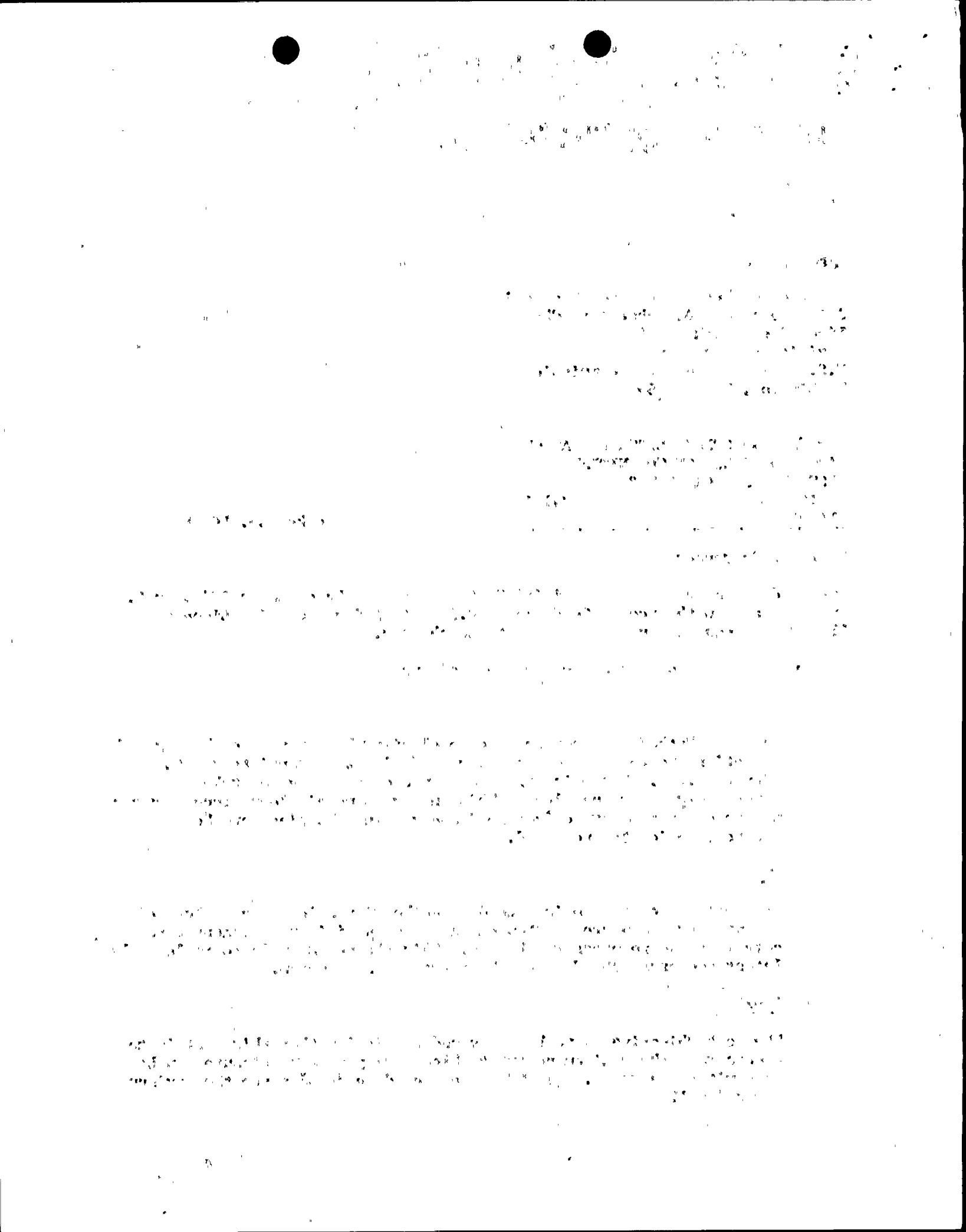


The Test Method has been revised to clarify that all MSIV's are used to demonstrate the maximum power at which a single valve closure can be made without a scram and not just the fastest valve. The Test Method was also revised to clarify the exact testing of the MSIV's. The delay time has been demonstrated during the preoperational tests and does not have to be repeated during this test.

