REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST
BROWNS FERRY NUCLEAR PLANT UNIT 3

CONDUCTED NOVEMBER 6-7, 1995

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1.0 INTRODUCTION

This report contains the summary technical analysis of the Reactor Building Containment Integrated Leak Rate Test (CILRT) conducted on Browns Ferry Nuclear Plant (BFN) Unit 3 November 6-7, 1995. As prescribed in BFN Technical Specification 4.7.A.2, the leakage of air from the boundary forming the reactor building primary containment is limited to 2.0 percent by weight of the containment air mass per day at a pressure of P_a, 49.6 psig. This test was conducted in accordance with the requirements of Title 10, Code of Federal Regulations (CFR), Part 50, Appendix J, which is implemented by BFN Surveillance Instruction (SI) 3-SI-4.7.A.2.a-f. Guidance for the procedure implemented by the SI was provided by the American National Standard for Containment Testing, ANSI 45.4-1972, the American Nuclear Society Standard for Containment Testing, ANS 56.8, and the procedure outlined in Bechtel Topical Report, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants" (BN-TOP-1, Revision 1).

BFN Unit 3 is a 3,293-megawatt thermal, boiling water reactor employing a steel pressure suppression containment. The Final Safety Analysis Report defines the calculated peak accident pressure, P_a, to be 49.6 psig. The reactor containment building is divided into two major compartments--the drywell, enclosing the reactor and the forced recirculation system, and a pressure suppression pool chamber. These two compartments are connected by blowdown pipes that terminate below the suppression pool level. Vacuum breakers are provided to ensure that the suppression chamber is never pressurized with respect to the drywell. For the performance of this CILRT, these vacuum breakers were mechanically locked open to ensure pressure equalization between the drywell and the suppression chamber.

This report outlines the objectives, principal events, special equipment, and analysis of the test results for the CILRT completed on November 7, 1995, on BFN Unit 3. In addition, a summary of local leak rate tests conducted since the previous CILRT is included in Appendix M.

2.0 SUMMARY

A CILRT was conducted on BFN Unit 3 November 6-7, 1995, in preparation for return to power operation following an extended shutdown period (~ 10.5 years). The CILRT was successfully completed in 10 hours and 14 minutes and included 63 data samples.

The calculated Total Time Leak Rate (TTLR) was 0.8562 percent of containment air mass per day (% /day). The associated reportable As Found 95 percent upper confidence limit (UCL), which includes the type B and C leakage for testable penetrations in service at the time of the CILRT, was 1.0645 % /day. The As Left 95 percent UCL was the same since no adjustments were necessary during the performance of the test.

The Mass Leak Rate (MLR) for the CILRT was 0.91106 % /day. The associated reportable As Found and As Left 95 percent UCL was 0.92275 %/day. These values reflect the adjustment provisions as described for TTLR.

3.0 TEST PURPOSE AND RESULTS

3.1 TEST PURPOSE

The primary objective of the CILRT was to demonstrate the leak-tight integrity of the Unit 3 reactor containment for return to power operation.

For BFN Unit 3, the leak-tight integrity is defined in Technical Specifications to be that the leakage of air from containment is not to exceed 1.5 % /day at peak accident pressure, P_a.

3.2 TEST RESULTS

The following table presents the test results with appropriate adjustments in leak rates as indicated by the notations. Evaluation of the Instrument Selection Guide and statistical analysis of proposed Regulatory Guide MS-021-5 are also presented. Additional tabular data on the CILRT and verification test results are presented in Appendices C and E.

The Total Time Leak Rate results, required by BN-TOP-1, Revision 1, for short duration tests, represent 70.9 percent of the allowable 1.5 percent of containment air mass, as described under Technical Specification 4.7.A.2. Agreement as prescribed by BN-TOP-1 between the CILRT and the verification test was -0.852 percent, which is well within the $\pm$ 25 percent L_a required by Technical Specifications.

During the stabilization period, the primary containment was tested for unidentified leakage with a soap solution using Technical Instruction 3-TI-173. Leakage was identified at several instrument tubing compression fittings on panels 3-25-306 and 3-25-307, and minor packing leakage was identified on several valves which are tested as part of the CILRT boundary. The magnitude of these leakage paths was insufficient to preclude the successful performance of the CILRT, so the locations of these leaks were noted in 3-TI-173, and repairs were deferred until after completion of the CILRT and verification tests. These repairs were subsequently performed during the primary containment depressurization period. Since no convenient provisions for locally quantifying these leaks existed, no adjustment was made in the CILRT results to reflect the improvement realized by these repairs.

The leak-tight integrity of BFN Unit 3 was accurately measured and recorded by a computer-based instrumentation and data acquisition system. The acquisition system provided reliable, immediate calculations of the test data, thereby allowing test engineers to continuously monitor all instrumentation and test parameters.

Table of CILRT and Verification Test Results

TTLR = Total Time Leak Rate
MLR = Mass Leak Rate

Post Test ISG = 0.16357 %/ day [1]
(25 percent L_a = 0.5 %/ day)

CILRT (As Found = As Left)

	Calculated	*With 95% UCL*
TTLR	0.85617 % /day	1.06352 % /day [2]
MLR	0.91106 % /day	0.92275 % /day [2]

CILRT Test Duration 10 Hours 14 Minutes
CILRT Number of Samples 63
CILRT Sample Span 68 to 130

Verification Test

TTLR Agreement -0.852% [3]
MLR Agreement 0.156% [3]

Verification Test Duration 5 Hours 19 Minutes
Verification Number of Samples 59
Verification Sample Span 139 to 197

Extended ANSI Statistical Analysis for CILRT (satisfaction of equations 1.1 or 1.2 and 2.1 is required)

Equation 1.1	0.2128 < 1	Satisfied
1.2	0.1506 < 1	Satisfied
2.1	1.5745 > 1	Satisfied

(1) See Appendix G for ISG plot
(2) Reflects leakage of systems in service during the CILRT of 0.0034 percent per day. See Appendix H for calculation.
(3) See Appendix F for agreement calculations.

4.0 CONDUCT OF TEST

Prior to the start of the CILRT, local leak rate tests (LLRT) were conducted on the containment closures (hatches with resilient seals, bellows, and electrical penetrations) in accordance with surveillance instructions 3-SI-4.7.A.2.g-1 and 3-SI-4.7.A.2.g-2 (series). LLRTs were conducted on valves forming the boundary of the primary containment in accordance with Surveillance Instructions 3-SI-4.7.A.2.g-3/(series) and 3-SI-4.7.A.2.i-3/(series), with all valves meeting satisfactory leakage requirements prior to the performance of the CILRT.

The Residual Heat Removal (RHR) and the Core Spray (CS) safety systems were aligned to allow exposure to the CILRT test pressure. Water levels in the reactor vessel and the pressure suppression chamber were monitored for unexpected or unusual changes during the test sequence, but were intentionally not controlled with makeup or letdown (See Appendix L). The levels were allowed to change in response to possible internal system leakage (i.e., leakage from the reactor vessel to the pressure suppression chamber via safety system piping) or possible external system leakage (i.e., from primary containment via the RHR and CS external piping). This test configuration provides a means to reflect any water leakage from these systems external to the primary containment boundary (via displacement) in the CILRT measured leak rate.

This CILRT was performed with the reactor vessel head installed and torqued. The Reactor Coolant System (RCS) temperature was maintained between 100 and 110°F to ensure minimal stress in the reactor vessel head flange region. Maintaining this RCS temperature required periodic operation of the RHR system in the shutdown cooling mode. This resulted in a perturbation in the air temperature in the drywell each time the RHR shutdown cooling mode was entered (approximately every 4 hours). This perturbation is reflected on the temperature, pressure, and mass graphs, and in the tabular data presented in the Appendices.

Although the maximum permissible exposure temperature for temperature sensors used with the CILRT measuring and data acquisition system is 390°F, the normal measuring range is 0-114°F. Five specially modified sensors were calibrated to allow temperature measurements up to 130°F. These five modified sensors were installed in the drywell area immediately above and below the vessel head flange in anticipation of possible elevated temperatures. However, maximum temperatures remained well below the 114°F threshold.

Pressurization of the primary containment was accomplished in approximately 6 hours. Pressurization began at 0626 hours on November 6, 1995 and was complete at 1338 hours.

The required 4 hour stabilization was begun on November 6 at 1343 hours, following completion of the isolation of penetration X-48 and venting of the pressurization line, and completed at 1752 hours (see Appendix A for stabilization phase acceptance criteria).

Evaluation of the containment environment parameters indicated that the temperature distribution was comparable to that of past BFN tests. The overall containment conditions stabilized rapidly during stabilization phase. This was attributed, in part, to a controlled pressurization rate which reduced temperature variations and the effects of ingassing. Another identifiable contributing factor was the containment ventilation configuration (no forced ventilation), which reduced spot heat sources due to blower operation).

At 1802 hours, the CILRT test phase was initiated. The 10 hour and 14 minute, 63 samples test proceeded relatively uneventfully, with conditions remaining stable, with the exception of the regularly spaced perturbations caused from the periodic operation of RHR shutdown cooling. The reactor vessel water level slowly decreased at a rate of 0.9 inches per hour throughout the test, while the suppression chamber water level increased at 0.05 inches per hour. The amount of increase in the suppression chamber water level was approximately equal to the vessel level decrease and confirmed that leakage out of the test boundary was essentially zero. The CILRT test phase was concluded at 0416 hours on November 7,1994, in accordance with BN-TOP-1, Revision 1. The linearity of the CILRT was confirmed by statistical evaluation as described in ANSI 56.8.

Subsequent to the conclusion of the CILRT test phase, a leak of 18.2 SCFM (approximately L_a) was imposed on the primary containment. The primary containment was allowed to stabilize for 1 hour after introduction of this leak before beginning the verification test. The 5 hour and 14 minute verification test was initiated at 0547 hours on November 7 and was completed at 1106 hours. No additional perturbations occurred during this period, and the required agreement between this test and the CILRT was attained immediately.

The following gives a chronological listing of events associated with the CILRT.

Date and Time	Event
11/5/95 0930	CILRT Management Pretest Briefing given by F. Nilsen at morning meeting.
11/5/95 2300	Operations Pretest Briefing given by K. Green at Operations shift-turnover meeting.
11/6/95 0521	Completed pretest briefings with Operations and all personnel associated with test.
11/6/95 0626	Began pressurization of primary containment.
11/6/95 0645	Observed that two pressure gauges were not responding to increase in pressure. Discovered fitting problem at tubing to Drywell compartment. Stopped pressurization to correct.
11/6/95 0703	Resumed pressurization.
11/6/95 0732	Regulated air-compressor cooling water to increase discharge air temperature from 65-68°F to approximately 75°F to minimize impact on containment temperature.
11/6/95 0831	Reactor water level at 111.7 inches.
11/6/95 0833	Containment pressure at ~ 27.0 psia. Atmospheric pressure at ~ 14.5 psia.
11/6/95 0915	Briefed oncoming Operations shift.
11/6/95 0955	Containment pressure at 24.48 psig.
11/6/95 1025	Notified by Operations that Torus water level had dropped 2.7 inches since start of pressurization. Investigation in progress.
11/6/95 1100	Torus Level Indicators 3-LE-64-54 and 3-LE-66-64 are new instruments. They read the actual torus water level incorrectly when the torus is pressurized, but they will correctly reflect changes in the water level. Initial and final water levels will be recorded using an associated sight glass, and these level indicators will be monitored for changes during the test sequence.

11/6/95	1200	Containment pressure at ~ 41 psig. Air-compressor discharge at 58 psig and 78°F.
11.6.95	1230	Drywell temperature sensor TS-21 overranging occasionally and may have to be eliminated from the data base. This will require re-assignment of associated humidity sensor HS-5. Will monitor.
11/6/95	1259	Containment pressure at 62.27 psia, Atmospheric pressure at 14.45 psia.
11/6/95	1302	Operations Keith Nichols reported that actual torus level was -4.75 inches (approximately the same level as when pressurization began).
11/6/95	1318	Containment pressure at 64.25 psia. Notified compressor operators to shut down one compressor.
11/6/95	1338	Notified compressor operators to shut down remaining compressor. Pressurization complete. Containment pressure at 65.23 psia. Atmospheric pressure at 14.43 psia.
11/6/95	1343	Began stabilization at sample number 44. Began performance of leak-checking portion of 3-TI-173.
11/6/95	1515	Deleted TS-21 due to overranging. Reset volume fractions and reassigned HS-5 to TS-22.
11/6/95	1639	Leak checks per 3-TI-173 progressing satisfactorily. Completed Core Spray pump shaft seal leakage tests. Small leak found on one pump (3A). Inspected Bonnet on 3-FCV-75-57.
11/6/95	1700	Drywell temperature sensor TS-14 overranged at sample 38 and at sample 46, then remained stable for the last 3.5 hours. Will mask reading for those two samples.
11/6/95	1707	Notified of a small leak on excess-flow check valve 3-ECKV-3-816. Will repair following test completion.

11/6/95	1730	Leakage found on instrument tubing joints in two locations. Leakage inspected and determined to be acceptable for performance of CILRT. These leaks will be repaired following the CILRT test sequence while pressure is still on containment. (These leaks are not locally testable).
11/6/95	1752	Terminated stabilization phase at sample 68. Stabilization length was 4 hours , 9 minutes. Stabilization criteria satisfied. Delta T values were: Avg. 4 hour = 0.452°F, Avg. last hour = 0.244°F
11/6/95	1802	Began test phase at sample number 69. Notified Operations to began hourly readings of water levels.
11/6/95	1840	Obtained water level from torus level sight glass. Torus level at -4.5 inches
11/6/95	1935	Removed TS-14 from data base due to sporadic overranging. Adjusted volume fractions and re-assigned HS-3 to TS-13.
11/6/95	2300	K. Green attended the Operations turnover meeting and gave update on CILRT status.
11/6/95	2310	Containment leak rate trending slightly upward.
11/7/95	0200	Control Rod Drive (CRD) 22-43 is leaking. Leak appears to be the directional control valve.
11/7/95	0203	Eight hours have elapsed since beginning test. The calculated TTLR is increasing very slightly. Cannot terminate due to Technical Specification requirement.
11/7/95	0210	Operations obtained torus water level from sight glass on 3-LE-64-54. Level at -4 5/8 inches.
11/7/95	0210	Operations contacted test director concerning isolating (CRD) leak. Since containment leak rate was acceptable leak, Operations was advised not to isolate to prevent changing test conditions and voiding test.
11/7/95	0416	Terminated Test phase at sample 130. Test duration was 10 hours, 14 minutes. All acceptance criteria met.

11/7/95	0440	Setting up for Verification Test phase. Operations obtained torus water level from sight glass on 3-LE-64-54. Level at -4 5/8 inches.
11/7/95	0447	Established an imposed leakage of 18.2 scfm on containment for verification test at Sample number 133. Contacted RADCON to obtain a grab sample of leak discharge.
11/7/95	0547	Completed required stabilization period with imposed leak. Started Verification test phase at sample 139.
11/7/95	0700	F. Nilsen attended Operations shift turnover meeting and gave test status update.
11/7/95	1014	UNIC-04 placed in procedure to correct flowrate meter 3-FI-64-132 reading from fpm to cfm. This meter is used during the depressurization of containment.
11/7/95	1106	Completed Verification test phase at sample 197 Test duration was 5 hours, 19 minutes. All BN-TOP-1, Revision 1, criteria met.
11/7/95	1106	Notified Maintenance department to repair leaks found during performance of 3-TI-173.
11/7/95	1220	Temporary mechanical valve stops used to provide positive control of depressurization path valve positions have been installed in ventilation valves 3-FCV-64 -29 and 3 FCV-64-30 but are binding severely. Will remove and lubricate threaded stems.
11/7/95	1245	Temporary mechanical valve stops lubricated and reinstalled in ventilation valves 3-FCV-64 -29 and 3-FCV-64-30. Began depressurization.
11/7/95	1500	Attended Operations shift turnover meeting and gave test status update. Depressurization in progress-containment pressure at 20.6 psig.
11/7/95	1642	Containment depressurization completed.

5.0 MEASUREMENTS AND CALCULATIONS

5.1 Test Equipment

Appendix J lists the range, accuracy, and repeatability of the special test equipment used in the Unit 3, Cycle 6 CILRT. Test instrumentation received pretest calibration checks. The test instruments were calibrated by the TVA Central Laboratories using traceable standards.

5.2 Sensor Location

Appendix J lists the volumetric weighting factor for each instrument based on the two-compartment model used for this test. The associated figures indicate sensor locations. The pressure sensors were divided so that two sensors measured each compartment through penetrations X-25 and X-205. Utilizing two sensors per compartment allows removal of any one malfunctioning pressure gauge during the test while continuing to accurately monitor containment pressure. An additional pressure gauge measured barometric pressure at the test station. Twenty-nine temperature sensors and seven humidity sensors measured conditions in the Drywell compartment, and six temperature sensors and three humidity sensors measured conditions in the Torus compartment. Using this number of sensors in each compartment yields precise measurements of all areas of each compartment and provides adequate margin to allow several malfunctioning sensors in each compartment to be deleted from the test calculations without compromising the test results. Two Drywell compartment temperature sensors were removed from the test data base due to sporadic overranging. The first sensor (TS-21) was removed during the stabilization phase and the second (TS-14) was removed approximately one and one-half hours into the test phase. In each case, the volume fractions were adjusted so that the remaining temperature sensors represented 100% of the compartment volume, and re-assignments were made so that the readings of the humidity sensors affected (HS-5 and HS-3) were correlated with an appropriately located temperature sensor (TS-22 and TS-13).

5.3 Computer-Based Data Acquisition and Data Reduction

The test data measured by the special test instrumentation during the BFN Unit 3 CILRT was automatically scanned and collected by a PC computer system and then reduced. The computer produced immediate statistical and graphical results of the containment test parameters, including temperature, pressure, vapor pressure, mass, MLR, and TTLR plots. These calculated results were reported automatically to the test director as data was collected. Appendix I depicts the functional relationship between the special test instrumentation and the PC computer system.

All calculations performed by the computer system were in conformance with the procedures outlined in ANS 56.8, ANSI 45.2-1972, and/or Bechtel Topical report BN-TOP-1, Revision 1.

Software used by the PC was purchased from Duke Engineering Company. Source listing for all computer programs are on file with the Plant Operating Systems group in Chattanooga, Tennessee. Additional software Commercial Dedication, Software Description, and User's manuals are located in the BFN Technical Support organization.

5.4 Containment Model

A two-compartment model was used to represent the Unit 3 containment.

The first compartment was the drywell which was subdivided into five segments. A constant volume mode was used with a volume of 164,170.2 ft^3 representing the drywell volume. Twenty-nine temperature, 7 relative humidity, and two pressure instruments were used to determine the ambient conditions in the drywell.

The second compartment was the pressure suppression chamber (torus). Due to the uniformity of atmospheric conditions in the torus, this compartment consisted of only one segment. Again, a constant volume mode was used, amounting to 136,629.5 ft^3. Six temperature, 3 relative humidity, and 2 pressure instruments were used in the torus compartment.

6.0 ANALYSIS OF TEST DATA

6.1 Instrument Assessment

The total complement of instruments for both the drywell and torus was 35 temperature, 10 relative humidity, 4 containment pressure, and one flow instrument. In addition, 1 pressure and one temperature instrument was used to monitor atmospheric conditions. Two temperature sensors, as discussed in paragraph 5.2, were the only instruments that malfunctioned during the entire test interval.

6.2 Discussion of Graphical and Tabular Results for the CILRT and Verification Phases

The CILRT and verification test phases were markedly uneventful. The CILRT was completed in 10 hours and 14 minutes with 63 samples collected. The measured, measured mean, calculated, and delta calculated leak rates were all converging. The extrapolated value of the leak rate was 0.93996 percent per day.

The verification test was also without incident. 59 samples were taken after allowing the verification imposed flow to stabilize for 1 hour. The verification test was concluded in 5 hours and 19 minutes and agreement was satisfactory.

During the CILRT phase and the verification test phase the water levels in the reactor vessel and torus were allowed to fluctuate without make-up to either vessel. The reactor vessel level decreased slightly (16.7 inches during the combined CILRT and verification test periods) while the torus level increased slightly (~ 0.2 inches during the same period) indicating that no measurable leakage was occurring out of the RHR and CS systems. (See Appendix L for water tabular data)

6.3 Discussion of agreement (Verification Test)

Since this test was conducted in accordance with BN-TOP-1, Revision 1, the verification flow was allowed to stabilize for approximately 1 hour prior to starting the verification phase of testing. The verification test ran 5 hours and 19 minutes, which is approximately one-half of the CILRT duration of 10 hours and 14 minutes. The verification test summary is contained in Appendix F.

Agreement between the verification test and CILRT test results was attained immediately and held constant throughout the verification test. This phase was completed in the minimum time required by BN-TOP-1 criteria.

6.4 Discussion of the Determination of the "As Found" Leakage Rate.

BFN Unit 3 was shut down in March, 1985, prior to the August issuance of IE Notice 85-71. The concept of "leakage savings" was not practiced by industry or inforced by NRC prior to issuance of this Notice. Although it was the in-house policy at BFN to perform As-Found leak rate tests, this practice was performed at that point in time to obtain information used for maintenance purposes, rather than obtaining leak rates for regulatory reporting. After the shutdown of Unit 3, it was anticipated that these As-Found tests would be performed prior to component maintenance. However, the lengthy delay of unit restart (ten and one-half years) resulted in deviations from normal practice, and not all components were tested prior to maintenance or modification. Therefore, an exact As-Found value for total minimum path or maximum path LLRT leakage is not available for the Unit 3, Cycle 6 extended shutdown period. However, since the unit only operated for about 3 months (November, 28,1984 to March 7, 1985) the As Found maximum path value can be approximated as the As Left maximum path LLRT total from the previous Unit 3, Cycle 5 refueling outage. Using maximum path leakage totals to approximate "leakage savings" is conservative and would result is an addition of only 0.02 percent per day(~11.5 SCFH) to the As Found CILRT results shown in this report. This addition is insignificant and would not impact the acceptability of the test results.

The Unit 3 CILRT As-Found leak rate value presented in this report reflects the total leak rate of the unit at the time of performance of the CILRT, including leakage from systems required to be in service during the test. No "leakage savings" is considered.

