

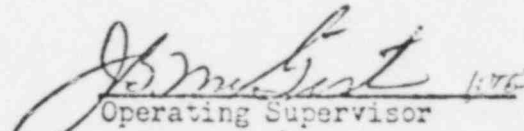
H. B. ROBINSON SEG PLANT

Robinson File No. 2-0-9-a

STEAM GENERATOR PRESSURE TEST

December 1, 1972

Recommend Approval

  
Operating Supervisor

Date: 12-2-72

Approved

  
Plant Manager

Date: 12-2-72

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PDR ADOCK 05000261  
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H. B. ROBINSON STEAM ELECTRIC PLANT  
STEAM GENERATOR PRESSURE TEST

December 1, 1972

Robinson File No. 2-0-9-a

12-2-72  
Date of Test

OBJECTIVE

1. Establish a 1900 psi differential pressure between the primary and secondary systems for purpose of a pressure test.

INITIAL CONDITIONS

1. Reactor is in hot shutdown condition with reactor coolant pumps running as required. JS
2. All control and shutdown rods are inserted. JS
3. Pressurizer heaters are in "auto" control. JS
4. Pressurizer power operated relief valves are set up for normal operation. JS
5. Pressurizer continuous spray valves are "open" and pressurizer control spray valves are in "auto" control. JS
6. Reactor makeup in "auto" control with boron adjusted to makeup at reactor coolant system concentration. JS
7. Letdown is maximum for purification of the primary system water. JS

Steam Generator Pressure Test Cont'd.

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8. One charging pump is in "auto" control. JA
9. Steam dump system is being utilized to maintain the hot shutdown condition. JA
10. Steam generator isolation valves are open. JA
11. Feedwater is being supplied through the feedwater bypass valves. JA
12. Primary coolant has been sampled for iodine and tritium, and leak rate of each S/G has been determined. JA

PRECAUTIONS

1. Primary system pressure should not exceed the normal operating pressure of 2235 psig. JA
2. Calibrated gauges are to be utilized on the primary and secondary system to determine pressure. JA
3. Only authorized personnel are to be allowed inside the containment vessel. JA
4. Insure a positive labyrinth seal as required for the reactor coolant pumps. JA
5. The limitation of a 200°F delta temperature between the pressurizer and the primary system is not applicable (Permanent change). JA

Steam Generator Pressure Test Cont'd.

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6. If test exceeds seventeen hours duration it will be necessary to compensate with boron addition for Xe decay to maintain shutdown margin. ~~84~~
7. Do not exceed a cooldown or heatup rate of 50° F. per hour.
8. During cooldown, monitor nuclear instrumentation and plot a 1/M curve.
9. Do not utilize the secondary system power operated relief valves unless it becomes necessary to prevent the safeties from lifting.
10. Sample and determine boron concentration of the primary system at 30 minute intervals or as requested by the shift foreman.
11. Pressurizer sprays should not be used if the spray fluid is more than 320°F below the pressurizer temperature.
12. All normal precautions for cooldown and heatup remain in effect unless specifically altered by this procedure.

INSTRUCTIONS

1. Borate to the boron concentration as specified in the attached shutdown margin calculations for the test period. Shutdown margin calculated for 1% shutdown at 200°F. JA
  2. Begin cooldown from hot shutdown conditions utilizing the turbine and/or condenser steam dumps to dissipate energy. Pressurizer automatic systems should maintain no load level and pressure in the pressurizer. Do not exceed a cooldown rate of 50°F / hour. JA
  3. When Tavg decreases to 543°F. go to the "Bypass Tavg Interlock" position on the steam dump controls. JA
  4. Block the High Steam Flow, Low Steam Pressure/ Low Tavg safety injection signal at Tavg of 543°F. JA
  5. Continue cooldown until a differential pressure of 1900 psi exists between the primary system (primary system pressure determined by PI 404 & 405) and the secondary system (secondary pressure determined from test gauges on the three steam lines). JA
- NOTE: Insure that a 1900 psi differential does exist. Secondary pressure indication should be 334 psig with primary pressure at 2235 psig.
6. Maintain the required pressure differential until the data required on the attached data sheet is obtained. JA

Instructions Cont'd.

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7. If no primary to secondary leakage is detected as indicated by an increase in steam generation<sup>23</sup> levels, return the system to normal operating pressure and begin normal heatup of the primary system as per GP-1.

NOTE: Refer to precaution number 6.

8. Determine S/G leakage.
9. Return to critical operation if S/G leakage is less than 0.3 gpm total.
10. Return to power operation as per GP-1.

9A  
198 gph  
JH  
JH

Pressure Requirements

Primary system pressure	2235 psig
Required differential	<u>1900 psig</u>
Corrected secondary pressure	335 psig
Correction for friction losses	-10 psig
Correction for head <del>losses</del> on test gauges	<u>+9.0 psig</u>
Total corrections	- 1 psig

To insure 1900 psig differential require secondary pressure of 334 psig on the secondary system test gauges.