The Acceptance Criteria has been revised to delete the closure time including a delay since the delay time has been demonstrated during the preoperational test phase. This delay time has been verified to be less than 0.5 second.

o ST-28

The Test Objective has been revised to reflect the commitment that the plant can be scrammed from outside the control room.

o ST-32

The Level 2 Acceptance Criteria has been revised to delete the requirement to keep the maximum local temperature below 167°F in the control rod drive area since the cabling has now been qualified to a higher temperature, therefore the General Electric criteria of less than or equal to 185°F is the only restriction on temperature in the control rod drive area.

o ST-37

The Level 2 Acceptance Criteria has been revised to be consistent with the Technical Specifications.

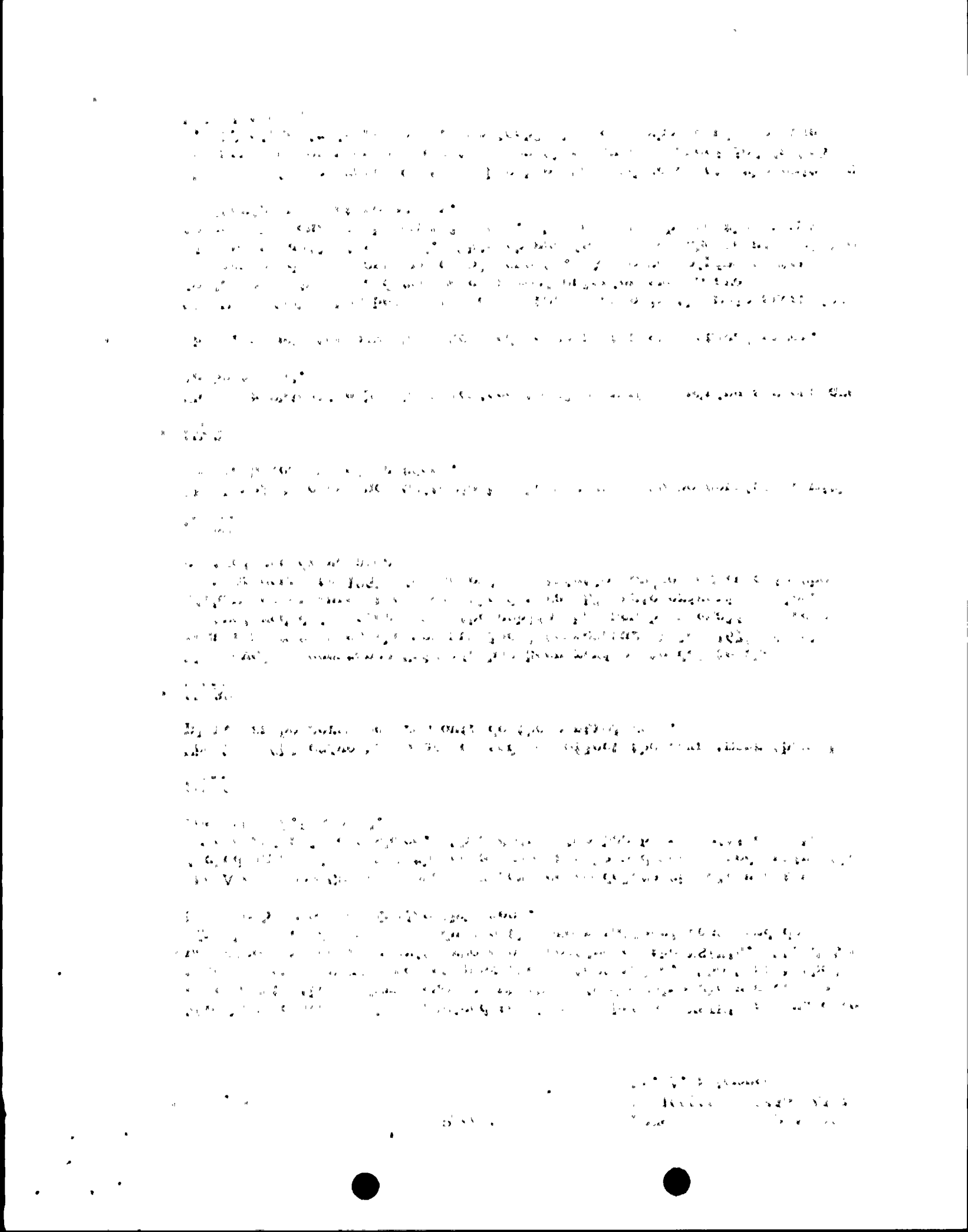
o ST-39

The Test Objective has been revised to clarify which piping systems are to be tested.