7.0 CONCLUSIONS

The reactor building containment integrated leak rate test performed on BFN Unit 3, cycle 6, recorded a calculated TTLR of 0.85617 percent of containment air mass per day, which clearly demonstrates the leak-tight integrity of Unit 3. The total 95 percent TTLR UCL As-Found and As-Left value of 1.06351 percent per day was less than 71 percent of that allowed by Technical Specifications.

The technique of multi-compartment modeling coupled with a computer-based data acquisition system yielded immediate results that accurately measured and displayed the Unit 3 containment leak rate.

APPENDIX A

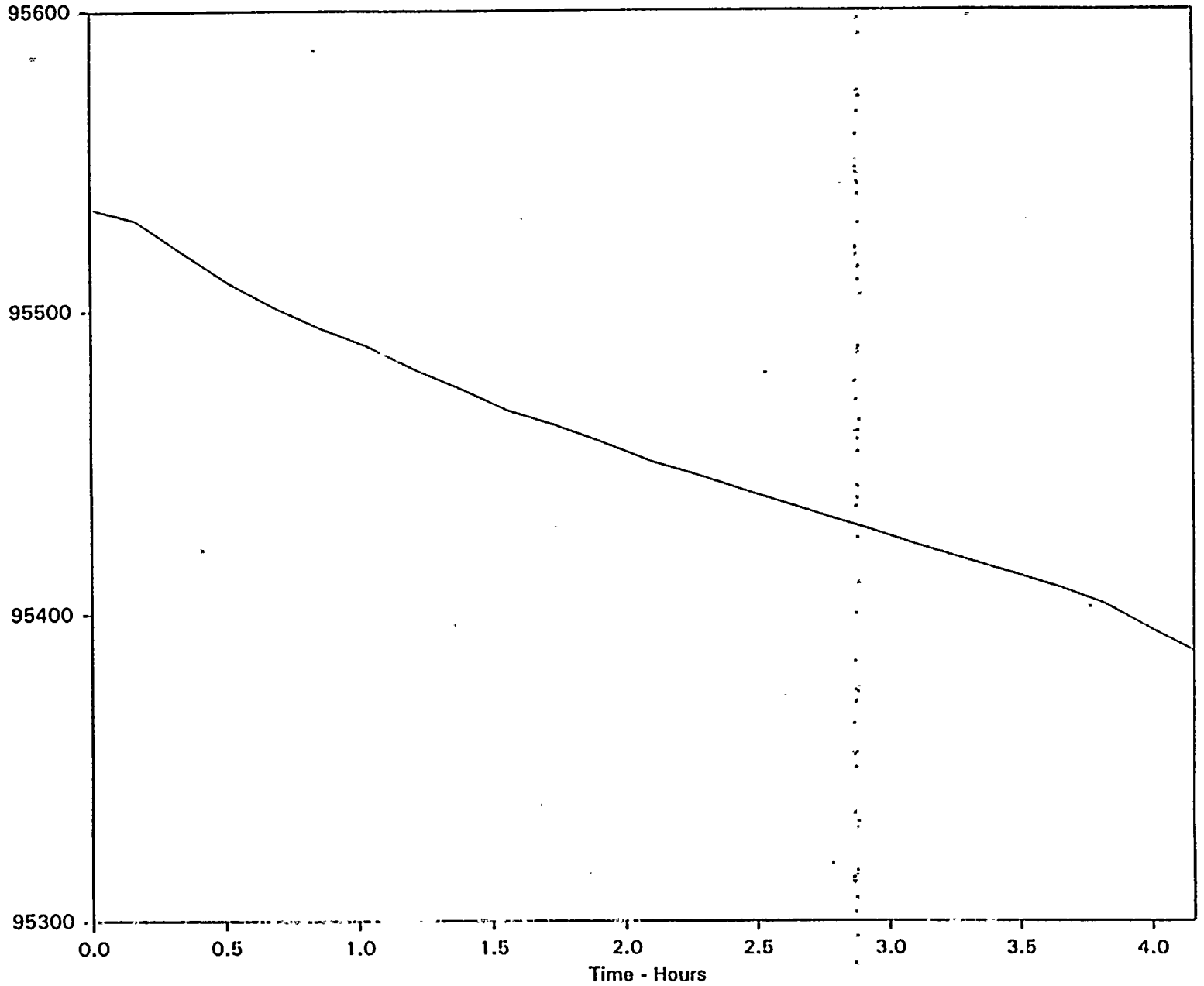
Stabilization Phase

Graphs and Tabular Data

Contents: Temperature stabilization criteria - Samples 44 to 67

Containment Mass

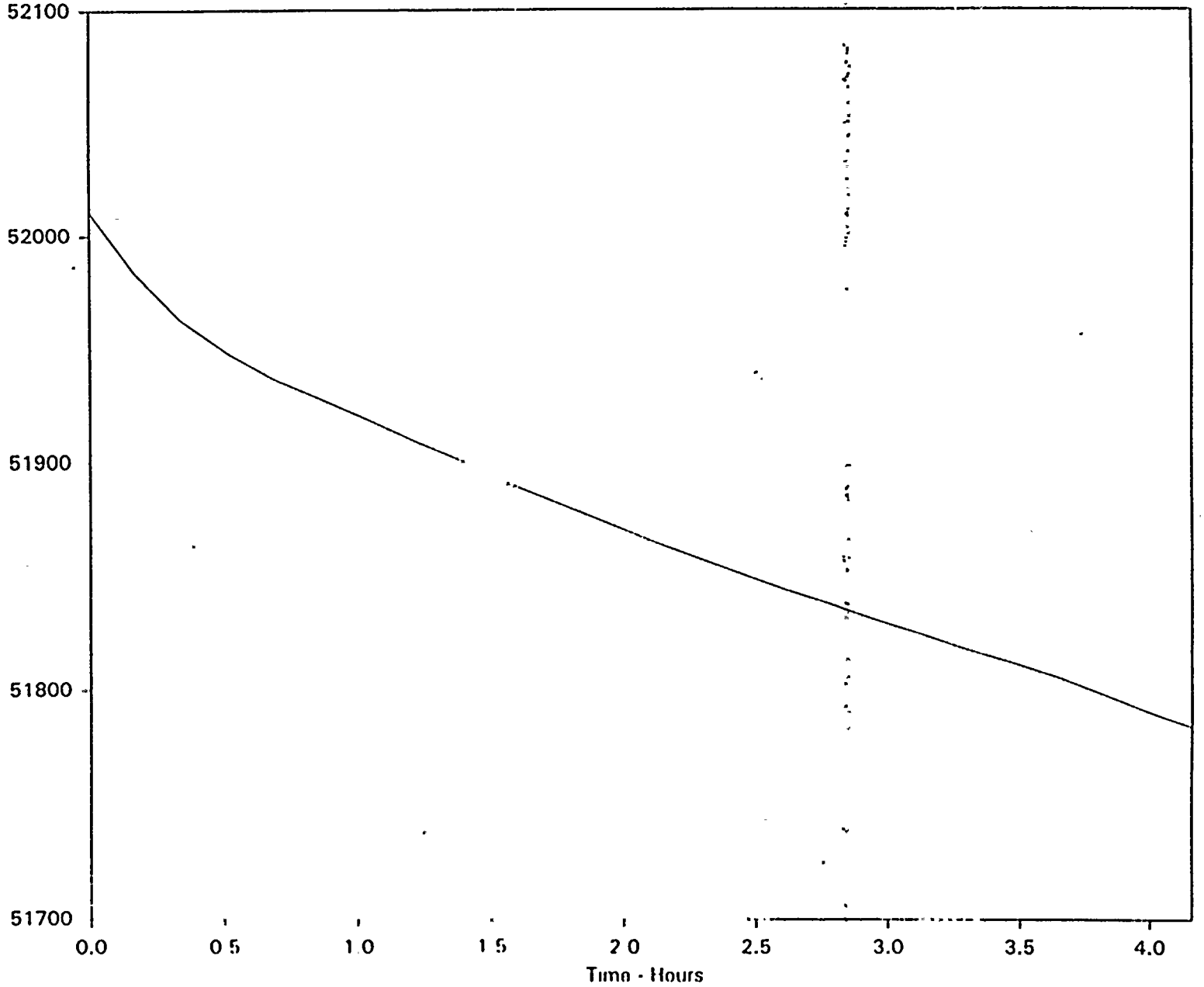
Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Drywell Mass

Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

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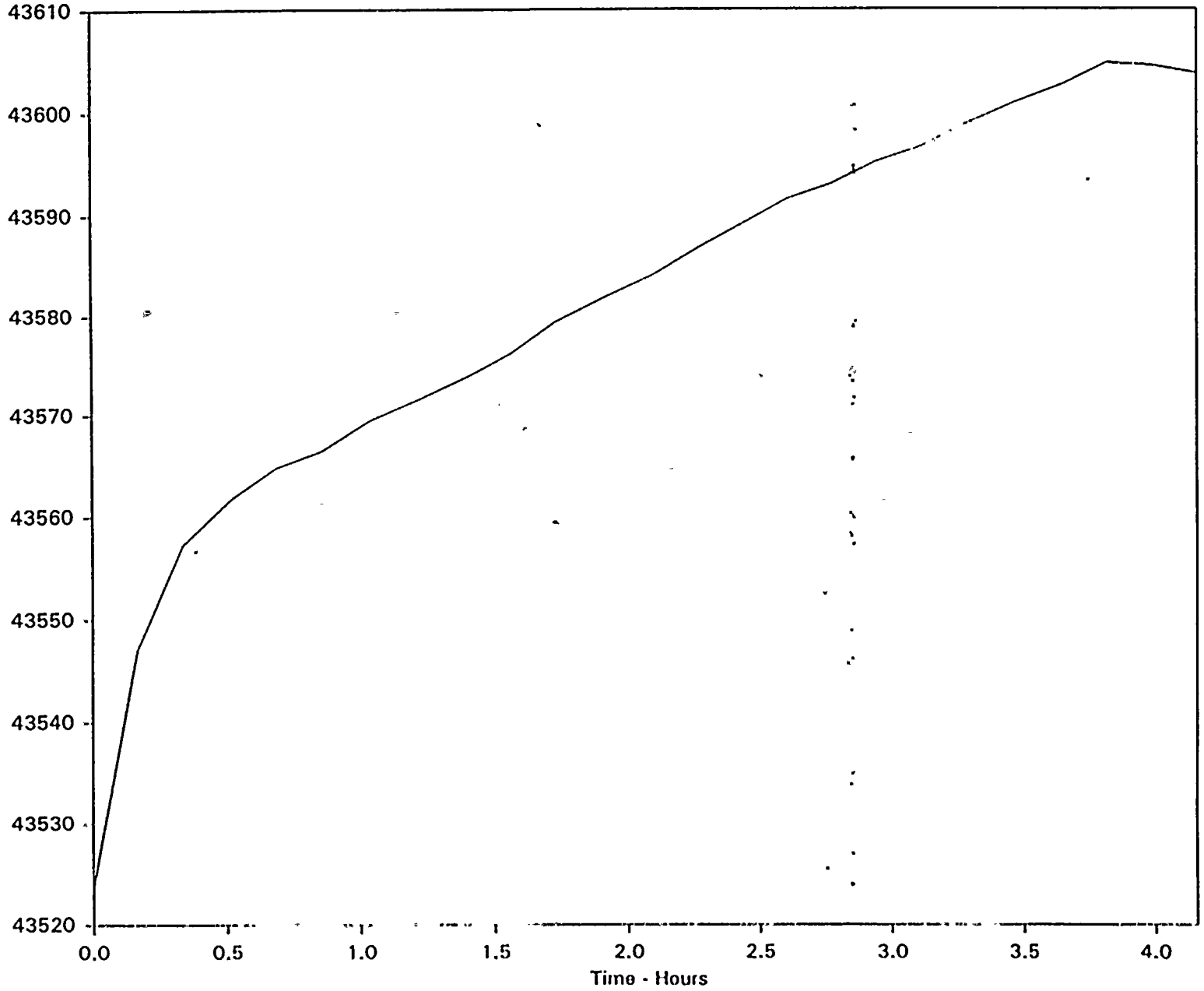
Torus Mass

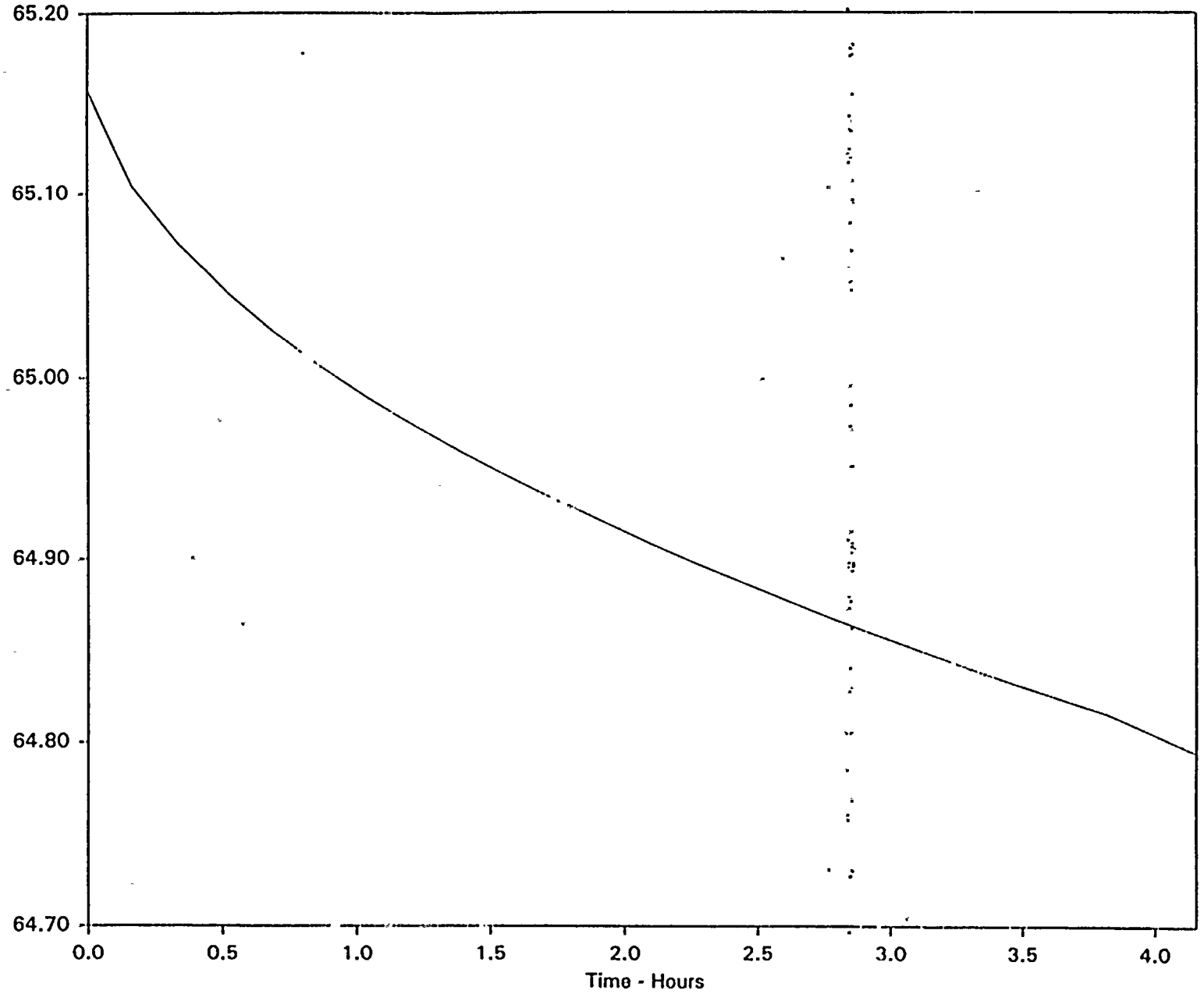
Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Drywell Average Pressure

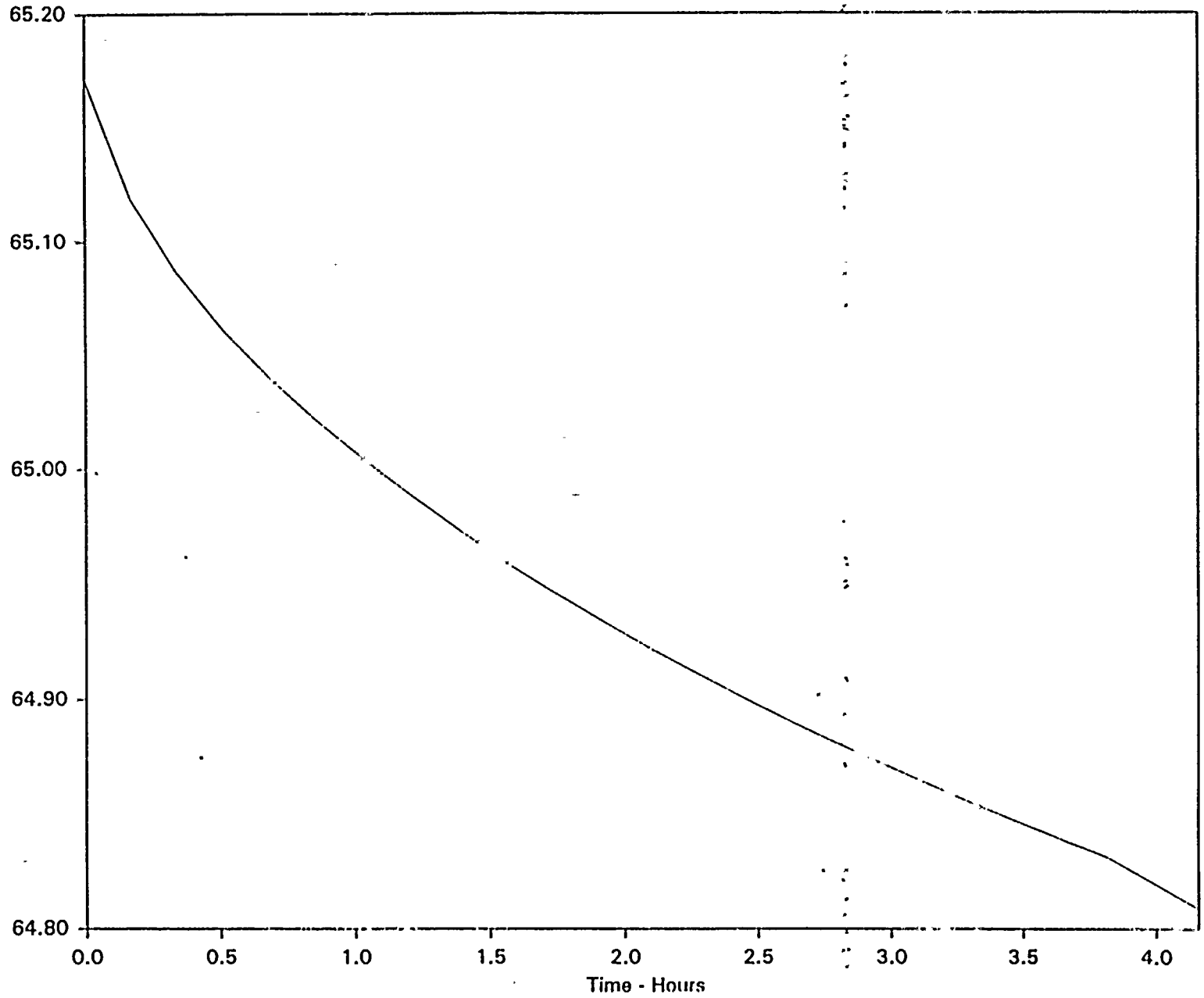
Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Torus Average Pressure

Browns Ferry Nuclear Plant
Unit 3



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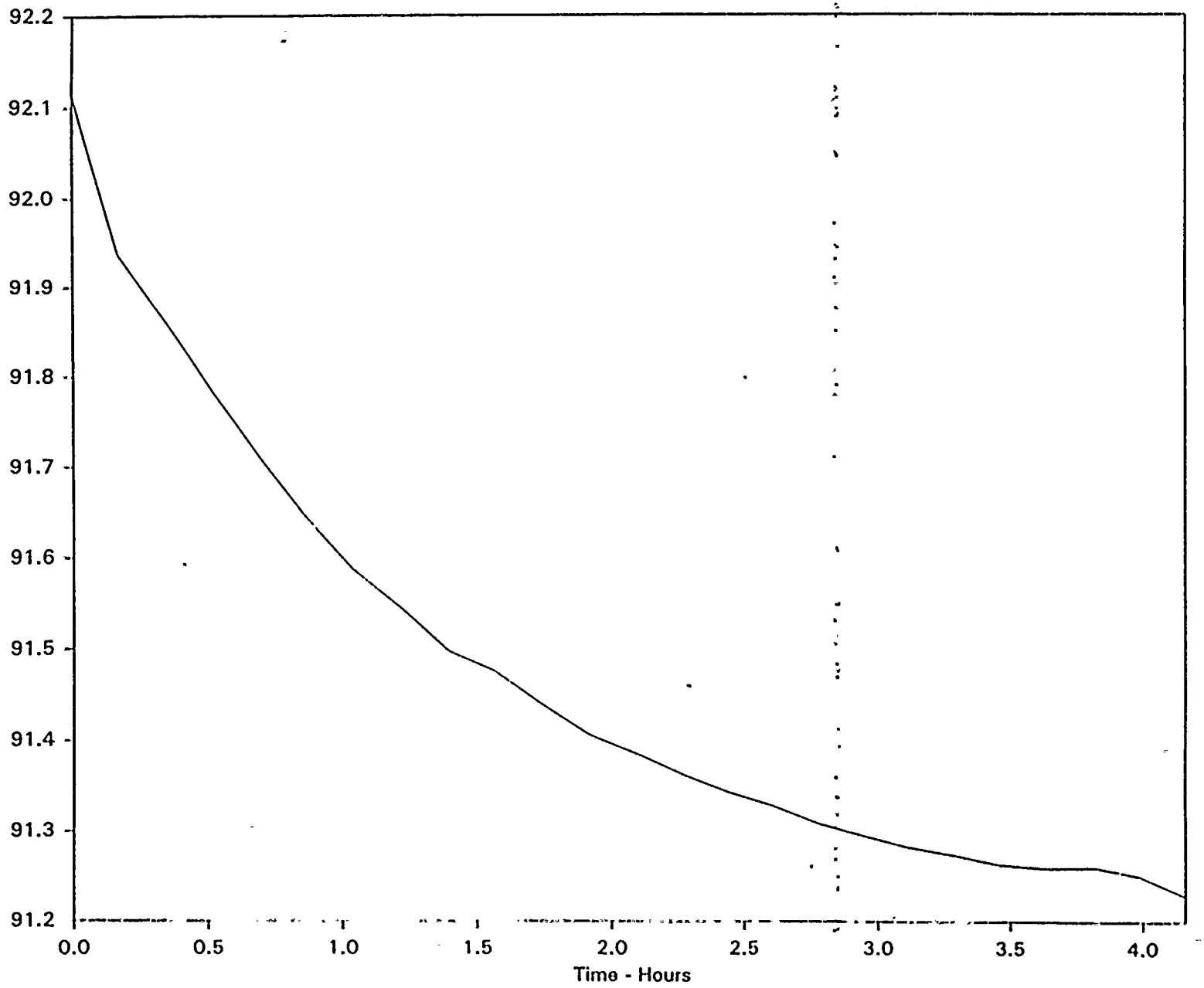
STABILIZATION PHASE