Shutdown Margin

45 Rods In Worth (Cold SD Worth = 78% Hot Worth)	-6100 pcm
Power Defect and Rod Bite	+2558 pcm
Temperature Defect (547-200°F)	+5600 pcm
Xe buildup after 2 hrs.	-1000 pcm
1% SD Margin	<u>+1000 pcm</u>
Required Boration	+2058 pcm

Add boron to obtain a concentration of 250 ppm (Boron worth 14 pcm/ppm)

S.D. Margin valid between two and seventeen hours after shutdown. After 17 hours add boron to compensate for Xe decay.

Primary to Secondary Leakage Data Sheet

	<u>IODINE - 131</u>	<u>TRITIUM</u>	<u>LEAK RATE</u>	<u>TIME/DATE</u>
<u>Before Test</u>				
RCS 11/28/72	$1.47 \times 10^{-2}$	$9.15 \times 10^{-2}$		
S/G - A 11/30/72	$2.28 \times 10^{-6}$	$6.78 \times 10^{-6}$	0.09 gph	12-1-72
B 11/30/72	$7.89 \times 10^{-7}$	$5.35 \times 10^{-6}$	0.03 gph	12-1-72
C 11/30/72	$1.04 \times 10^{-6}$	$6.96 \times 10^{-6}$	0.04 gph	12-1-72
F. W.		$1.05 \times 10^{-5}$	0.16 gph	12-1-72
<u>After Test</u>				
RCS		$9.15 \times 10^{-2}$		0345/12/2/72
S/G - A		$8.05 \times 10^{-6}$	0.075 gph	0345/12/2/72
B		$4.15 \times 10^{-6}$	0.039 gph	0345/12/2/72
C		$9.04 \times 10^{-6}$	0.054 gph	0345/12/2/72
<u>After Return to Power</u>				
RCS	$1.41 \times 10^{-1}$	$3.52 \times 10^{-2}$		2130/12-2-72
S/G - A	$1.52 \times 10^{-5}$	$2.53 \times 10^{-5}$	0.067 gph	1930/12-2-72
B	$5.19 \times 10^{-7}$	$1.36 \times 10^{-5}$	0.002 gph	1930/12-2-72
C	$8.17 \times 10^{-7}$	$1.40 \times 10^{-5}$	0.004 gph	1930/12-2-72
F. W.		$1.43 \times 10^{-5}$	0.22 gph	1930/12-2-72
RCS	$8.99 \times 10^{-2}$	$2.32 \times 10^{-2}$		12-5-72
S/G - A	$8.91 \times 10^{-6}$		0.06 gph	12-5-72
FW		$0 \pm 3.72 \times 10^{-6}$	0.17 gph	12-5-72

Steam Generator Pressure Test Data

Time: 0322 HRS

Date: 12-2-72

Primary System Pressure:

PI 404	<u>2264</u>	psig
PI 405	<u>2268</u>	psig
Average	<u>2266</u>	psig
Correction for elevation head	<u>-23</u>	psi
Corrected Primary System Pressure	<u>2243</u>	psi

Secondary System Pressure:

Test Gauge Steam Line "A"	<u>318</u>	psig
Test Gauge Steam Line "B"	<u>322</u>	psig
Test Gauge Steam Line "C"	<u>325</u>	psig
Average	<u>321.66</u>	psig

Pressure Differential:

Primary System Average	<u>2243</u>	psig
- Secondary System Average	<u>321.66</u>	psig
Differential	<u>1921.34</u>	psi
- Friction Losses from S/G	<u>* 10</u>	psi
Differential (Friction loss Corrected)	<u>1911.34</u>	psi
+ Pressure Head from steam lines to test gauges	<u>** 9.0</u>	psi
Corrected Differential Pressure	<u>1920.34</u>	psi

\* Losses from S/G's to pressure gauge lines  
\*\* 20.5 ft. elevation difference resulting in 9.0 psi.

Data Collected By:

Milton W. Jordan

12-2-72

Primary System Data

<u>Identity</u>	<u>Computer Address</u>	<u>Value</u>
RCS Loop "A" Hot Leg Temperature	TO419A	<u>433.0</u>
RCS Loop "A" Cold Leg Temperature	TO406A	<u>433.6</u>
RCS Loop "B" Hot Leg Temperature	TO439A	<u>433.1</u>
RCS Loop "B" Cold Leg Temperature	TO426A	<u>432.7</u>
RCS Loop "C" Hot Leg Temperature	TO459A	<u>437.0</u>
RCS Loop "C" Cold Leg Temperature	TO446A	<u>437.2</u>
Pressurizer H <sub>2</sub> O Temperature	TO480A	<u>652.1</u>
Pressurizer Steam Temperature	TO481A	<u>622.5</u>

Data Collected By:

clw/mtt

Date:

12-2-72