The Prerequisites have been revised to correct a grammatical error.

The Test Method has been revised to state that only the main steamline inside containment and the reactor recirculation system are instrumented for measuring displacements. All other piping systems will be visually inspected. This change is based on the results of the tests taken during the Unit 1 tests. These tests showed that remote monitoring was not necessary.

The Level 2 Acceptance Criteria has been revised to delete the criteria for maximum measured accelerations on these systems specified in Table 3.9-33 since it is no longer applicable based on the results of the Unit 1 tests.



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SSES PLA-2155
ER 100508 File 841-1
Mr. A. Schwencer

o Figure 14.2-5

For ST-7, the performance of this test has been revised from Test Condition 3 to Test Condition 4. This change was made because this test must be performed with the recirculation pumps tripped. By performing the test in Test Condition 4 rather than Test Condition 3, the amount of time spent in natural circulation is reduced.

For ST-17, the requirement for this test to be performed during Test Condition 2 has been deleted in order to provide scheduling flexibility while meeting testing requirements.

For ST-25, the performance of this test has been revised from Test Condition 1 to Test Condition 5. The performance of this test at Test Condition 5 will give more useful results. Also all MSIV's will be tested not just the fastest one as originally planned.

In order not to impact our startup schedule, we would request that these modifications be approved by April 16, 1984.

If you have any questions, please contact us.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

Enclosure

cc: R. L. Perch

must conform to license limitations. Water quality must be known at all times and should remain within the guidelines of the Water Quality Specifications.

Level 2 - Not applicable.

(ST-2) Radiation Measurements

Test Objectives The objectives of this test are (a) to determine the background radiation levels in the plant environs prior to operation for base data on activity buildup and (b) to monitor radiation at selected power levels to assure the protection of personnel during plant operation.

Prerequisites - The required preoperational tests have been completed.

Test Method - A survey of natural background radiation at selected locations throughout the plant will be made prior to fuel loading. During the Heatup Test Condition and during Test Conditions 1, 3 and 6 ~~Subsequent to fuel loading, during reactor heatup and at power levels of approximately 25%, 60% and 100% of rated power,~~ gamma radiation level measurements and, where appropriate, thermal and fast neutron measurements will be made at selected locations throughout the plant.

Acceptance Criteria - Level 1 - The radiation doses of plant origin and the occupancy times of personnel in radiation zones shall be controlled consistent with the guidelines of the standards for protection against radiation outlined in 10CFR20.

Level 2 - The radiation doses of plant origin shall meet the following limits depending upon which Radiations Zone the radiation base survey point is located:

Radiation Zone	Limit
I	0.5 mRem/hr.
II	2.5 mRem/hr.
III	15 mRem/hr.
IV	100 mRem/hr.

Note: All areas designated Radiation Zone V have potential radiation doses of 100 mRem/hr. Readings taken in Zone V during the Startup Test Program may be less than 100 mRem/hr; however, since Zone V is defined in terms of potential levels, there are no Acceptance Criteria for Zone V base survey points.

(ST-3) Fuel Loading

Test Objective - The objective of this test is to achieve the full and proper core complement of nuclear fuel assemblies through a safe and efficient fuel loading evolution.

Acceptance Criteria - Level 1 - The Maximum Linear Heat Generation Rate (MLHGR) of any rod during steady-state conditions shall not exceed the limit specified by the Plant Technical Specifications.

The steady-state Minimum Critical Power Ratio (MCPR) shall not exceed the limits specified by the Plant Technical Specifications.

The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) shall not exceed the limits specified by the Plant Technical Specifications.

Steady-state reactor power shall be limited to the rated MWT and values on or below the licensed analytically determined power-flow line.

Level 2 - Not applicable.

(ST-20) Steam Production Verification

(This test deleted from the FSAR for Unit 2).

(ST-21) Core Power-Void Mode Response

Test Objectives - The objective of this test is to verify the stability of the core power-void dynamic response.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been calibrated.