Drywell Average Temperature

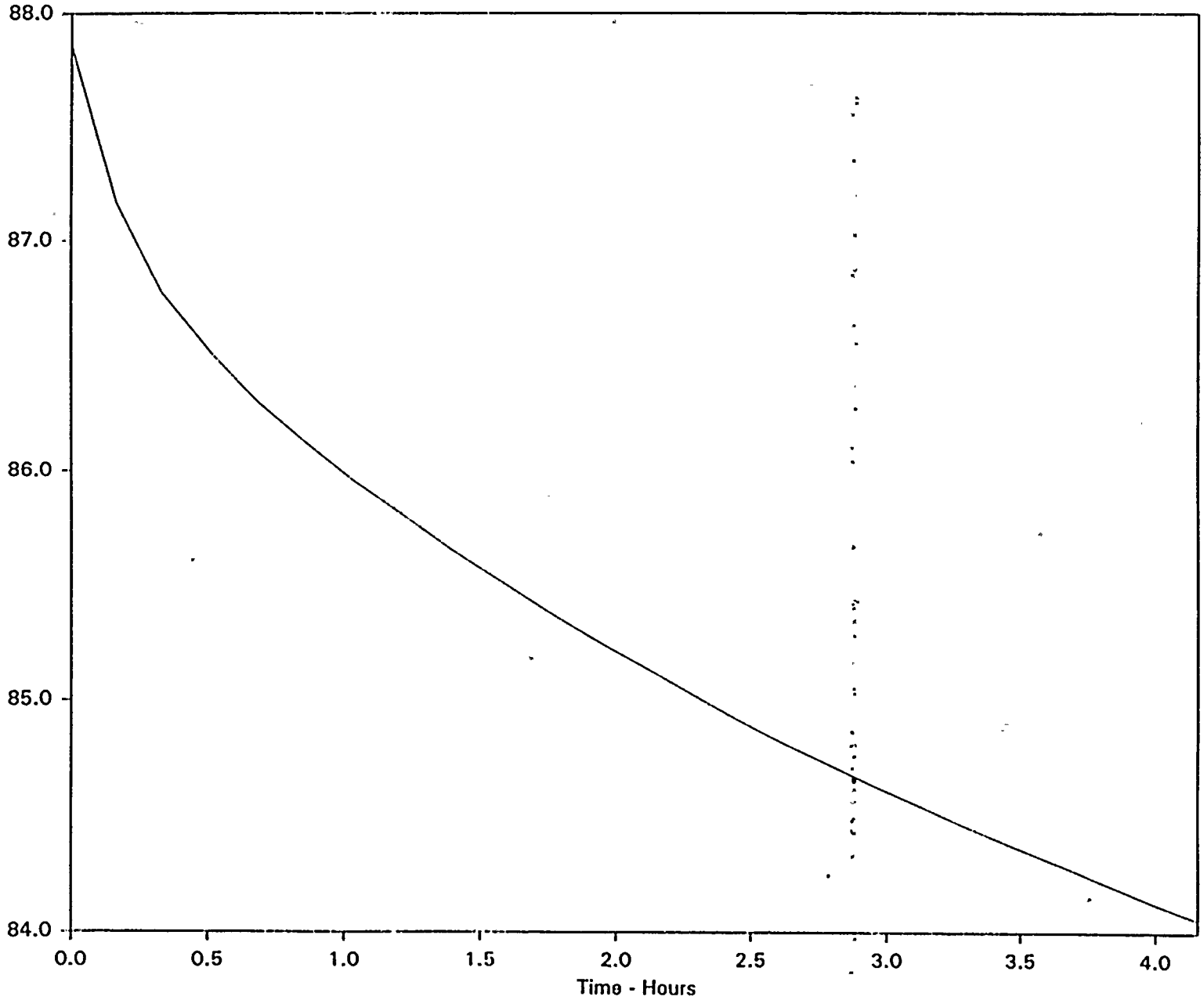
Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Torus Average Temperature

Browns Ferry Nuclear Plant
Unit 3



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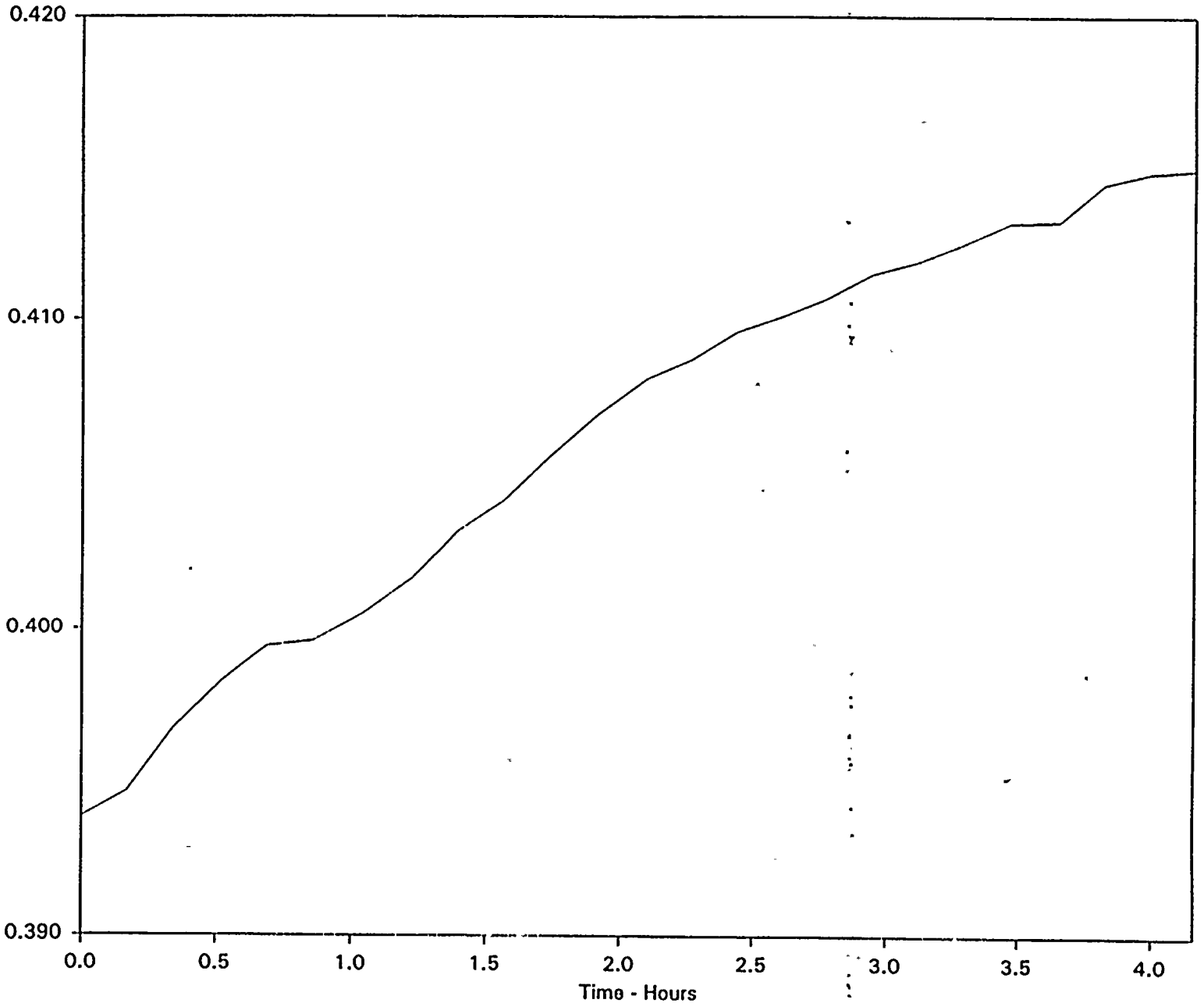
STABILIZATION PHASE

Drywell Average Vapor Pressure

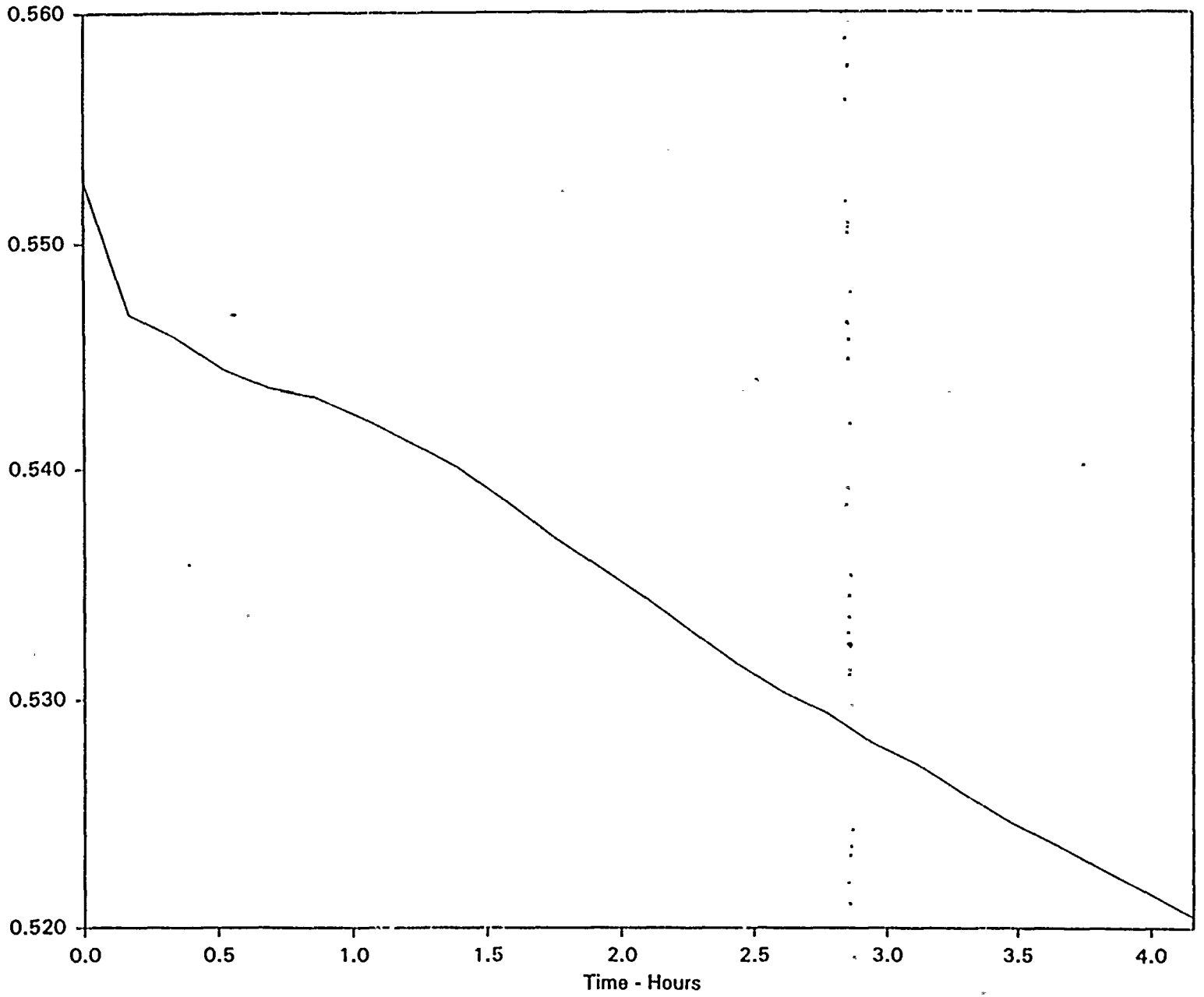
Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Torus Average Vapor Pressure

Browns Ferry Nuclear Plant
Unit 3



STABILIZATION PHASE

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
44	16:43:23	Drywell	52010.59	92.113	0.3938	65.1584
		Torus	43523.58	87.862	0.5527	65.1719
		TOTAL	95534.17			
45	16:53:29	Drywell	51983.15	91.937	0.3946	65.1044
		Torus	43546.98	87.165	0.5468	65.1185
		TOTAL	95530.13			
46	17:03:34	Drywell	51962.79	91.865	0.3967	65.0727
		Torus	43557.32	86.777	0.5458	65.0869
		TOTAL	95520.11			
47	17:14:40	Drywell	51947.50	91.782	0.3983	65.0455
		Torus	43561.82	86.503	0.5444	65.0599
		TOTAL	95509.32			
48	17:24:46	Drywell	51936.35	91.712	0.3994	65.0246
		Torus	43564.81	86.297	0.5436	65.0391
		TOTAL	95501.16			
49	17:34:52	Drywell	51928.04	91.647	0.3996	65.0068
		Torus	43566.41	86.128	0.5432	65.0212
		TOTAL	95494.45			
50	17:45:57	Drywell	51918.59	91.587	0.4005	64.9889
		Torus	43569.43	85.948	0.5422	65.0034
		TOTAL	95488.01			
51	17:57:03	Drywell	51908.56	91.542	0.4017	64.9724
		Torus	43571.51	85.793	0.5411	64.9870
		TOTAL	95480.07			
52	18:07:09	Drywell	51900.24	91.497	0.4031	64.9582
		Torus	43573.67	85.655	0.5400	64.9728
		TOTAL	95473.92			
53	18:17:15	Drywell	51891.04	91.476	0.4041	64.9452
		Torus	43576.10	85.527	0.5386	64.9598
		TOTAL	95467.14			
54	18:27:20	Drywell	51883.36	91.441	0.4055	64.9330
		Torus	43579.31	85.395	0.5371	64.9475
		TOTAL	95462.67			
55	18:38:26	Drywell	51875.04	91.406	0.4069	64.9200
		Torus	43581.78	85.267	0.5357	64.9346
		TOTAL	95456.83			
56	18:49:32	Drywell	51866.29	91.384	0.4081	64.9076
		Torus	43584.06	85.145	0.5343	64.9222
		TOTAL	95450.35			
57	18:59:38	Drywell	51859.32	91.362	0.4087	64.8971
		Torus	43586.68	85.035	0.5329	64.9117
		TOTAL	95446.00			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
58	19:09:44	Drywell	51852.06	91.344	0.4096	64.8868
		Torus	43589.10	84.928	0.5315	64.9013
		TOTAL	95441.17			
59	19:19:49	Drywell	51845.07	91.328	0.4101	64.8768
		Torus	43591.48	84.825	0.5303	64.8913
		TOTAL	95436.56			
60	19:29:55	Drywell	51838.78	91.309	0.4107	64.8673
		Torus	43592.97	84.733	0.5294	64.8818
		TOTAL	95431.75			
61	19:40:01	Drywell	51832.02	91.295	0.4115	64.8580
		Torus	43595.17	84.638	0.5281	64.8725
		TOTAL	95427.19			
62	19:50:07	Drywell	51825.78	91.282	0.4119	64.8492
		Torus	43596.68	84.553	0.5272	64.8638
		TOTAL	95422.45			
63	20:00:13	Drywell	51819.21	91.274	0.4125	64.8406
		Torus	43598.83	84.465	0.5260	64.8553
		TOTAL	95418.04			
64	20:11:18	Drywell	51812.58	91.263	0.4132	64.8318
		Torus	43600.88	84.375	0.5247	64.8464
		TOTAL	95413.46			
65	20:22:24	Drywell	51805.88	91.259	0.4132	64.8230
		Torus	43602.65	84.288	0.5236	64.8376
		TOTAL	95408.53			
66	20:32:30	Drywell	51798.59	91.260	0.4145	64.8154
		Torus	43604.72	84.207	0.5225	64.8300
		TOTAL	95403.31			
67	20:42:36	Drywell	51790.77	91.250	0.4149	64.8049
		Torus	43604.49	84.128	0.5215	64.8194
		TOTAL	95395.26			
68	20:52:42	Drywell	51783.99	91.228	0.4150	64.7940
		Torus	43603.72	84.053	0.5205	64.8083
		TOTAL	95387.71			

BN-TOP-1 Temperature Stabilization

Browns Ferry Nuclear Plant
Unit 3
Containment

TIME	TEMP	AVE. DT OVER LAST 2 HOURS	RATE OF DT CHANGE OVER LAST 2 HOURS
t	T	$\frac{\lvert T_t - T_{t-2} \rvert}{2}$	
HOURS	°F	°F/HR	°F/HR/HR
16:43	90.182		
16:53	89.769		
17:03	89.554		
17:14	89.384		
17:24	89.252		
17:34	89.140		
17:45	89.025		
17:57	88.931		
18:07	88.844		
18:17	88.773		
18:27	88.694		
18:38	88.617		
18:49	88.550	0.630	0.623
18:59	88.488	0.551	0.352
19:09	88.430	0.498	0.262
19:19	88.374	0.458	0.195
19:29	88.322	0.427	0.170
19:40	88.271	0.417	0.152
19:50	88.226	0.386	0.126
20:00	88.181	0.365	0.119
20:11	88.134	0.343	0.106
20:22	88.092	0.314	0.108
20:32	88.056	0.306	0.098
20:42	88.015	0.291	0.088
20:52	87.969	0.283	0.072

Mass Point Temperature Stabilization

Browns Ferry Nuclear Plant
Unit 3
Containment

①	②	③	④	⑤
TIME	TEMP	AVE. DT OVER LAST 4 HOURS	AVE. DT OVER LAST HOUR	
t	T	$\frac{\lvert T_t - T_{t-4} \rvert}{4}$	$\lvert T_t - T_{t-1} \rvert$	⑤ = ③ - ④
HOURS	°F	°F/HR	°F/HR	°F/HR
16:43	90.182			
16:53	89.769			
17:03	89.554			
17:14	89.384			
17:24	89.252			
17:34	89.140			
17:45	89.025			
17:57	88.931			
18:07	88.844			
18:17	88.773			
18:27	88.694			
18:38	88.617			
18:49	88.550			
18:59	88.488			
19:09	88.430			
19:19	88.374			
19:29	88.322			
19:40	88.271			
19:50	88.226			
20:00	88.181			
20:11	88.134			
20:22	88.092			
20:32	88.056			
20:42	88.015	0.543	0.246	0.298
20:52	87.969	0.452	0.246	0.205

APPENDIX B

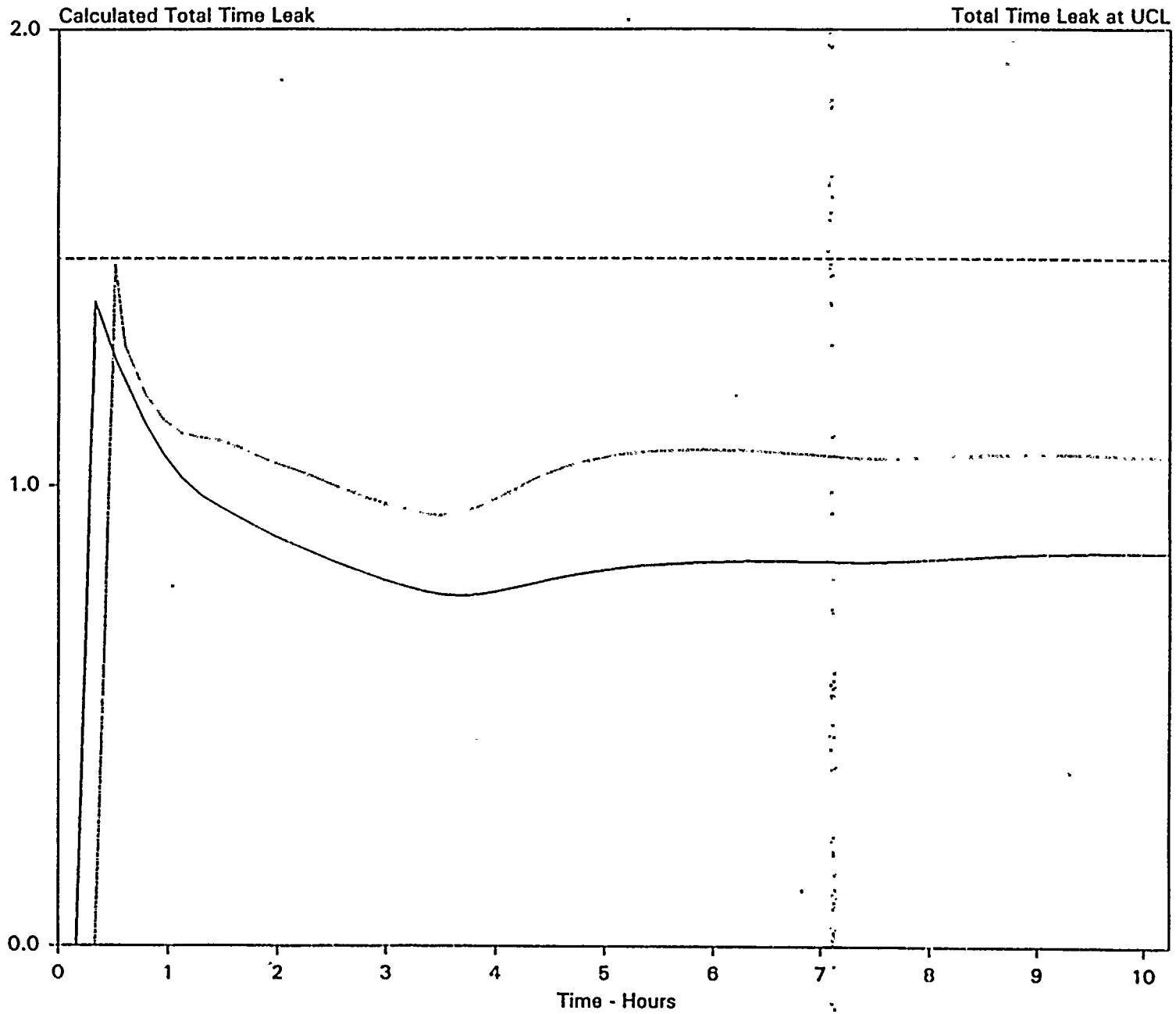
CILRT Test Phase Graphs

(samples 68 to 130)