Test Method - The core power void loop mode that results from a combination of the neutron kinetics and core thermal hydraulic dynamics is least stable near the natural circulation end of the rated 100 percent power rod line. A fast change in the reactivity balance is obtained by moving a very high worth rod only 1 or 2 notches ~~by simulating a failure of the pressure regulator~~ and by performing pressure regulator setpoint changes.

Acceptance Criteria - Level 1 - The transient response of any system related variable to any test input must not diverge.

Level 2 - Not applicable.

(ST-22) Pressure Regulator

Test Objectives - The objectives of this test are to demonstrate the takeover capability of the backup pressure regulator upon failure of the controlling pressure regulator and to demonstrate smooth pressure control transition between the control valves and bypass valves when reactor steam generation exceeds steam flow used by the turbine.

satisfied. Rate of valve stroking and timing of the close-open sequence will be such that minimum practical disturbance is introduced and that PCIOMR limits are not exceeded.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Peak neutron flux must remain at least 7.5% below the Neutron flux scram trip value. Peak vessel pressure must remain at least 10 psi below the high pressure scram setting. Peak steam flow in each line must remain at least 10% below the high flow isolation trip setting. Peak simulated heat flux must remain at least 5% below its scram trip point.

(ST-25) Main Steam Isolation Valves

Test Objectives - The objectives of this test are (a) to functionally check the main steam isolation valves (MSIVs) for proper operation at selected power levels, (b) to determine reactor transient behavior during and following simultaneous full closure of all MSIVs, (c) to determine isolation valve closure time and (d) to ~~determine~~ demonstrate the maximum power at which a single valve closure can be made without a scram.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The Main Steam Isolation Valves (MSIVs) are operated during this test to verify their functional performance, ~~and to~~ determine closure times, ~~while functionally testing the operation of the MSIVs, the time to fully close each individual valve will be noted. The fastest MSIV will then be tested to determine what power level~~ and to demonstrate the maximum power level at which an MSIV can experience fast closure without causing a scram. All MSIVs will later be used to demonstrate a full isolation subsequently leading to a scram. (The Nuclear Steam Supply Shutoff System (NSSSS) logic will be used to initiate the full isolation). The acceptability of the fast criteria (3 seconds) is determined by ~~utilizing the~~ full stroke time ~~without delay extrapolated~~ from measured stroke times between 10% closed and 90% closed. The acceptability of the slow criteria (5 seconds) is determined by utilizing the full stroke time ~~with delay extrapolated for~~ the final 10% of stroke. from solenoid deenergization to 90% closed and extrapolating extrapolating

Acceptance Criteria - Level 1:

The positive change in vessel dome pressure occurring within 30 seconds after closure of all MSIVs must not exceed predicted values by more than 25 psi.

The positive change in heat flux following closure of all MSIVs shall not exceed predicted values by more than 2% of rated value.

Following the closure of all MSIV's, the reactor must scram.

~~Closure time for any MSIV, including delay, shall not be greater than 5.5 seconds.~~

Closure time for any MSIV shall not be less than 3.0 seconds nor greater than 5.0 seconds.

Feedwater control settings must prevent flooding the main steam lines during the full isolation test.

Level 2 - The positive change in vessel dome pressure occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, scram timing and dome pressure and will use beginning of life nuclear data.

The positive change in heat flux occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, and dome pressure and will use beginning of life nuclear data.

If water level reaches Level 2 setpoint during the MSIV full closure test, RCIC shall automatically initiate and reach rated flow.

During the MSIV full closure test, the relief valves must reclose properly (without any detectable leakage) following the pressure transient.

During full closure of individual MSIVs, peak vessel dome pressure must remain at least 10 psi below the scram setpoint.

During full closure of individual MSIVs, peak neutron flux must remain at least 7.5% below its scram setpoint.

During full closure of individual MSIVs, steam flow in individual lines must remain at least 10% below the high flow isolation trip setpoint.

During full closure of individual MSIVs, the simulated heat flux must remain at least 5% less than its flow biased scram setpoint.

(ST-26) Relief Valves

Test Objectives - The objectives of this test are to verify that the relief valves function properly, reseat properly after operation and contain no major blockages in the relief valve discharge piping.

d) The positive change in simulated heat flux shall not exceed the Level 2 criteria by more than 2% of rated value.

e) The two pump drive flow coastdown transient, during the first three seconds of an RPT trip, must fall within the specified limits.

Level 2

a) There shall be no MSIV closure in the first 3 minutes of the transient and operator action shall not be required in that period to avoid the MSIV trip.

b) The positive change in vessel dome pressure and in simulated heat flux which occur within the first 30 seconds after the initiation of either generator or turbine trip must not exceed the predicted values.

(Predicted values will be referenced to actual test conditions of initial power level, dome pressure, scram timing, and the time from the start of stop/control valve motion to start of control rod motion, and will use beginning of life nuclear data.)

c) For the Generator trip within the bypass valves capacity (initial thermal power values less than or equal to 25 percent of rated) the reactor shall not scram.

d) The Total Delay from the initiation of a Turbine Stop Valve Closure or Turbine Control Valve Fast Closure to complete suppression of the Electric Arc between the fully open contacts of the Recirculation Pump Trip (RPT) Breaker shall be less than 175 milliseconds.

e) Feedwater level control shall avoid the loss of feedwater flow due to a high level (L8) trip.

f) Feedwater level control shall maintain water level above the L2 level trip setpoint for HPCI, RCIC and ATWS RPT.

(ST-28) Shutdown from Outside the Main Control Room

Test Objective - The objective of this test is to demonstrate that the reactor can be shutdown, maintained in a hot shutdown condition, and cooled down from outside the main control room. Also, the adequacy of the Emergency Operating Procedures will be verified.

scrammed,

design conditions in the drywell and reactor building portion of the mainsteam tunnel, respectively, during operating conditions and post scram conditions.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - During heatup, at test conditions 2 and 6, and following a planned scram from 100% power, data will be taken to ascertain that the containment atmospheric conditions are within design limits.

Acceptance Criteria - Level 1 - The area under the reactor vessel in the Control Rod Drive are is maintained below 185°F.

Level 2 - The general drywell area is maintained at an average temperature less than or equal to 135°F, with maximum local temperature not to exceed 150°F.

The area beneath the reactor pressure vessel is maintained at an average temperature less than or equal to 135°F, ~~maximum local temperature not to exceed 160°F,~~ with minimum local temperature above 100°F.

The area around the recirculation pump motors is maintained at an average temperature less than or equal to 128°F, with maximum local temperature not to exceed 135°F.

The inside base of the shield wall in the RPV skirt area is maintained at temperatures greater than 100°F.

The reactor building portion of the mainsteam pipeway is maintained at or below 125°F.

The area surrounding the drywell head shall have an average temperature equal to or greater than 135°F, with maximum local temperature not to exceed 150°F.

The reactor pressure vessel support skirt flange shall be maintained at or below 150°F.

The temperature of the concrete surrounding the primary containment main steamline penetrations are maintained less than 200°F.

appropriate. In addition, the 100% power trip testing shall have been completed or 120 effective full power days shall not have elapsed prior to performing the nitrogen inerting test.

Test Method - The test will consist of collecting data and performing quantitative analysis of the off gas system effluent to determine if the performance is acceptable per the Technical Specification. For the nitrogen inerting system, the proper nitrogen concentration will be verified by the as installed plant oxygen detectors/instruments in the two major volumes of the primary containment. Proper operation of the offgas system will also be verified.

Acceptance Criteria - Level 1 - The release of radioactive gaseous and particulate effluents must not exceed the limits specified in the site technical specifications.

Level 2-The system flow, pressure, temperature, and relative humidity shall comply with design specifications. The catalytic recombiner, the hydrogen analyzer, the activated carbon beds and the filters shall be performing their required function. There shall be no less than 8000 lb/hr. of dilution steam flow when the steam jet air ejectors are pumping. The containment nitrogen inerting system shall be capable of inerting the primary containment free volume within 24 hours from the start of the test and the resulting oxygen concentration shall be less than ~~or equal to~~ 4%.

(ST-38) BOP Piping System Expansion

(The system expansion testing previously contained in this test has been merged into ST-17.)

(ST-39) Piping Vibration During Dynamic Transients

Test Objective - The objective of this test for dynamic transient testing is to demonstrate that vibration levels on main steam inside containment, reactor recirculation, and system piping identified in Table 3.9-33 meet acceptable limits during selected dynamic transients.