Contents:

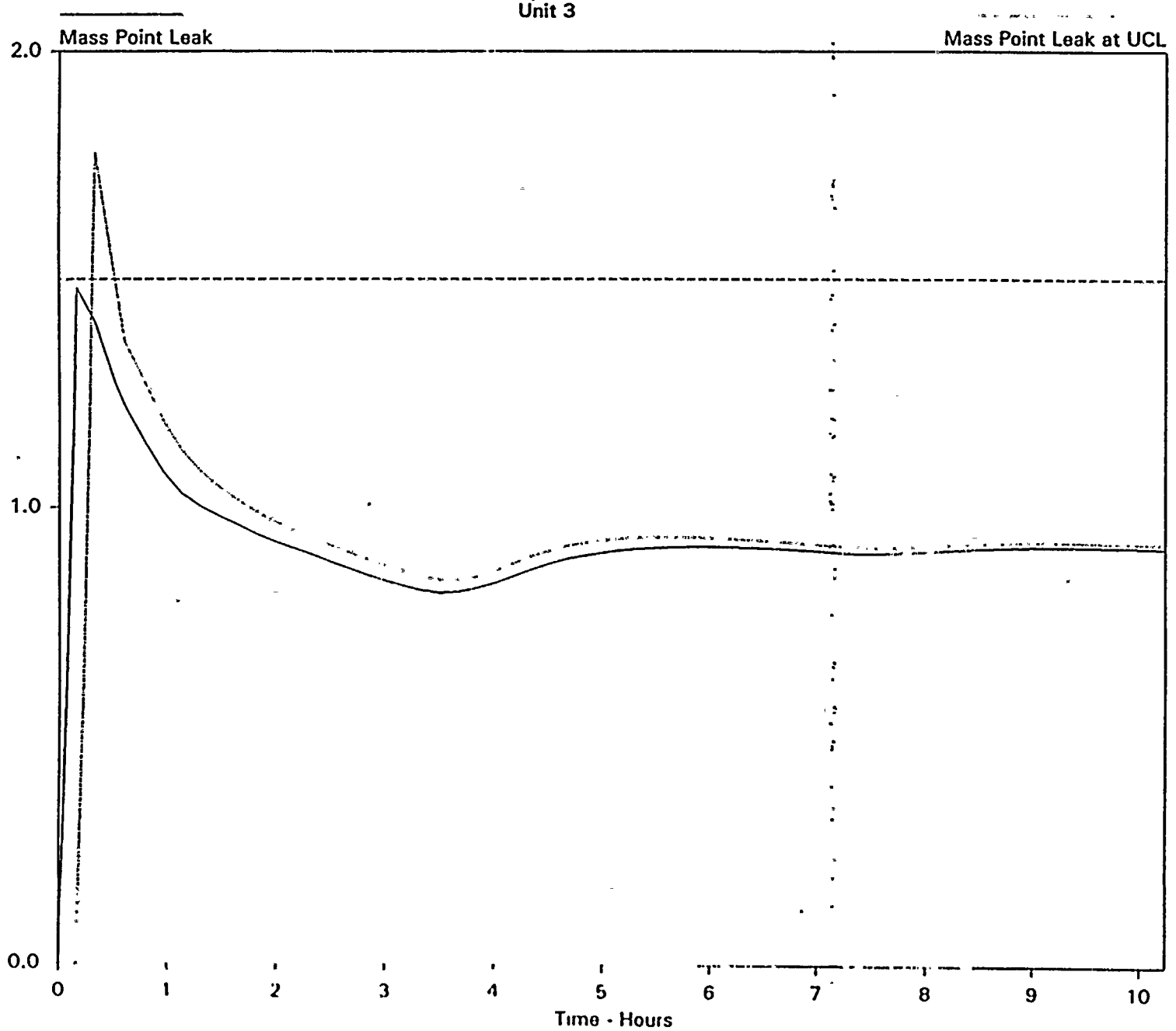
Calculated Total Time Leak & Total Time Leak at UCL

Browns Ferry Nuclear Plant
Unit 3



Mass Point Leak & Mass Point Leak at UCL

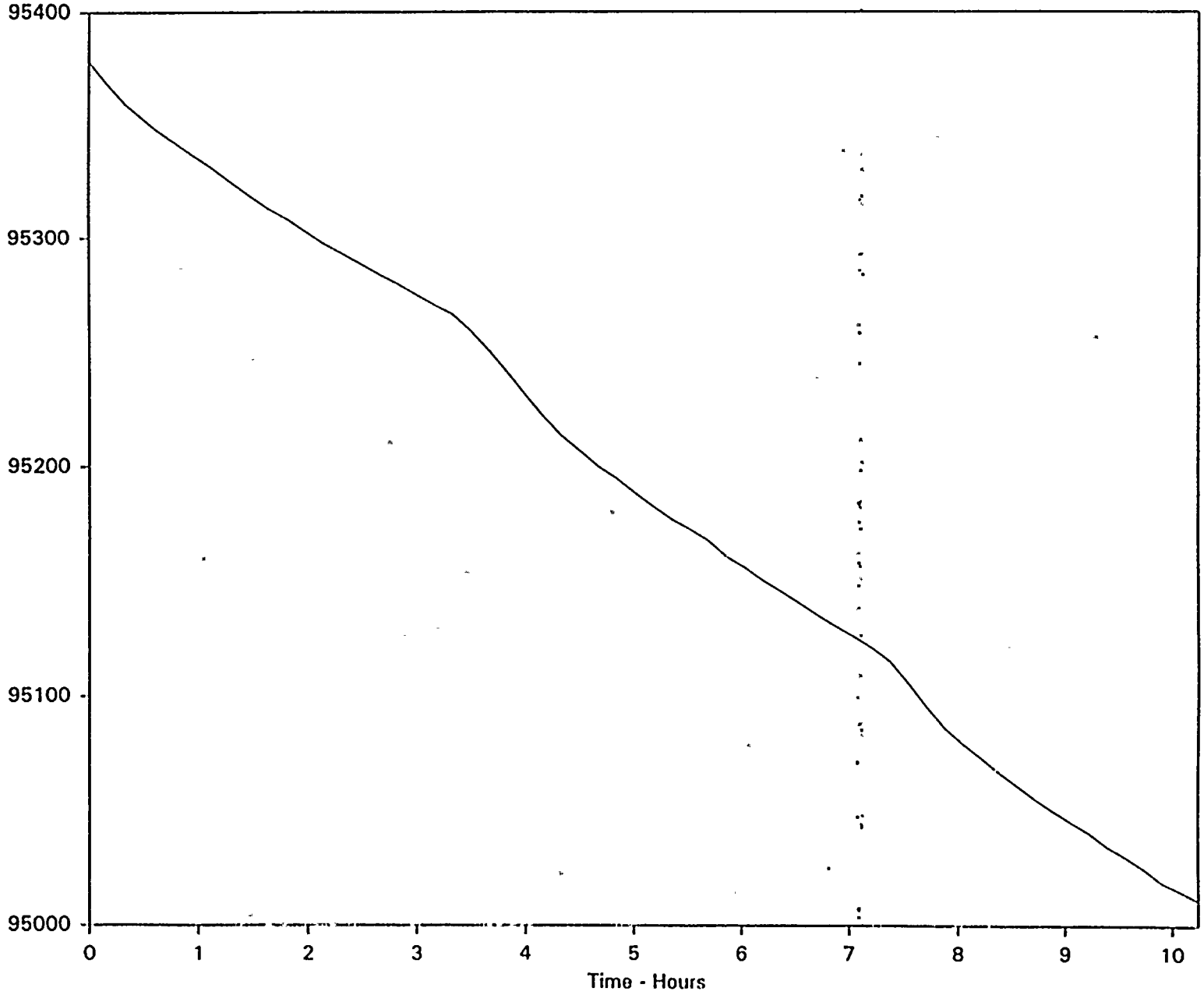
Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

Containment Mass

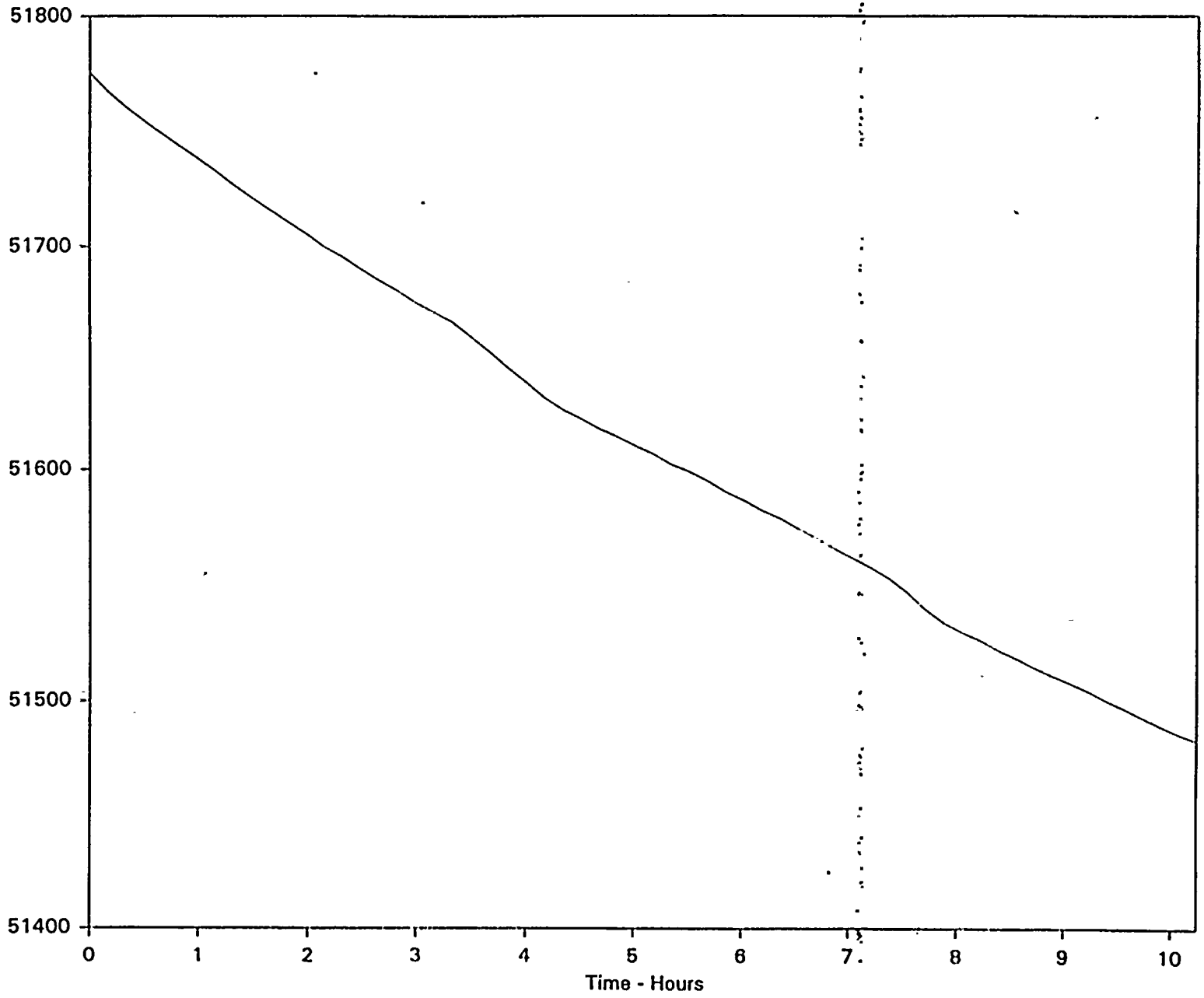
Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

Drywell Mass

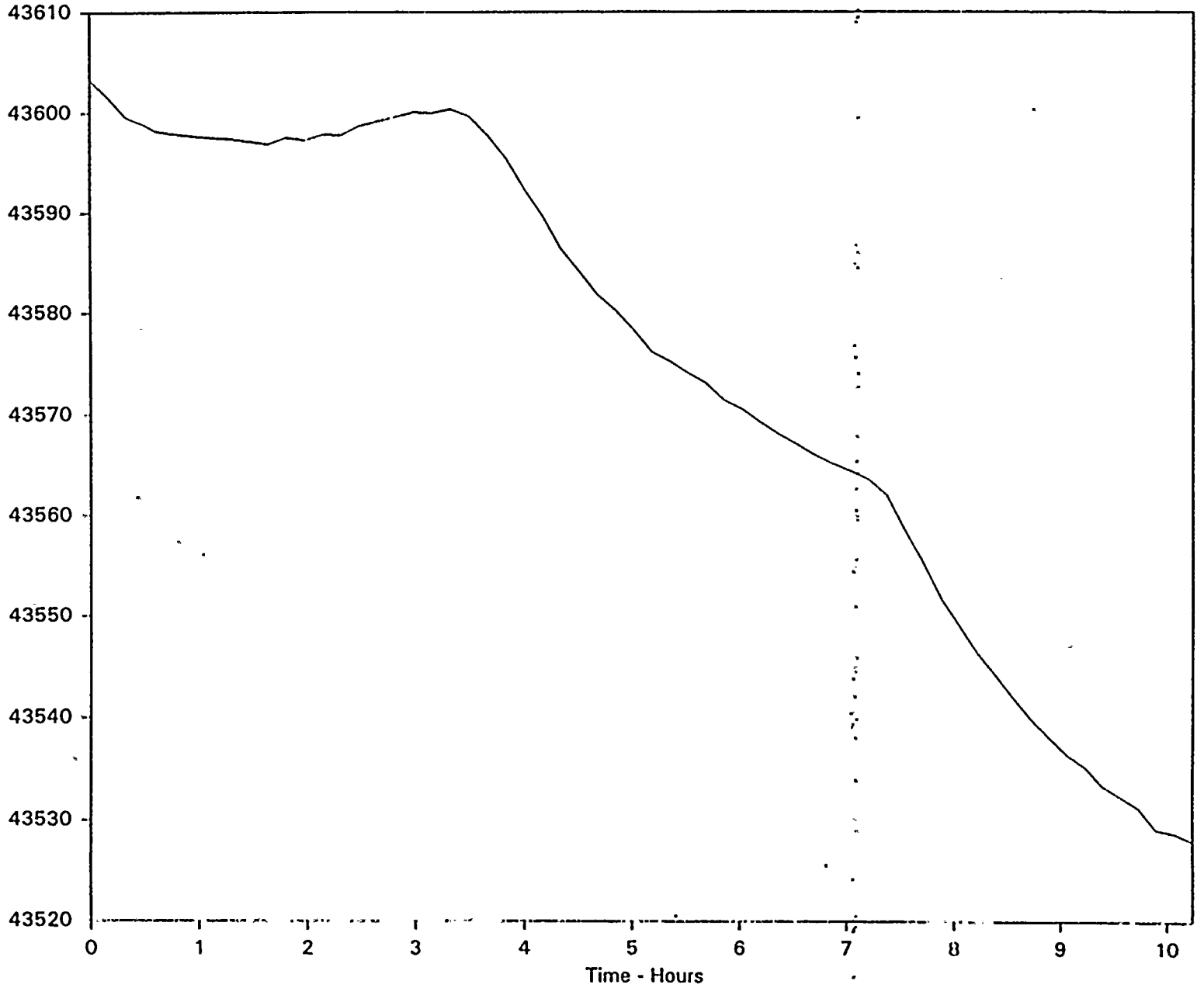
Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

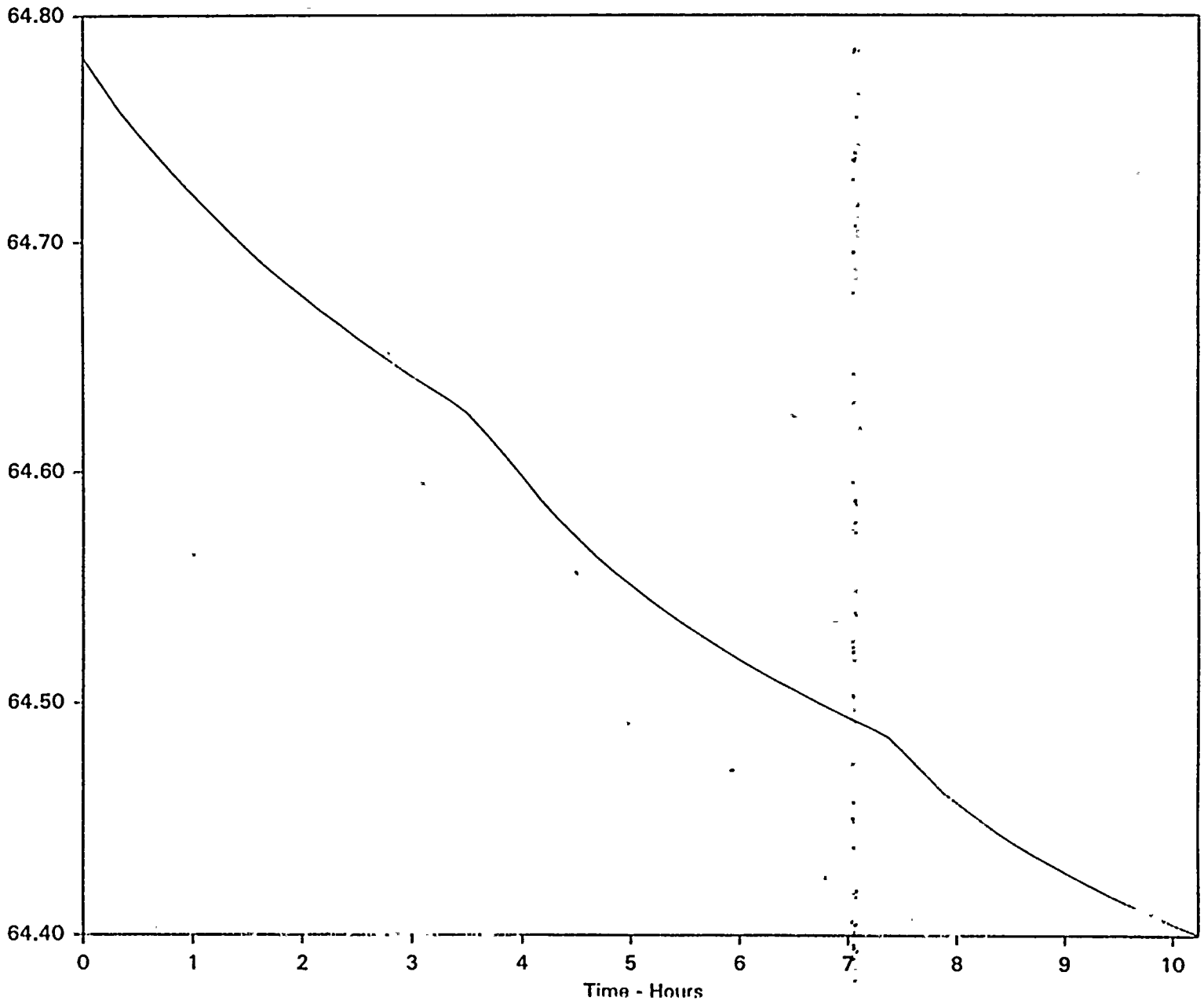
Torus Mass

Browns Ferry Nuclear Plant
Unit 3



Drywell Average Pressure

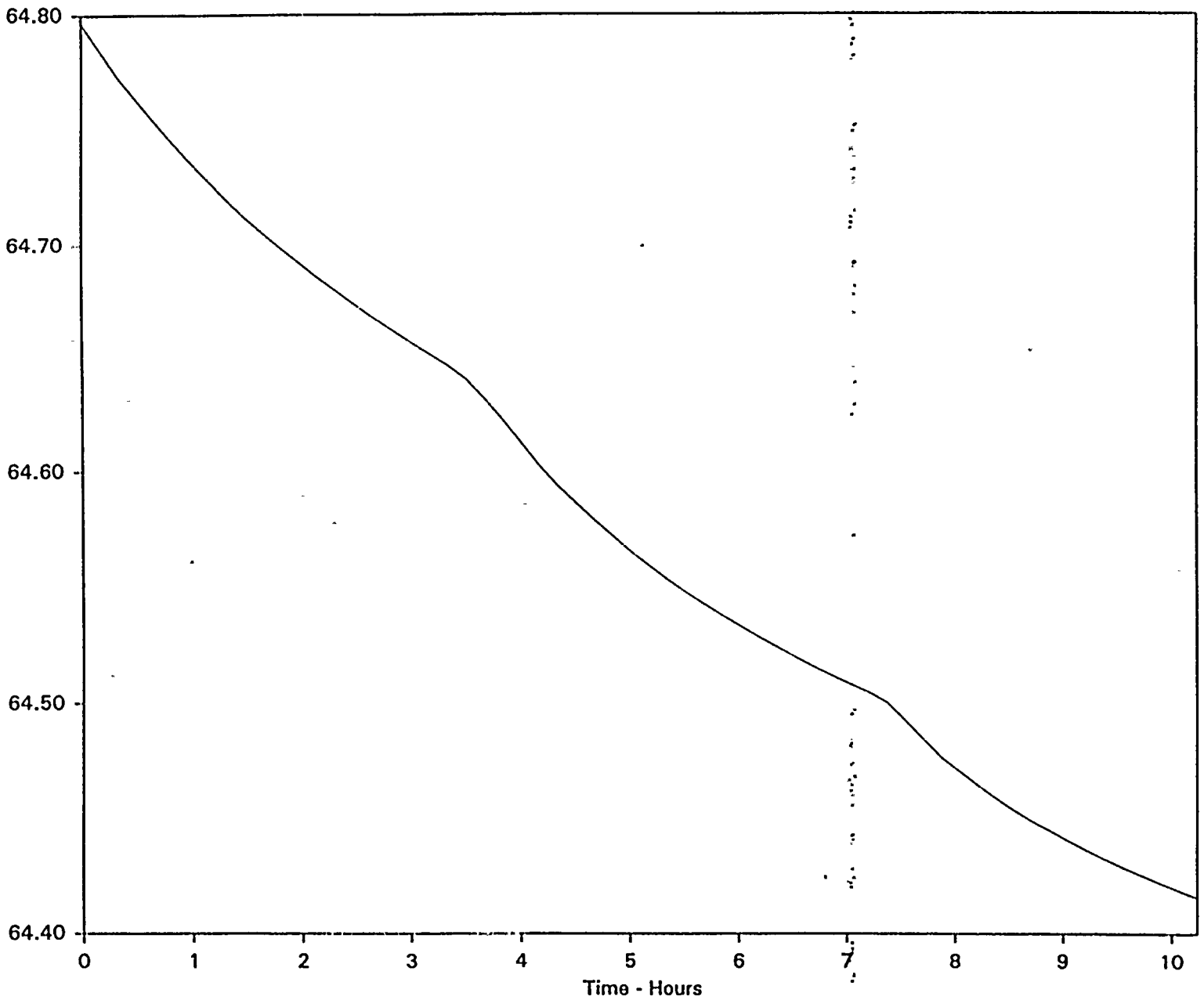
Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

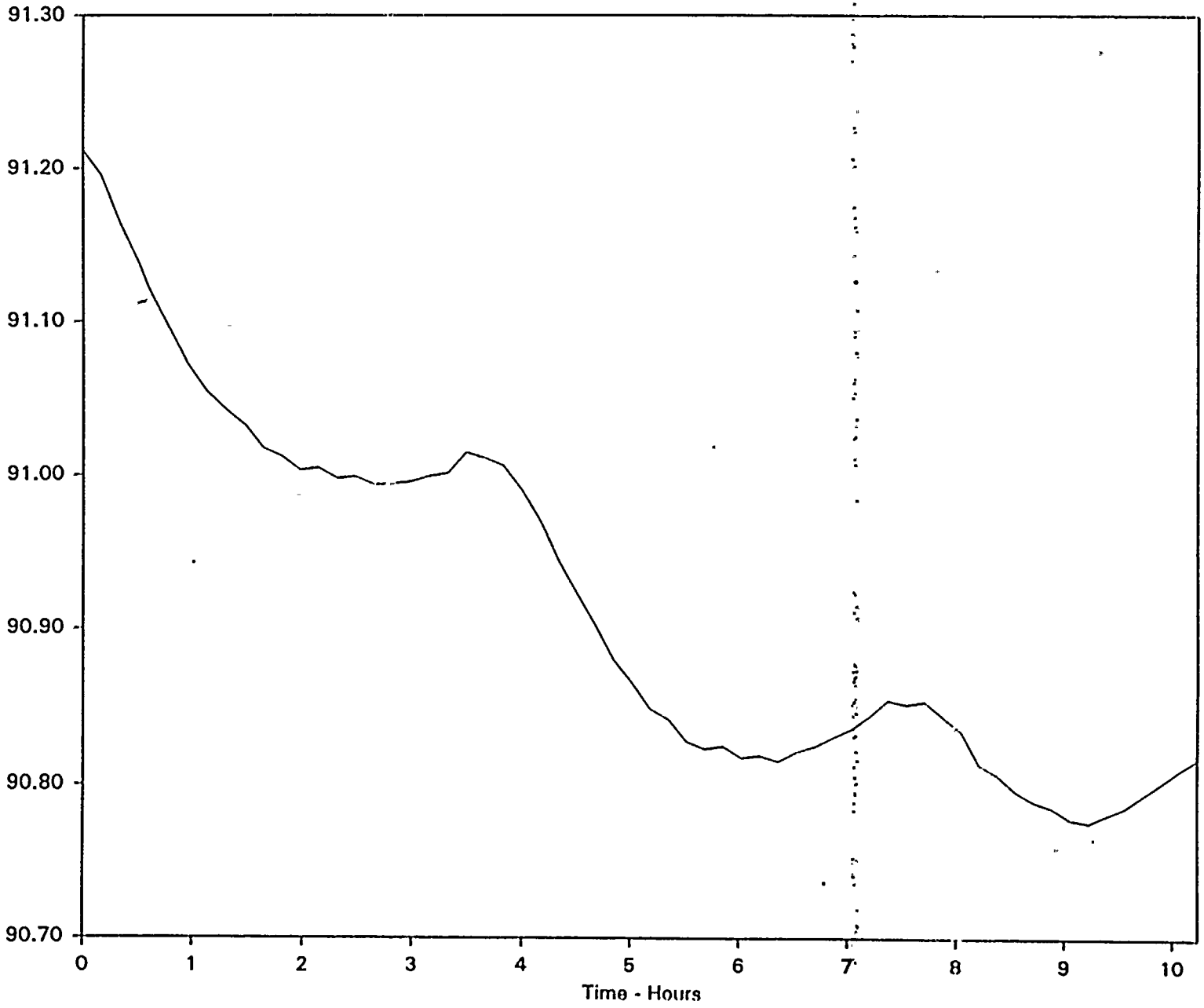
Torus Average Pressure

Browns Ferry Nuclear Plant
Unit 3



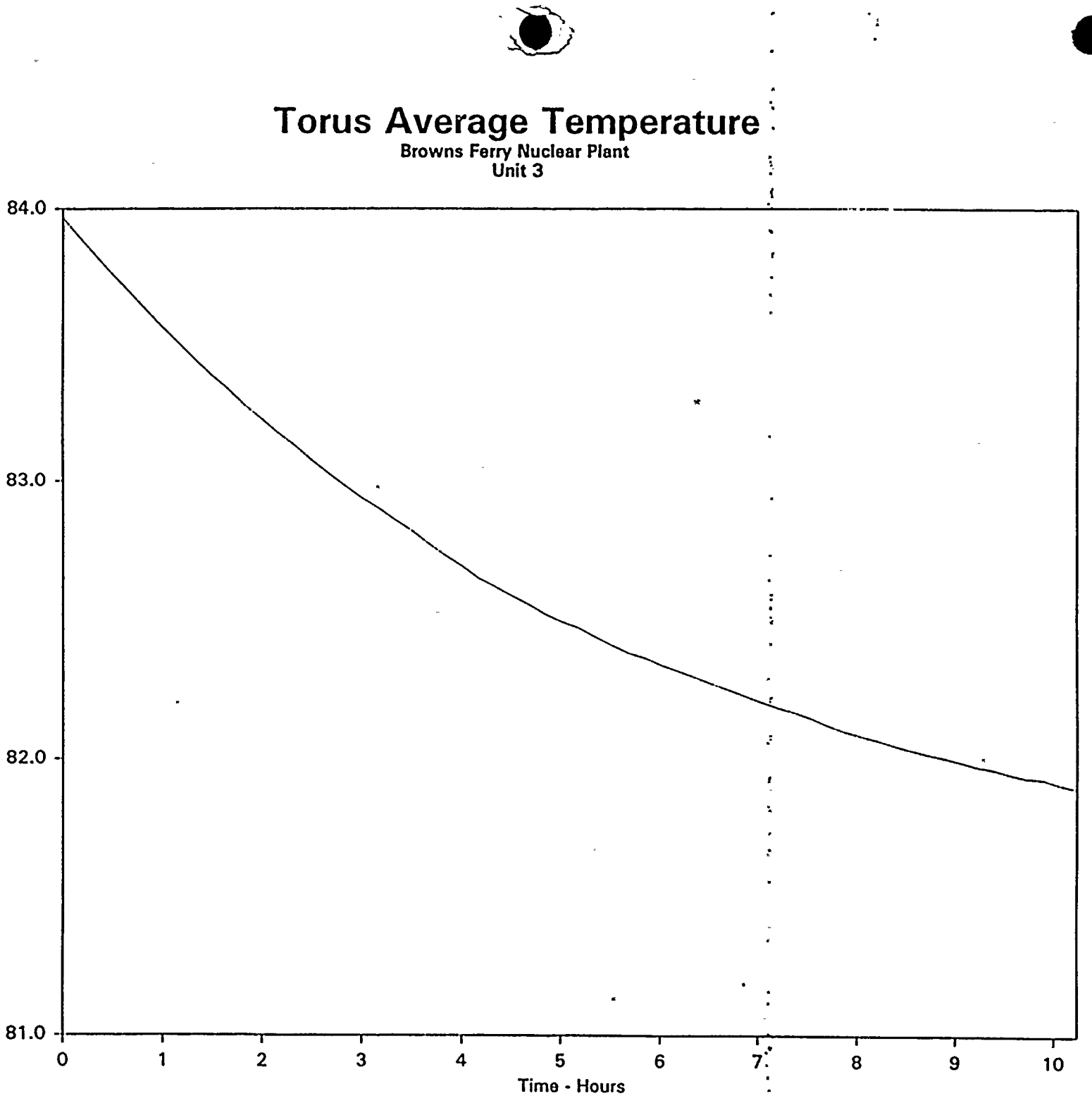
Drywell Average Temperature

Browns Ferry Nuclear Plant
Unit 3



° F

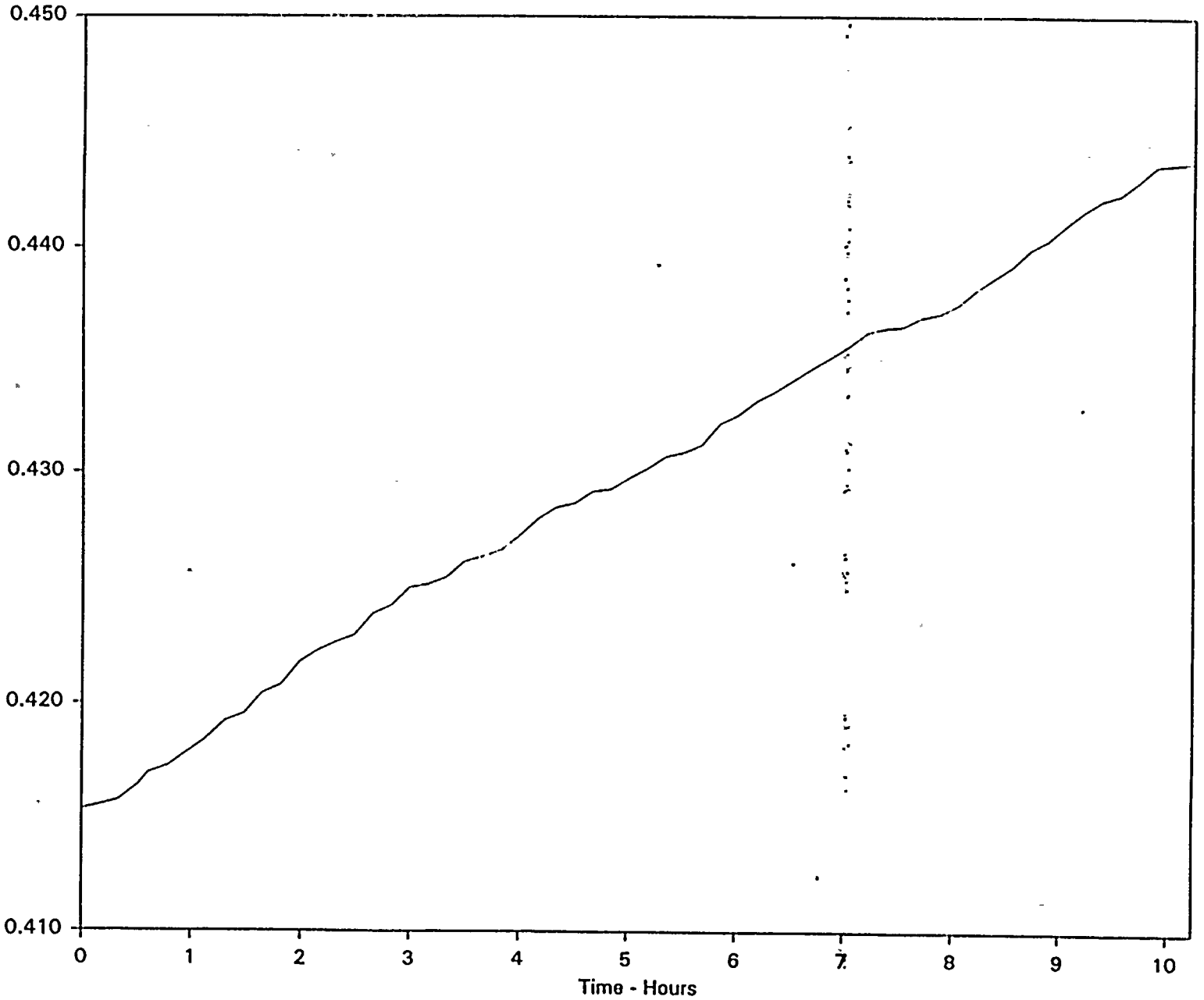
CILRT TEST PHASE



CILRT TEST PHASE

Drywell Average Vapor Pressure

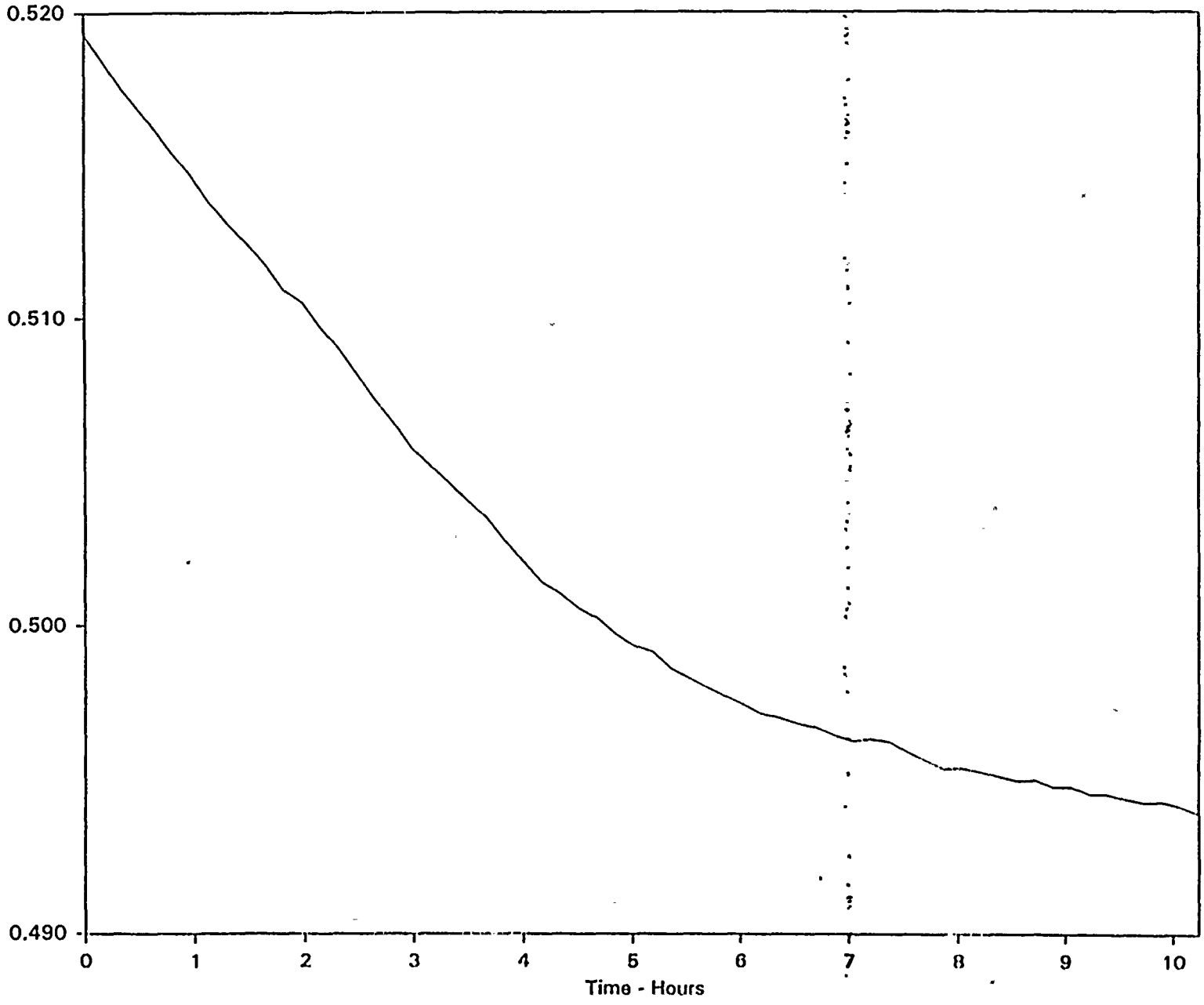
Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

Torus Average Vapor Pressure

Browns Ferry Nuclear Plant
Unit 3



CILRT TEST PHASE

APPENDIX C

CILRT Test Phase Tabular Data

(samples 68 to 130)

Contents:

Total Time Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	MEASURED LEAK (WT %/DAY)	CALCULATED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
69	0.00	-	-	-
70	10.10	1.480974	-	-
71	20.20	1.405476	1.405476	-
72	31.30	1.266608	1.275059	1.486497
73	36.47	1.231309	1.227777	1.304901
74	47.52	1.145211	1.134577	1.197491
75	57.62	1.091352	1.067916	1.143241
76	67.72	1.054852	1.016918	1.112397
77	78.82	1.036872	0.978081	1.102714
78	88.90	1.020993	0.953804	1.096254
79	99.00	1.000184	0.931637	1.083354
80	109.10	0.972956	0.908701	1.063222
81	119.20	0.960181	0.889552	1.047858
82	129.30	0.947023	0.872787	1.034568
83	139.38	0.928243	0.856205	1.019521
84	149.48	0.909589	0.839637	1.003318
85	159.58	0.894976	0.824015	0.987984
86	169.68	0.879511	0.808877	0.972830
87	179.77	0.870198	0.795381	0.959959
88	189.87	0.861251	0.783119	0.948698
89	199.97	0.849322	0.771286	0.937592
90	210.07	0.861303	0.764032	0.934182
91	220.17	0.881297	0.761809	0.939364
92	230.25	0.904832	0.764260	0.952207
93	240.35	0.928264	0.770439	0.970519
94	250.45	0.948538	0.779232	0.991685
95	260.55	0.959950	0.788887	1.012081
96	270.63	0.960992	0.797802	1.028893
97	280.73	0.962510	0.806088	1.043072
98	290.83	0.955550	0.812732	1.053184
99	300.93	0.953954	0.818634	1.061337
100	311.02	0.951553	0.823801	1.067759
101	321.12	0.947106	0.828043	1.072345
102	331.22	0.937545	0.830895	1.074515
103	341.32	0.931710	0.832946	1.075370
104	351.43	0.933765	0.835142	1.076423
105	361.53	0.925752	0.836410	1.076058
106	371.63	0.923392	0.837428	1.075347
107	381.73	0.917515	0.837863	1.073832
108	391.82	0.914330	0.838053	1.072016
109	401.92	0.910813	0.837966	1.069878
110	412.02	0.906254	0.837543	1.067338
111	422.12	0.901533	0.836800	1.064433

Total Time Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	MEASURED LEAK (WT %/DAY)	CALCULATED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
112	432.20	0.898085	0.835893	1.061372
113	442.30	0.898146	0.835123	1.058569
114	452.40	0.910181	0.835516	1.057421
115	462.50	0.923184	0.837040	1.057926
116	472.60	0.934335	0.839435	1.059726
117	482.68	0.936811	0.841926	1.061642
118	492.78	0.936068	0.844229	1.063262
119	502.88	0.936823	0.846483	1.064797
120	512.98	0.935239	0.848514	1.065992
121	523.07	0.934571	0.850412	1.066991
122	533.17	0.932058	0.852038	1.067607
123	543.27	0.928345	0.853333	1.067765
124	553.37	0.924167	0.854290	1.067471
125	563.45	0.923163	0.855160	1.067081
126	573.55	0.919158	0.855731	1.066314
127	583.65	0.916154	0.856099	1.065305
128	593.75	0.916076	0.856472	1.064334
129	603.85	0.910166	0.856468	1.062900
130	613.93	0.904978	0.856166	1.061117

Mass Point Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
69	0.00	1.000000	-	-
70	10.10	0.999896	1.480974	-
71	20.20	0.999803	1.405478	1.778417
72	31.30	0.999725	1.270295	1.496087
73	36.47	0.999688	1.221265	1.362384
74	47.52	0.999622	1.142417	1.272263
75	57.62	0.999563	1.078264	1.191702
76	67.72	0.999504	1.031056	1.127073
77	78.82	0.999432	1.001103	1.079079
78	88.90	0.999370	0.980539	1.044650
79	99.00	0.999312	0.961881	1.016620
80	109.10	0.999263	0.941131	0.990729
81	119.20	0.999205	0.924748	0.969371
82	129.30	0.999150	0.910675	0.951096
83	139.38	0.999102	0.895917	0.933692
84	149.48	0.999056	0.880632	0.916860
85	159.58	0.999008	0.866178	0.901089
86	169.68	0.998964	0.851971	0.885944
87	179.77	0.998914	0.839633	0.872292
88	189.87	0.998864	0.828685	0.859916
89	199.97	0.998821	0.817931	0.848040
90	210.07	0.998744	0.813236	0.840910
91	220.17	0.998653	0.814979	0.840229
92	230.25	0.998553	0.822396	0.846614
93	240.35	0.998451	0.834112	0.859164
94	250.45	0.998350	0.848449	0.875502
95	260.55	0.998263	0.862964	0.891754
96	270.63	0.998194	0.875497	0.904886
97	280.73	0.998124	0.886486	0.915853
98	290.83	0.998070	0.894604	0.923105
99	300.93	0.998006	0.901326	0.928751
100	311.02	0.997945	0.906738	0.932955
101	321.12	0.997888	0.910703	0.935604
102	331.22	0.997844	0.912604	0.936086
103	341.32	0.997792	0.913373	0.935502
104	351.43	0.997721	0.914427	0.935331
105	361.53	0.997676	0.914174	0.933931
106	371.63	0.997617	0.913654	0.932360
107	381.73	0.997568	0.912391	0.930166
108	391.82	0.997512	0.910875	0.927811
109	401.92	0.997458	0.909093	0.925285
110	412.02	0.997407	0.906942	0.922492
111	422.12	0.997357	0.904449	0.919463

Mass Point Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
112	432.20	0.997304	0.901825	0.916372
113	442.30	0.997241	0.899533	0.913602
114	452.40	0.997141	0.899022	0.912481
115	462.50	0.997035	0.900189	0.913118
116	472.60	0.996934	0.902608	0.915211
117	482.68	0.996860	0.905110	0.917434
118	492.78	0.996797	0.907312	0.919328
119	502.88	0.996728	0.909416	0.921133
120	512.98	0.996668	0.911169	0.922559
121	523.07	0.996605	0.912710	0.923765
122	533.17	0.996549	0.913861	0.924561
123	543.27	0.996498	0.914537	0.924865
124	553.37	0.996449	0.914739	0.924696
125	563.45	0.996388	0.914835	0.924440
126	573.55	0.996339	0.914538	0.923813
127	583.65	0.996287	0.913984	0.922957
128	593.75	0.996223	0.913479	0.922164
129	603.85	0.996183	0.912466	0.920920
130	613.93	0.996142	0.911060	0.919351

BN-TOP-1 Termination Criteria

Browns Ferry Nuclear Plant
Unit 3

BN-TOP-1 Termination Criteria Evaluation for Reading # 130

1. The Trend Report based on Total Time calculations shall indicate that the magnitude of the calculated leak rate is tending to stabilize at a value less than the maximum allowable leak rate (<.75La).