Prerequisites: Instrumentation has been installed and calibrated.

Test Method - Devices for measuring ~~continuous loads/~~ displacements ~~accelerations and pressures~~ are mounted on piping systems, and responses during transients are compared with calculated values. ~~Those portions of the systems which are non-safety related~~ are visually inspected prior to, during and subsequent to the transient loading condition, as applicable, by qualified test engineers to determine acceptable vibratory response.

Acceptance Criteria - Level 1 - The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam

main steam inside containment and reactor recirculation

Other piping systems identified in Table 3.9-33

inside drywell and/or reactor recirculation piping shall not exceed the allowable value for each specific point.

~~Level 2 - The maximum measured accelerations on those systems listed in Table 3.9-33 shall not exceed the design maximum expected values at each specific point.~~

The vibratory response of ~~non-remotely monitored~~ systems identified in Table 3.9-33 shall be judged to be within acceptable limits by a qualified test engineer.

Based on visual inspection during a post transient walkdown, there shall be no signs of excessive piping response (such as damaged insulation, markings on piping, structural or hanger steel, or walls, damaged pipe supports, etc.) on systems listed in Table 3.9-33.

The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam inside drywell and/or reactor recirculation piping shall not exceed the expected value for each specific point.

(ST-40) BOP Piping Steady State Vibration

(The steady state vibration testing previously contained in this test has been merged into ST-33.)

FIGURE 14.2-5, Sht. 3

Test No.	Test Name	Open Vessel	Heat Up	Test Condition (1) 1	2	3	4	5	6
ST-1	Chemical & Radiochemical	X(2)	X	X	X	X		X	X
ST-2	Radiation Measurements	X(2)	X	X		X			X
ST-3	Fuel Loading	X(2)							
ST-4	Full Core Shutdown Margin		X(6)						
ST-5	Control Rod Drive	X(2,3)	X(3)	X(3)		X(3)			X(3)
ST-6	SRM Performance & Control Rod Seq. (18)								
ST-7	Reactor Water Cleanup			X(7)			X(9)		
ST-8	Residual Heat Removal								X(9,13)
ST-9	Water Level Measurements		X						
ST-10	SRM & IRM Performance & Control Rod Seq.		X(6)	X					
ST-11	LPRM Calibration			X(7)	X	X			X
ST-12	APRM Calibration		X	X	X	X		X	X
ST-13	Process Computer					X(9)			
ST-14	RCIC		X	X(7)					X(8,9)
ST-15	HPCI		X			X			X(8,9)
ST-16	Selected Process Temps		X			X	X(14)		X(14)
ST-17	System Expansion		X(6)		X(8)				X(9,13)
ST-18	Tip Uncertainty					X			X(9)
ST-19	Core Performance			X	X	X	X	X	X
ST-20	Steam Production (19)								
ST-21	Core Power-Void Mode Response						X		X(12)
ST-22	Pressure Regulator			X	X	X	X	X	X
ST-23	Feedwater			X	X	X	X	X	X(8,15)
ST-24	Turbine Valve Surv.								X(8,16)
ST-25	MSIVs		X					X	X(8,16)
ST-26	Relief Valves		X		X				
ST-27	Turbine Stop Valve Trip Generator Load Rejection				X(10)	X			X
ST-28	Shutdown From Outside Control Room			X					
ST-29	Recirculation Flow Control				X	X		X	X
ST-30	Recirculation System					X(11)			X
ST-31	Loss of T-G & Offsite Power				X				
ST-32	Containment Atmosphere and Main Steam Tunnel Cooling		X		X				X(13)
ST-33	Piping Steady State Vibration		X		X	X		X	X(8,9)
ST-34	Rod Sequence Exchange (17)								
ST-35	Recirculation System Flow Calibration					X			X
ST-36	Cooling Water Systems (17)								
ST-37	Gaseous Radwaste System		X	X		X		X	X
ST-38	BOP Piping System Expansion (4)								
ST-39	Piping Vibration During Synamic Transients		X		X	X	X		X
ST-40	BOP Piping Steady State Vibration (5)								

Rev. 34, 02/84

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT

INDIVIDUAL STARTUP TEST SEQUENCE - UNIT 2

FIGURE 14.2-5, Sheet 3