Required Value: 1.500000 %/day Actual Value: 0.856166 %/day

(Note: The magnitude of the calculated leak rate may be increasing slightly as it tends to stabilize. In this case the average rate of increase of the calculated leak rate shall be determined from the accumulated data over the last five hours or last twenty data points, whichever provides the most points. Using this average rate, the calculated leak rate can then be linearly extrapolated to the 24th hour data point. If this extrapolated value of the calculated leak rate exceeds 75% of the maximum allowable leak rate (La) then the leak rate test is continued.)

Required Value: 1.500000 %/day Actual Value: 0.939964 %/day

2. The end of test upper 95% confidence limit for the calculated leak rate based on Total Time calculations shall be less than the maximum allowable leak rate (<.75La).

Required Value: 1.500000 %/day Actual Value: 1.061117 %/day

3. The mean of the measured leak rates based on Total Time calculations over the last five hours of test or last twenty data points, whichever provides the most data, shall be less than the maximum allowable leak rate (<.75La).

Required Value: 1.500000 %/day Actual Value: 0.923193 %/day

4. Data shall be recorded at approximately equal intervals and in no case at intervals greater than one hour.

Required Interval: <=1 hr Maximum Actual Interval: 0.19 hr

5. At least twenty (20) data points shall be provided for proper statistical analysis.

Required # Data Points: >=20 Actual Data Points: 62

6. In no case shall the minimum test duration be less than six (6) hours.

Required Minimum Duration: 6 hr Actual Duration: 10.2 hr

Mass Point Termination Criteria

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME	MP UCL %/day	Curv 11	Curv 111	Curv 12	Scat 21
69	0.00	0.0000	-	-	-	0.0000
70	10.10	0.0000	-	-	-	1.0000
71	20.20	1.7784	-	-	-	1.1254
72	31.30	1.4961	0.3105	27.1827	89.9864	1.2107
73	36.47	1.3624	3.6894	24.3021	75.3850	1.2441
74	47.52	1.2723	10.9491	20.4870	57.7076	1.3300
75	57.62	1.1917	11.9522	17.0825	44.7689	1.3915
76	67.72	1.1271	9.1679	13.8720	34.5840	1.4428
77	78.82	1.0791	4.8551	10.2768	24.8526	1.4872
78	88.90	1.0446	3.8724	7.9209	18.7689	1.5116
79	99.00	1.0166	4.1530	6.5511	15.2442	1.5347
80	109.10	0.9907	5.8624	5.9601	13.5972	1.5601
81	119.20	0.9694	6.9320	5.2691	11.8376	1.5818
82	129.30	0.9511	7.8073	4.6669	10.3493	1.6014
83	139.38	0.9337	9.9932	4.3272	9.4678	1.6218
84	149.48	0.9169	13.6001	4.1361	8.9260	1.6435
85	159.58	0.9011	17.8426	3.9526	8.4213	1.6647
86	169.68	0.8859	23.3567	3.8093	8.0157	1.6863
87	179.77	0.8723	27.2274	3.6002	7.4950	1.7060
88	189.87	0.8599	29.3555	3.3719	6.9541	1.7244
89	199.97	0.8480	32.8290	3.1931	6.5255	1.7428
90	210.07	0.8409	19.1766	2.7550	5.6080	1.7521
91	220.17	0.8402	6.8607	2.1130	4.3075	1.7496
92	230.25	0.8466	1.8814	1.3586	2.7872	1.7355
93	240.35	0.8592	0.2675	0.5823	1.2066	1.7128
94	250.45	0.8755	0.0134	-0.1381	0.2897	1.6856
95	260.55	0.8918	0.3643	-0.7149	1.5190	1.6594
96	270.63	0.9049	0.9705	-1.0957	2.3540	1.6385
97	280.73	0.9159	1.7279	-1.3422	2.9120	1.6213
98	290.83	0.9231	2.4217	-1.4344	3.1349	1.6096
99	300.93	0.9288	3.0751	-1.4589	3.2080	1.6003
100	311.02	0.9330	3.6154	-1.4330	3.1665	1.5930
101	321.12	0.9356	3.9241	-1.3620	3.0207	1.5878
102	331.22	0.9361	3.7552	-1.2344	2.7425	1.5855
103	341.32	0.9355	3.3483	-1.0911	2.4259	1.5846
104	351.43	0.9353	3.1094	-0.9795	2.1799	1.5832
105	361.53	0.9339	2.5981	-0.8453	1.8806	1.5834
106	371.63	0.9324	2.1340	-0.7233	1.6085	1.5838
107	381.73	0.9302	1.6129	-0.5978	1.3277	1.5851
108	391.82	0.9278	1.1666	-0.4831	1.0716	1.5867
109	401.92	0.9253	0.7870	-0.3773	0.8354	1.5885
110	412.02	0.9225	0.4637	-0.2759	0.6098	1.5908
111	422.12	0.9195	0.2145	-0.1791	0.3949	1.5935
112	432.20	0.9164	0.0618	-0.0916	0.2016	1.5963
113	442.30	0.9136	0.0046	-0.0238	0.0523	1.5987
114	452.40	0.9125	0.0007	-0.0087	0.0190	1.5989
115	462.50	0.9131	0.0139	-0.0361	0.0793	1.5969
116	472.60	0.9152	0.0953	-0.0900	0.1982	1.5930
117	482.68	0.9174	0.2529	-0.1395	0.3077	1.5891

Mass Point Termination Criteria

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME	MP UCL %/day	Curv 11	Curv 111	Curv 12	Scat 21
118	492.78	0.9193	0.4505	-0.1763	0.3899	1.5856
119	502.88	0.9211	0.6913	-0.2068	0.4581	1.5823
120	512.98	0.9226	0.9265	-0.2262	0.5018	1.5795
121	523.07	0.9238	1.1579	-0.2388	0.5306	1.5770
122	533.17	0.9246	1.3314	-0.2418	0.5379	1.5750
123	543.27	0.9249	1.4011	-0.2346	0.5222	1.5737
124	553.37	0.9247	1.3485	-0.2185	0.4863	1.5729
125	563.45	0.9244	1.2739	-0.2018	0.4493	1.5723
126	573.55	0.9238	1.0997	-0.1791	0.3986	1.5722
127	583.65	0.9230	0.8805	-0.1536	0.3416	1.5724
128	593.75	0.9222	0.7040	-0.1315	0.2924	1.5725
129	603.85	0.9209	0.4538	-0.1019	0.2264	1.5733
130	613.93	0.9194	0.2128	-0.0679	0.1506	1.5745

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
69	21:02:48	Drywell	51775.38	91.212	0.4154	64.7818
		Torus	43603.31	83.968	0.5193	64.7964
		TOTAL	95378.69			
70	21:12:54	Drywell	51767.21	91.196	0.4155	64.7699
		Torus	43601.57	83.898	0.5185	64.7848
		TOTAL	95368.78			
71	21:23:00	Drywell	51760.34	91.165	0.4158	64.7581
		Torus	43599.55	83.830	0.5176	64.7729
		TOTAL	95359.88			
72	21:34:06	Drywell	51753.70	91.137	0.4164	64.7472
		Torus	43598.73	83.755	0.5168	64.7620
		TOTAL	95352.43			
73	21:39:16	Drywell	51750.74	91.121	0.4170	64.7422
		Torus	43598.21	83.722	0.5164	64.7569
		TOTAL	95348.95			
74	21:50:19	Drywell	51744.73	91.096	0.4173	64.7320
		Torus	43597.92	83.647	0.5155	64.7467
		TOTAL	95342.65			
75	22:00:25	Drywell	51739.34	91.073	0.4178	64.7232
		Torus	43597.70	83.582	0.5148	64.7380
		TOTAL	95337.04			
76	22:10:31	Drywell	51733.81	91.055	0.4184	64.7149
		Torus	43597.56	83.520	0.5139	64.7296
		TOTAL	95331.38			
77	22:21:37	Drywell	51727.13	91.043	0.4192	64.7059
		Torus	43597.43	83.452	0.5131	64.7206
		TOTAL	95324.56			
78	22:31:42	Drywell	51721.39	91.032	0.4195	64.6979
		Torus	43597.18	83.393	0.5125	64.7127
		TOTAL	95318.57			
79	22:41:48	Drywell	51716.20	91.018	0.4205	64.6907
		Torus	43596.91	83.342	0.5118	64.7055
		TOTAL	95313.10			
80	22:51:54	Drywell	51710.81	91.012	0.4208	64.6837
		Torus	43597.57	83.282	0.5110	64.6985
		TOTAL	95308.38			
81	23:02:00	Drywell	51705.55	91.003	0.4218	64.6771
		Torus	43597.33	83.232	0.5105	64.6918
		TOTAL	95302.88			
82	23:12:06	Drywell	51699.75	91.005	0.4223	64.6705
		Torus	43597.84	83.178	0.5097	64.6854
		TOTAL	95297.58			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
83	23:22:11	Drywell	51695.18	90.998	0.4227	64.6645
		Torus	43597.81	83.133	0.5090	64.6794
		TOTAL	95292.99			
84	23:32:17	Drywell	51689.94	90.999	0.4230	64.6584
		Torus	43598.69	83.078	0.5082	64.6733
		TOTAL	95288.63			
85	23:42:23	Drywell	51684.96	90.994	0.4239	64.6525
		Torus	43599.13	83.030	0.5073	64.6674
		TOTAL	95284.09			
86	23:52:29	Drywell	51680.26	90.994	0.4243	64.6471
		Torus	43599.58	82.983	0.5066	64.6618
		TOTAL	95279.84			
87	00:02:34	Drywell	51675.01	90.995	0.4251	64.6414
		Torus	43600.07	82.938	0.5058	64.6564
		TOTAL	95275.08			
88	00:12:40	Drywell	51670.40	90.999	0.4252	64.6363
		Torus	43599.98	82.900	0.5052	64.6512
		TOTAL	95270.38			
89	00:22:46	Drywell	51665.86	91.001	0.4255	64.6312
		Torus	43600.34	82.857	0.5046	64.6460
		TOTAL	95266.20			
90	00:32:52	Drywell	51659.22	91.015	0.4262	64.6252
		Torus	43599.63	82.820	0.5041	64.6401
		TOTAL	95258.85			
91	00:42:58	Drywell	51652.39	91.011	0.4264	64.6165
		Torus	43597.78	82.775	0.5035	64.6315
		TOTAL	95250.17			
92	00:53:03	Drywell	51645.25	91.006	0.4266	64.6073
		Torus	43595.45	82.733	0.5028	64.6224
		TOTAL	95240.70			
93	01:03:09	Drywell	51638.58	90.990	0.4272	64.5977
		Torus	43592.33	82.695	0.5021	64.6126
		TOTAL	95230.91			
94	01:13:15	Drywell	51631.77	90.969	0.4280	64.5876
		Torus	43589.57	82.650	0.5014	64.6025
		TOTAL	95221.34			
95	01:23:21	Drywell	51626.66	90.945	0.4285	64.5788
		Torus	43586.37	82.618	0.5011	64.5937
		TOTAL	95213.03			
96	01:33:26	Drywell	51622.27	90.923	0.4286	64.5711
		Torus	43584.15	82.585	0.5005	64.5860
		TOTAL	95206.43			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
97	01:43:32	Drywell	51617.86	90.903	0.4291	64.5638
		Torus	43581.85	82.555	0.5002	64.5788
		TOTAL	95199.72			
98	01:53:38	Drywell	51614.36	90.880	0.4293	64.5569
		Torus	43580.26	82.520	0.4997	64.5718
		TOTAL	95194.62			
99	02:03:44	Drywell	51610.26	90.865	0.4297	64.5505
		Torus	43578.28	82.493	0.4993	64.5653
		TOTAL	95188.54			
100	02:13:49	Drywell	51606.57	90.848	0.4302	64.5444
		Torus	43576.09	82.472	0.4991	64.5593
		TOTAL	95182.67			
101	02:23:55	Drywell	51602.09	90.842	0.4307	64.5386
		Torus	43575.16	82.438	0.4986	64.5535
		TOTAL	95177.25			
102	02:34:01	Drywell	51598.93	90.828	0.4309	64.5332
		Torus	43574.08	82.408	0.4983	64.5480
		TOTAL	95173.01			
103	02:44:07	Drywell	51594.96	90.823	0.4312	64.5281
		Torus	43573.09	82.380	0.4980	64.5429
		TOTAL	95168.06			
104	02:54:14	Drywell	51589.98	90.825	0.4322	64.5231
		Torus	43571.36	82.362	0.4977	64.5380
		TOTAL	95161.33			
105	03:04:20	Drywell	51586.49	90.818	0.4326	64.5182
		Torus	43570.52	82.335	0.4974	64.5333
		TOTAL	95157.01			
106	03:14:26	Drywell	51582.16	90.819	0.4332	64.5137
		Torus	43569.23	82.313	0.4971	64.5286
		TOTAL	95151.39			
107	03:24:32	Drywell	51578.64	90.815	0.4336	64.5093
		Torus	43568.06	82.292	0.4970	64.5241
		TOTAL	95146.70			
108	03:34:37	Drywell	51574.32	90.821	0.4341	64.5051
		Torus	43567.08	82.270	0.4968	64.5199
		TOTAL	95141.40			
109	03:44:43	Drywell	51570.21	90.825	0.4346	64.5010
		Torus	43566.01	82.250	0.4967	64.5159
		TOTAL	95136.22			
110	03:54:49	Drywell	51566.24	90.830	0.4351	64.4971
		Torus	43565.14	82.230	0.4964	64.5120
		TOTAL	95131.37			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
111	04:04:55	Drywell	51562.21	90.836	0.4356	64.4933
		Torus	43564.42	82.208	0.4963	64.5082
		TOTAL	95126.63			
112	04:15:00	Drywell	51558.04	90.844	0.4362	64.4897
		Torus	43563.55	82.188	0.4963	64.5046
		TOTAL	95121.60			
113	04:25:06	Drywell	51553.56	90.854	0.4364	64.4855
		Torus	43562.01	82.172	0.4962	64.5003
		TOTAL	95115.57			
114	04:35:12	Drywell	51547.38	90.851	0.4365	64.4776
		Torus	43558.57	82.150	0.4959	64.4923
		TOTAL	95105.96			
115	04:45:18	Drywell	51540.40	90.853	0.4369	64.4695
		Torus	43555.48	82.123	0.4956	64.4844
		TOTAL	95095.88			
116	04:55:24	Drywell	51534.46	90.844	0.4371	64.4612
		Torus	43551.76	82.102	0.4954	64.4761
		TOTAL	95086.22			
117	05:05:29	Drywell	51530.19	90.835	0.4375	64.4552
		Torus	43549.00	82.085	0.4954	64.4701
		TOTAL	95079.18			
118	05:15:35	Drywell	51526.82	90.813	0.4381	64.4492
		Torus	43546.34	82.068	0.4953	64.4641
		TOTAL	95073.16			
119	05:25:41	Drywell	51522.44	90.807	0.4387	64.4436
		Torus	43544.21	82.050	0.4951	64.4587
		TOTAL	95066.65			
120	05:35:47	Drywell	51518.90	90.796	0.4392	64.4385
		Torus	43542.02	82.033	0.4950	64.4534
		TOTAL	95060.92			
121	05:45:52	Drywell	51514.98	90.790	0.4399	64.4336
		Torus	43539.92	82.018	0.4950	64.4485
		TOTAL	95054.90			
122	05:55:58	Drywell	51511.40	90.786	0.4404	64.4291
		Torus	43538.14	82.005	0.4948	64.4441
		TOTAL	95049.54			
123	06:06:04	Drywell	51508.19	90.778	0.4410	64.4248
		Torus	43536.45	81.990	0.4948	64.4399
		TOTAL	95044.64			
124	06:16:10	Drywell	51504.73	90.776	0.4416	64.4209
		Torus	43535.23	81.973	0.4945	64.4358
		TOTAL	95039.96			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
125	06:26:15	Drywell	51500.79	90.781	0.4421	64.4171
		Torus	43533.37	81.963	0.4945	64.4320
		TOTAL	95034.16			
126	06:36:21	Drywell	51497.17	90.786	0.4424	64.4134
		Torus	43532.34	81.947	0.4944	64.4283
		TOTAL	95029.51			
127	06:46:27	Drywell	51493.29	90.793	0.4429	64.4101
		Torus	43531.23	81.933	0.4943	64.4250
		TOTAL	95024.52			
128	06:56:33	Drywell	51489.33	90.801	0.4436	64.4067
		Torus	43529.09	81.930	0.4943	64.4215
		TOTAL	95018.42			
129	07:06:39	Drywell	51485.92	90.810	0.4437	64.4035
		Torus	43528.73	81.910	0.4942	64.4185
		TOTAL	95014.66			
130	07:16:44	Drywell	51482.74	90.817	0.4438	64.4005
		Torus	43527.95	81.897	0.4939	64.4155
		TOTAL	95010.69			

APPENDIX D

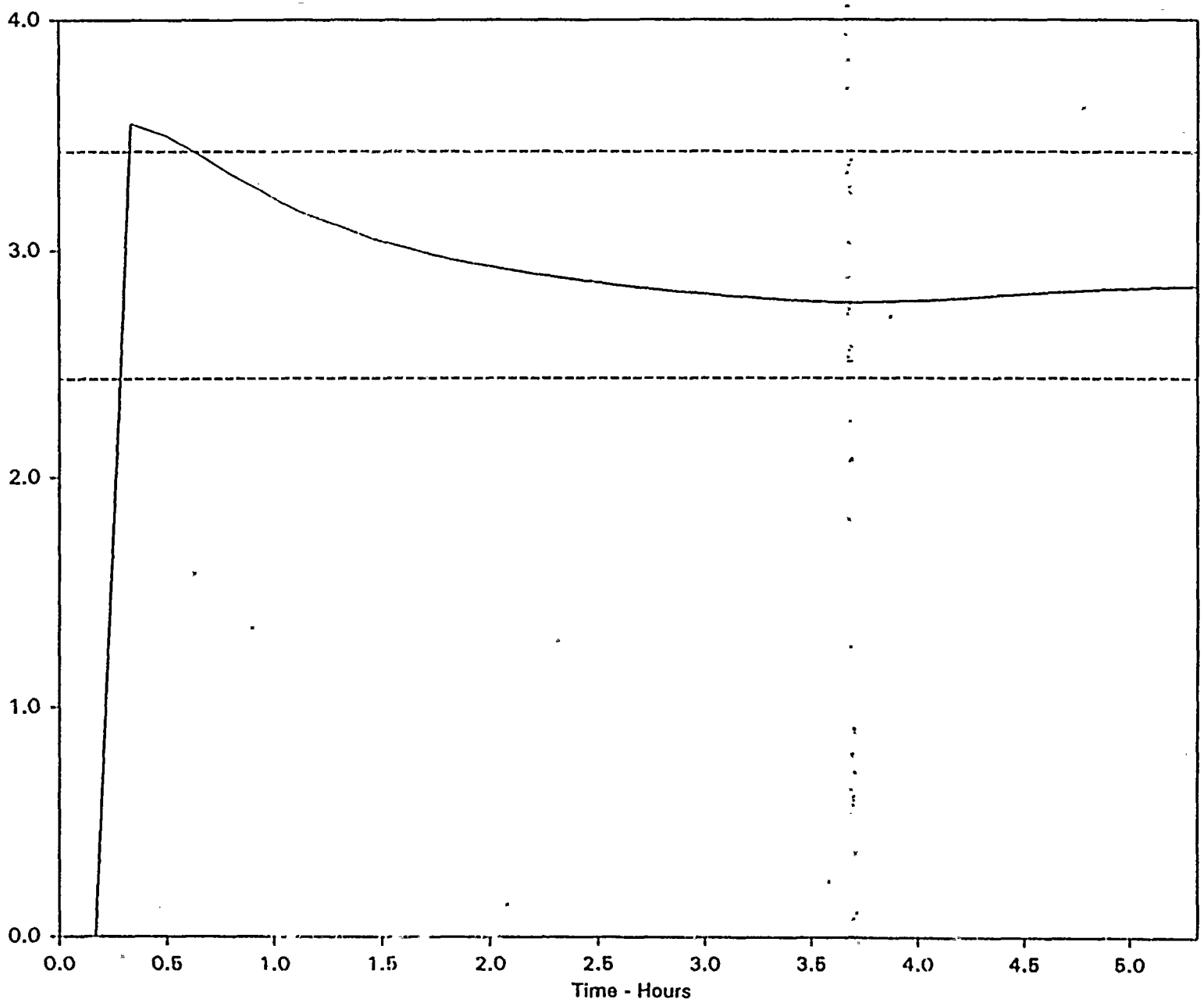
Verification Test Phase Graphs

(samples 139 to 197)

Contents:

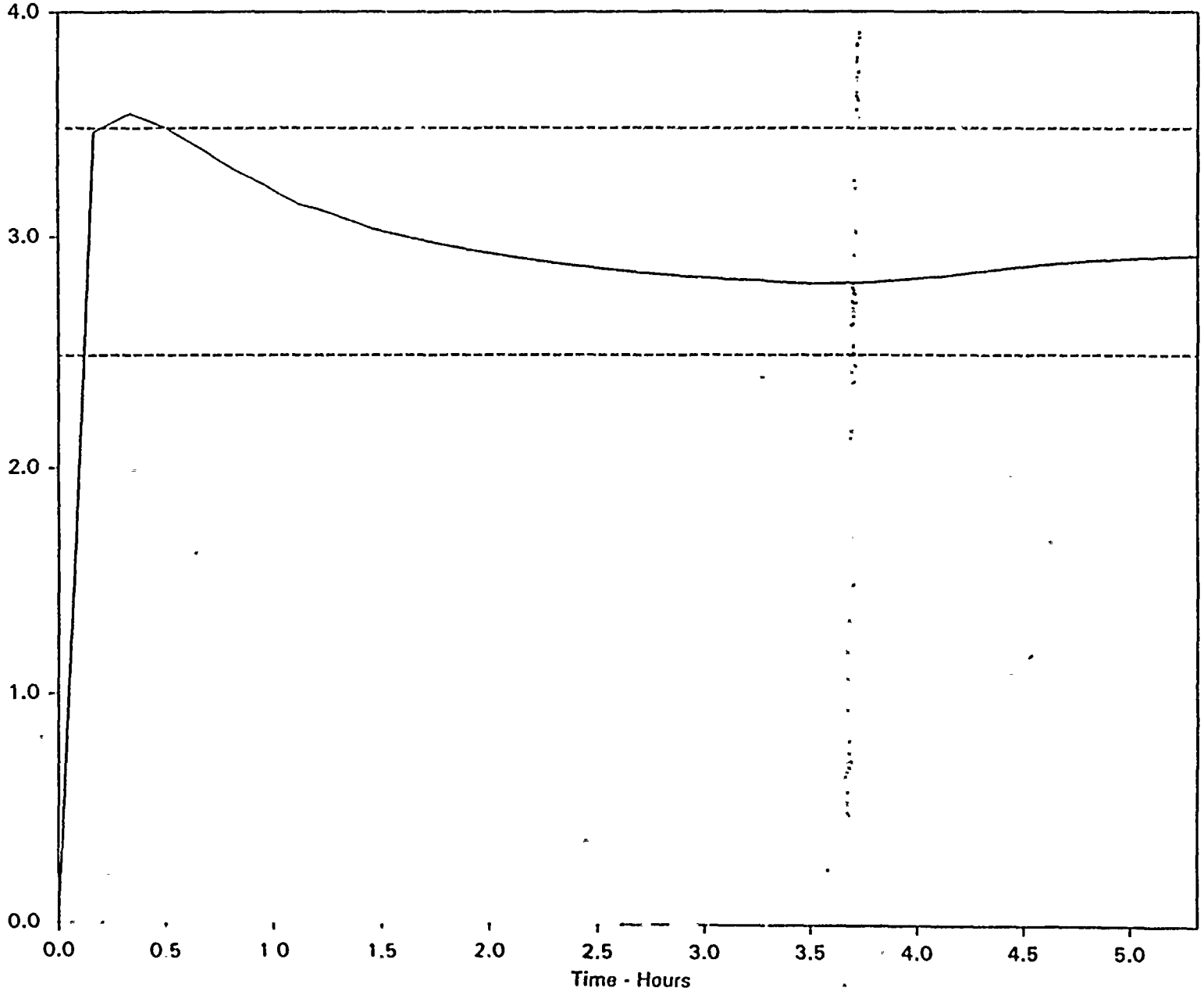
Calculated Total Time Leak

Browns Ferry Nuclear Plant
Unit 3



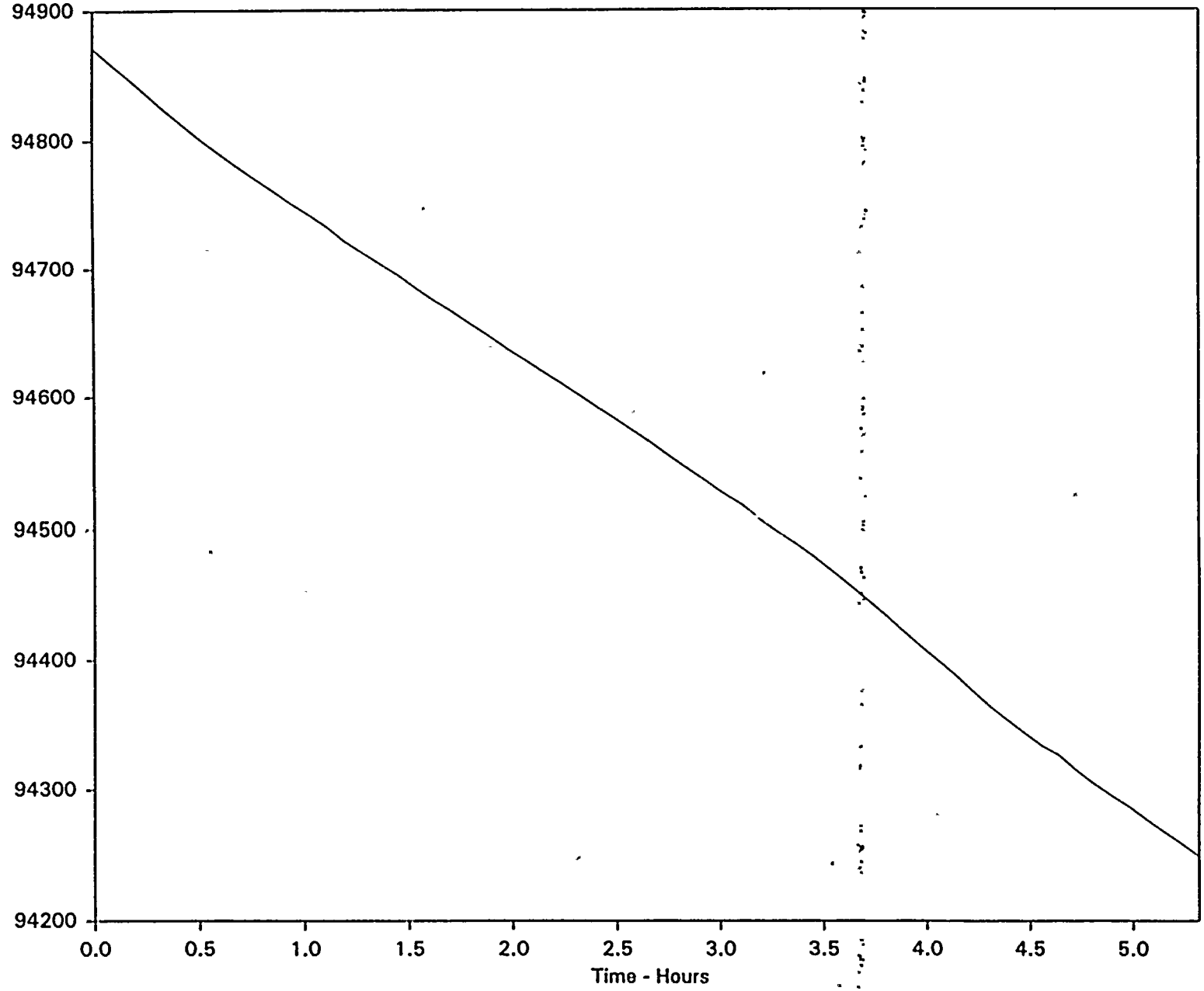
Mass Point Leak

Browns Ferry Nuclear Plant
Unit 3



Containment Mass

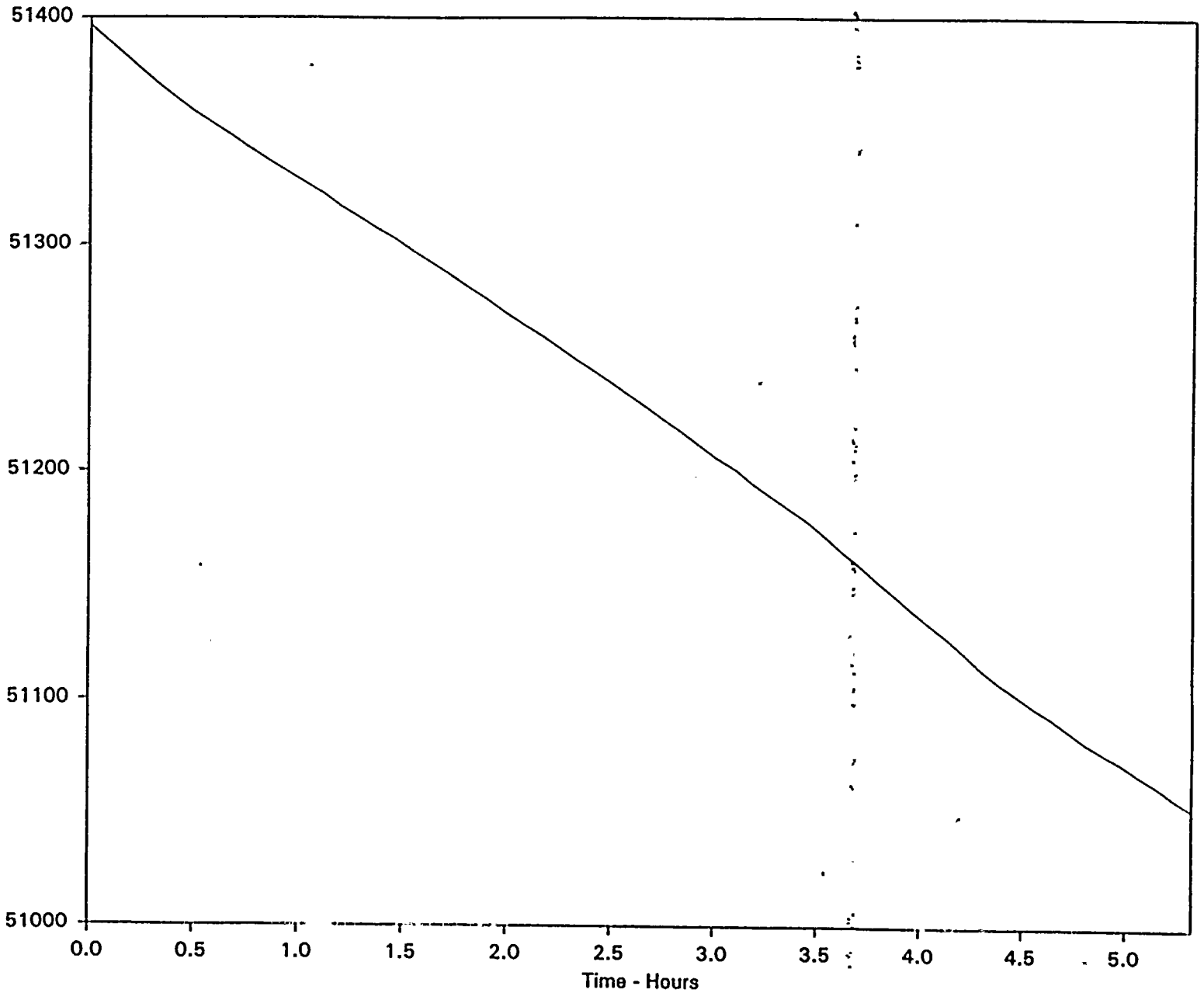
Browns Ferry Nuclear Plant
Unit 3



VERIFICATION TEST PHASE

Drywell Mass

Browns Ferry Nuclear Plant
Unit 3



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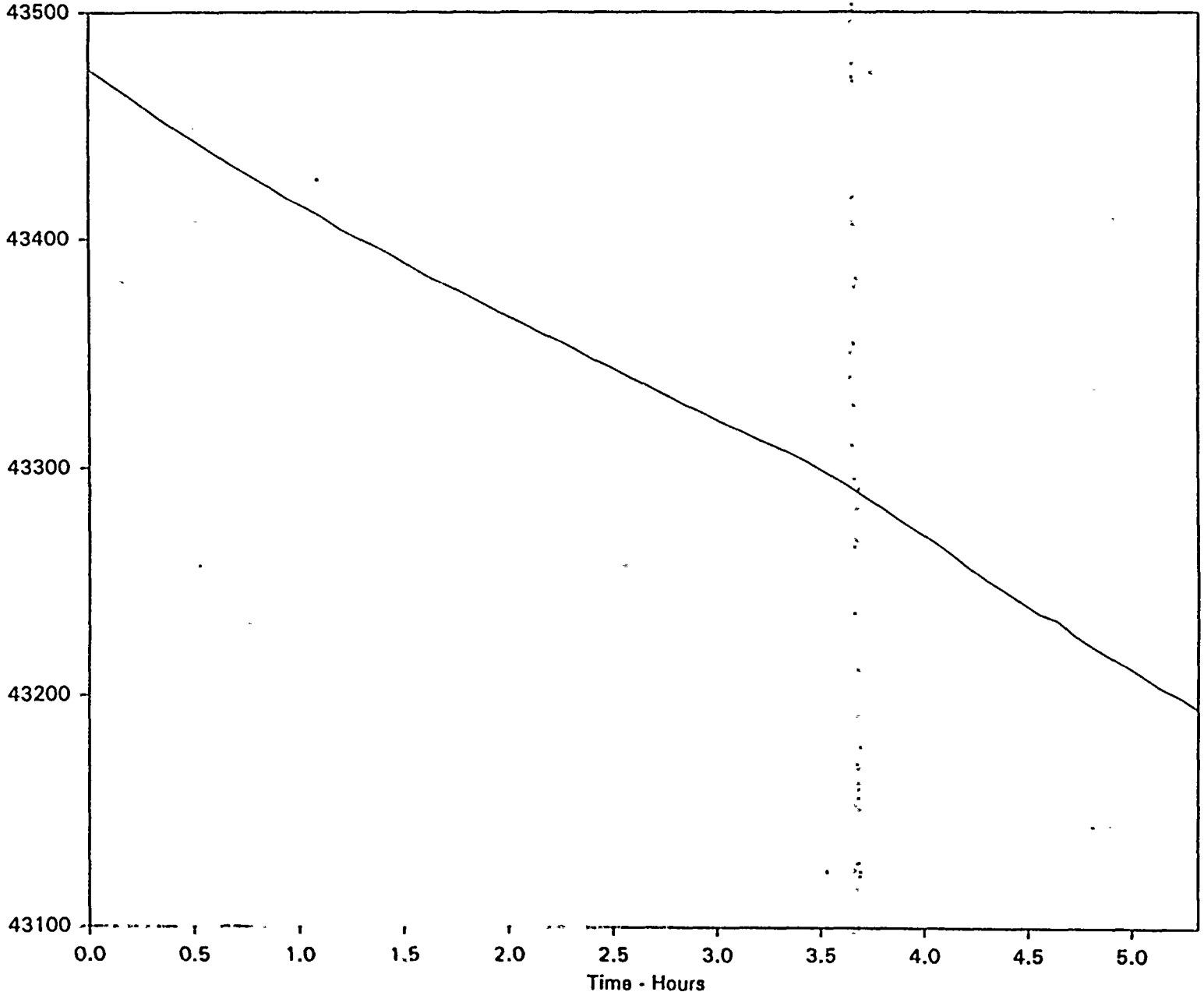
VERIFICATION TEST PHASE

Torus Mass

Browns Ferry Nuclear Plant
Unit 3



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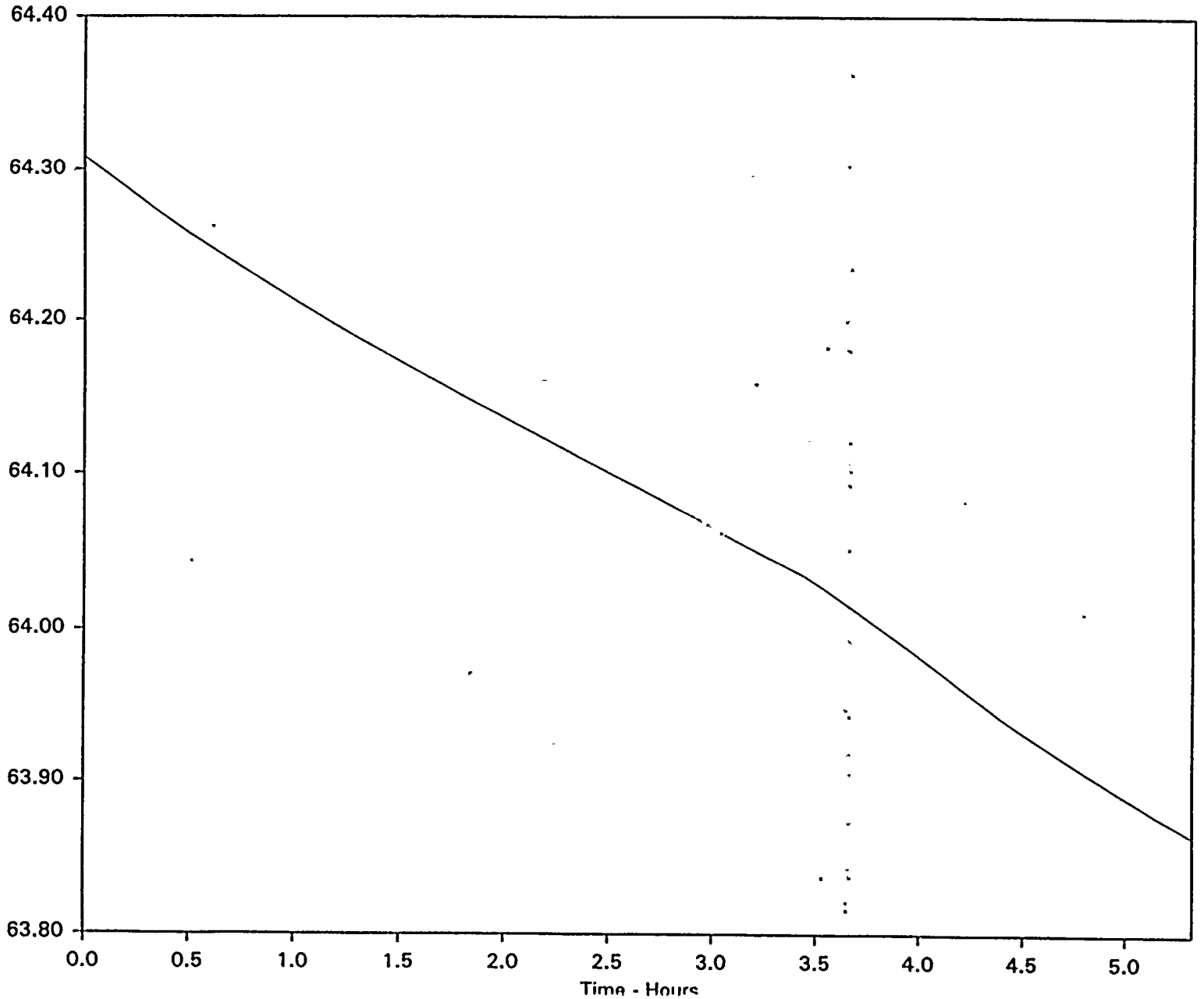
VERIFICATION TEST PHASE

Drywell Average Pressure

Browns Ferry Nuclear Plant
Unit 3



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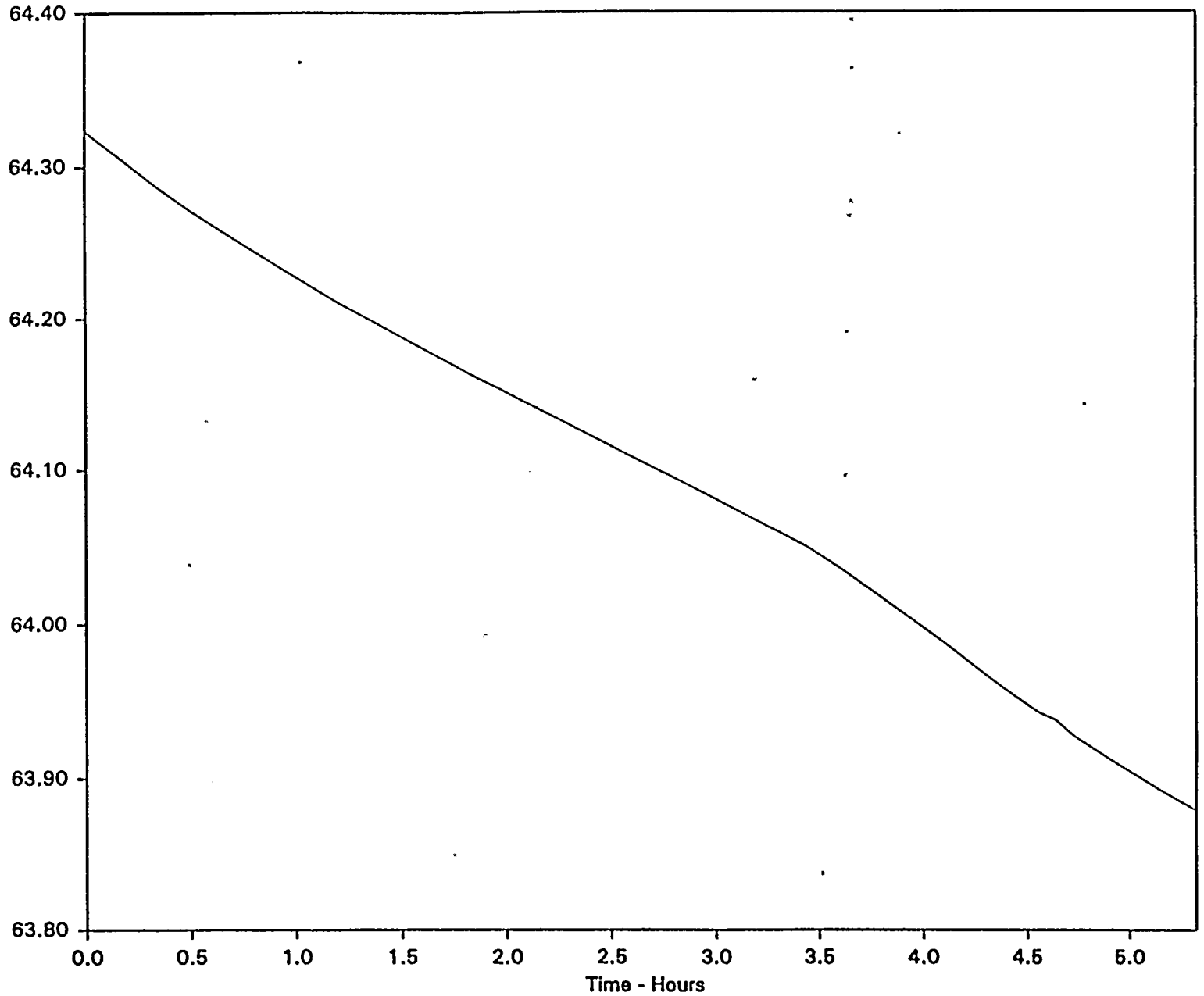
VERIFICATION TEST PHASE

Torus Average Pressure

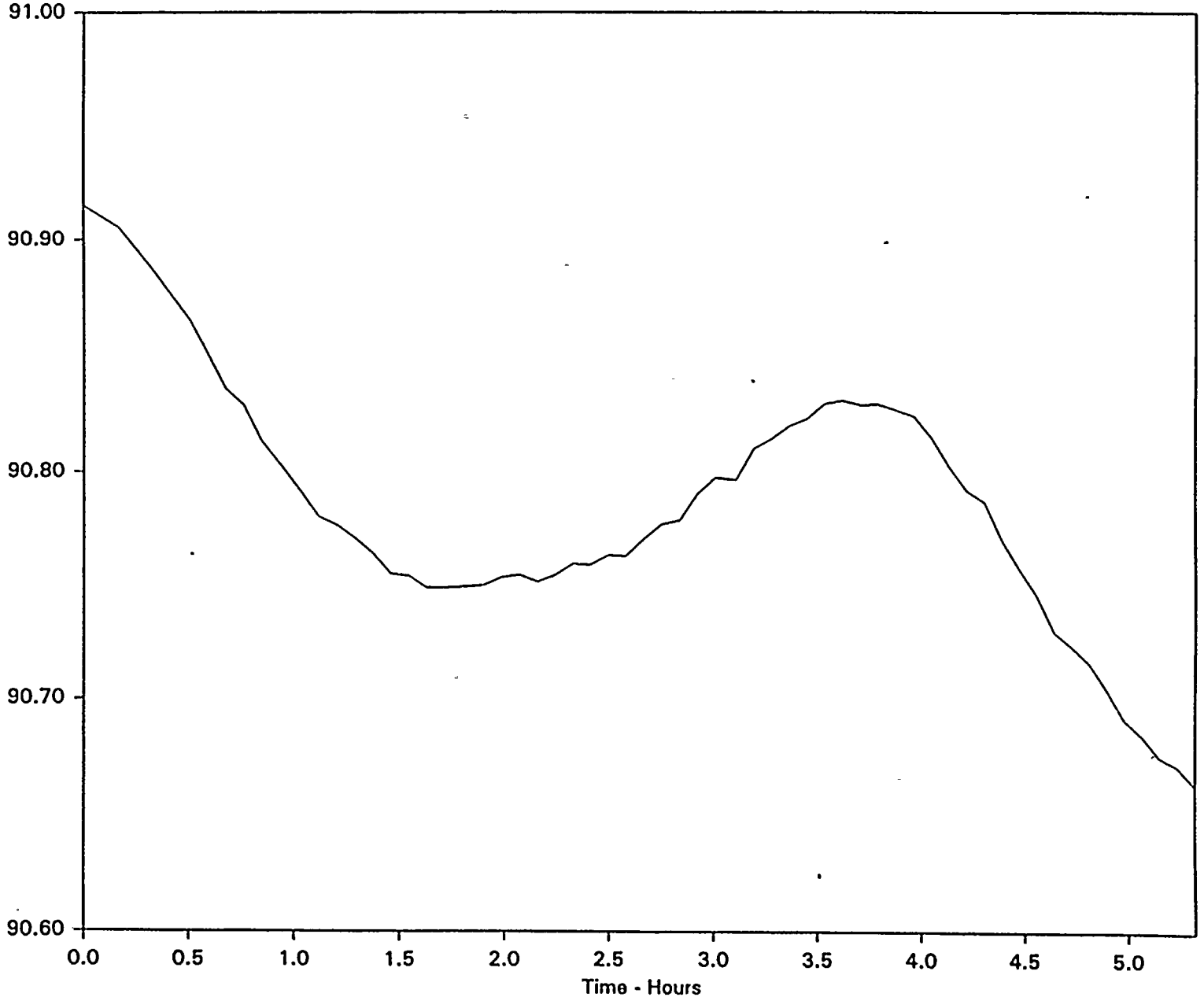
Browns Ferry Nuclear Plant
Unit 3



VERIFICATION TEST PHASE

Drywell Average Temperature

Browns Ferry Nuclear Plant
Unit 3



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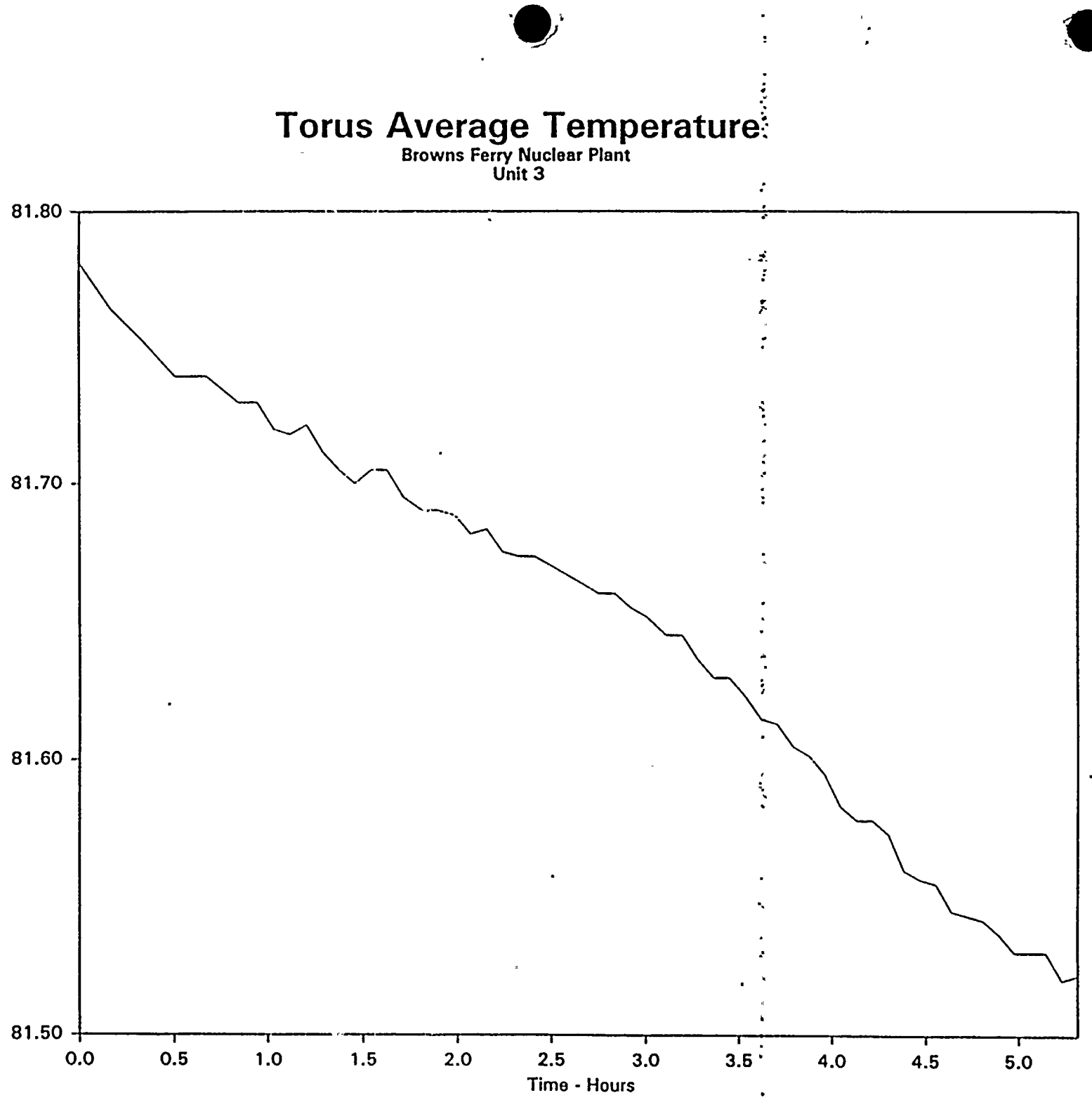
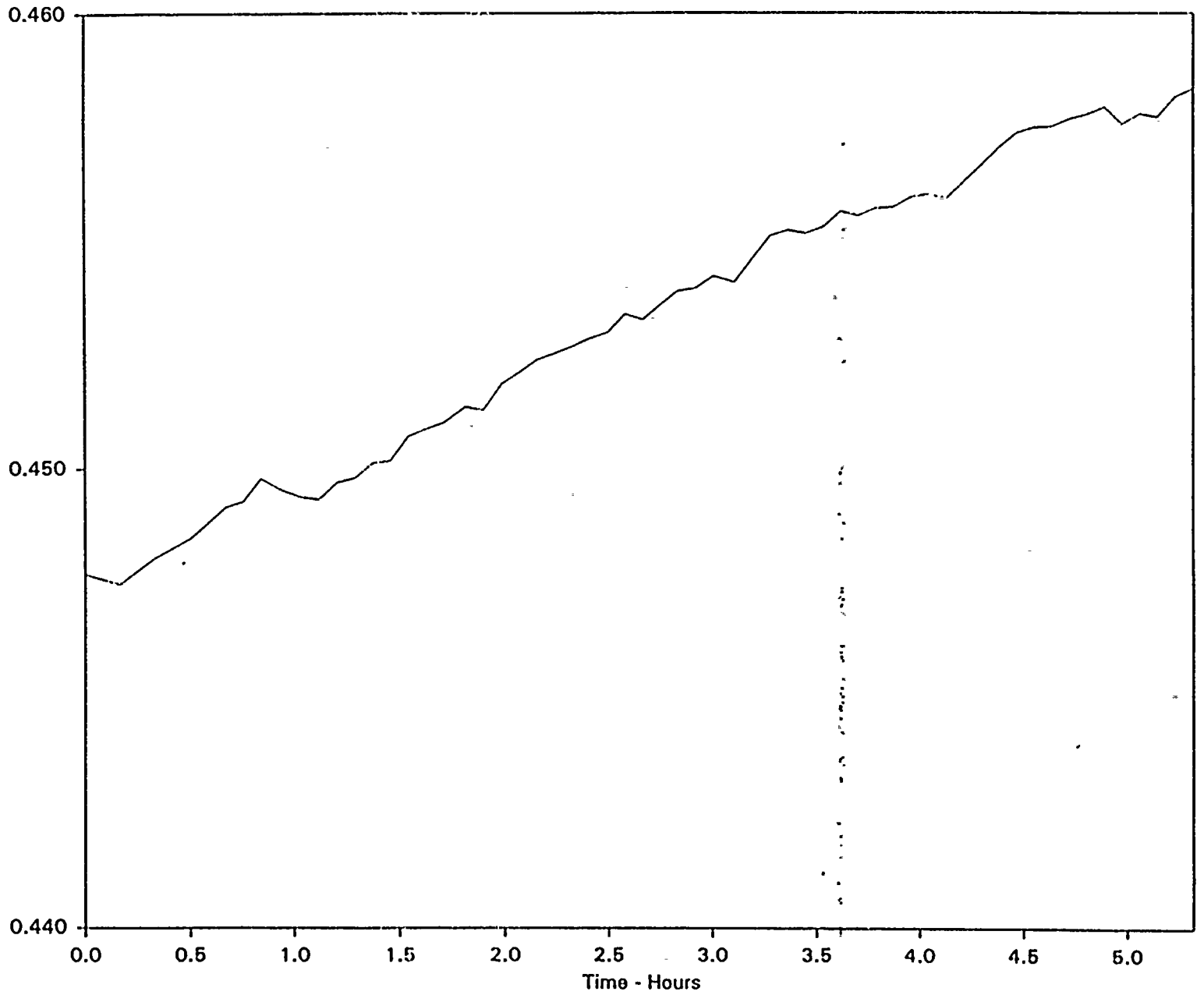
VERIFICATION TEST PHASE


Torus Average Temperature
Browns Ferry Nuclear Plant
Unit 3
81.80
81.70
81.60
81.50
°F
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Time - Hours

Drywell Average Vapor Pressure

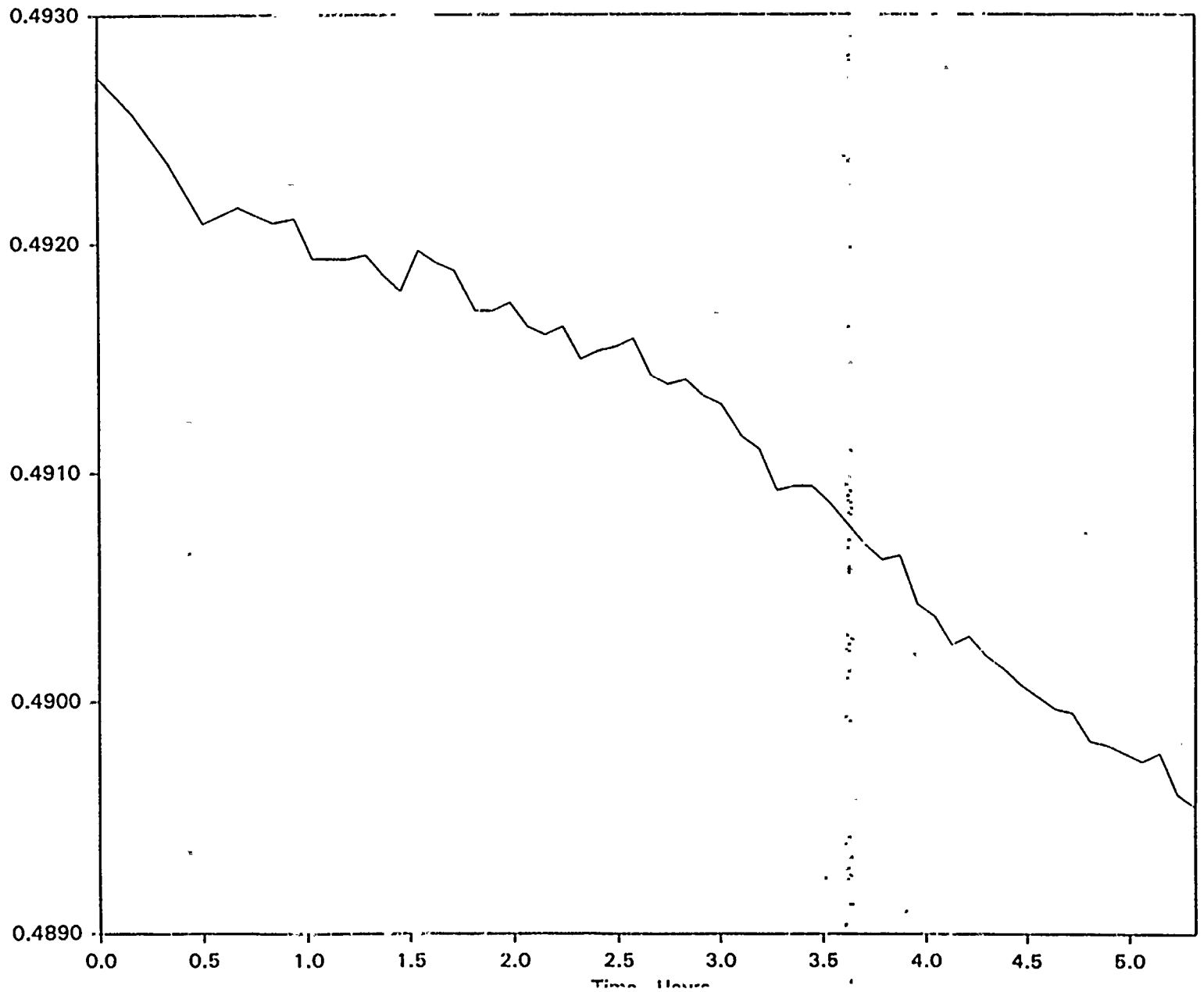
Browns Ferry Nuclear Plant
Unit 3



VERIFICATION TEST PHASE

Torus Average Vapor Pressure

Browns Ferry Nuclear Plant
Unit 3



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VERIFICATION TEST PHASE

APPENDIX E

Verification Test Phase Tabular Data

(samples139 to 197)

Contents:

Total Time Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	MEASURED LEAK (WT %/DAY)	CALCULATED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
139	0.00	-	-	-
140	10.10	3.467233	-	-
141	20.20	3.549774	3.549774	-
142	30.28	3.469550	3.496700	4.140368
143	40.38	3.365340	3.405089	3.754550
144	45.48	3.326937	3.355488	3.587435
145	50.62	3.278164	3.307921	3.493057
146	56.72	3.234726	3.258166	3.415860
147	61.97	3.180637	3.210106	3.351930
148	67.08	3.148010	3.167354	3.295210
149	72.27	3.158886	3.139690	3.257283
150	77.45	3.120935	3.109435	3.218039
151	82.55	3.092211	3.080081	3.181518
152	87.65	3.059388	3.050001	3.145331
153	92.75	3.065604	3.028190	3.122830
154	97.85	3.048226	3.007604	3.102309
155	102.95	3.024102	2.986573	3.080594
156	109.05	3.008887	2.962494	3.057875
157	114.13	2.998517	2.946016	3.043502
158	119.23	2.995010	2.932017	3.033466
159	124.32	2.979502	2.918068	3.022402
160	129.42	2.967644	2.904617	3.011633
161	134.50	2.953964	2.891412	3.000584
162	139.60	2.948198	2.879480	2.991495
163	144.70	2.938725	2.868121	2.982862
164	149.78	2.930432	2.857461	2.974902
165	154.88	2.921502	2.847172	2.967152
166	159.98	2.914087	2.837453	2.959966
167	165.07	2.909641	2.828652	2.953966
168	170.18	2.905451	2.820495	2.948801
169	175.28	2.901830	2.813124	2.944556
170	180.47	2.899856	2.806308	2.941132
171	186.48	2.884686	2.796219	2.933586
172	191.62	2.889730	2.790808	2.931535
173	196.70	2.881169	2.785342	2.928748
174	201.82	2.873585	2.779683	2.925324
175	206.92	2.869092	2.774316	2.922076
176	212.02	2.879014	2.770616	2.921640
177	217.12	2.889946	2.768489	2.923840
178	222.20	2.900490	2.767763	2.928252
179	227.30	2.913092	2.768392	2.934851
180	232.40	2.924540	2.770169	2.943097
181	237.48	2.936725	2.773074	2.952873

Total Time Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	MEASURED LEAK (WT %/DAY)	CALCULATED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
182	242.58	2.942904	2.776389	2.962729
183	247.68	2.950414	2.780222	2.972899
184	252.77	2.966628	2.785282	2.984860
185	257.87	2.981625	2.791286	2.998062
186	262.95	2.984327	2.797213	3.010283
187	268.05	2.985484	2.802885	3.021367
188	273.13	2.986618	2.808375	3.031520
189	278.23	2.971013	2.812370	3.038434
190	283.33	2.982597	2.817047	3.046321
191	288.42	2.983900	2.821617	3.053691
192	293.52	2.980227	2.825680	3.059917
193	298.62	2.972417	2.829007	3.064661
194	303.70	2.971977	2.832184	3.068993
195	308.80	2.969631	2.835049	3.072699
196	313.90	2.966145	2.837568	3.075742
197	318.98	2.964229	2.839886	3.078373

Mass Point Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
139	0.00	1.000000	-	-
140	10.10	0.999757	3.467233	-
141	20.20	0.999502	3.549767	3.957495
142	30.28	0.999270	3.485860	3.611337
143	40.38	0.999056	3.386444	3.533530
144	45.48	0.998949	3.334020	3.455293
145	50.62	0.998848	3.285578	3.398040
146	56.72	0.998726	3.238509	3.345909
147	61.97	0.998631	3.187955	3.297139
148	67.08	0.998533	3.144050	3.250589
149	72.27	0.998415	3.120902	3.215002
150	77.45	0.998321	3.092508	3.180164
151	82.55	0.998227	3.063801	3.147222
152	87.65	0.998138	3.033384	3.114814
153	92.75	0.998025	3.014337	3.089489
154	97.85	0.997929	2.996045	3.066043
155	102.95	0.997838	2.976232	3.042752
156	109.05	0.997721	2.957605	3.020696
157	114.13	0.997623	2.941462	3.001063
158	119.23	0.997520	2.928961	2.984695
159	124.32	0.997428	2.916089	2.968743
160	129.42	0.997333	2.903791	2.953745
161	134.50	0.997241	2.891470	2.939202
162	139.60	0.997142	2.880920	2.926316
163	144.70	0.997047	2.870922	2.914202
164	149.78	0.996952	2.861592	2.902907
165	154.88	0.996858	2.852642	2.892182
166	159.98	0.996762	2.844285	2.882156
167	165.07	0.996665	2.836971	2.873160
168	170.18	0.996566	2.830545	2.865075
169	175.28	0.996468	2.824939	2.857848
170	180.47	0.996366	2.820293	2.851592
171	186.48	0.996264	2.814126	2.844228
172	191.62	0.996155	2.810137	2.838796
173	196.70	0.996064	2.805680	2.833113
174	201.82	0.995973	2.800974	2.827349
175	206.92	0.995877	2.796533	2.821913
176	212.02	0.995761	2.794539	2.818698
177	217.12	0.995643	2.794775	2.817727
178	222.20	0.995524	2.796855	2.818784
179	227.30	0.995402	2.800804	2.822059
180	232.40	0.995280	2.806192	2.827162
181	237.48	0.995157	2.812913	2.834023

Mass Point Leak Rate Analysis

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
182	242.58	0.995042	2.819971	2.841335
183	247.68	0.994925	2.827483	2.849245
184	252.77	0.994793	2.836496	2.859181
185	257.87	0.994661	2.846662	2.870635
186	262.95	0.994550	2.856307	2.881217
187	268.05	0.994443	2.865293	2.890813
188	273.13	0.994335	2.873677	2.899566
189	278.23	0.994259	2.879566	2.905133
190	283.33	0.994131	2.886336	2.911834
191	288.42	0.994024	2.892728	2.918080
192	293.52	0.993925	2.898226	2.923252
193	298.62	0.993836	2.902469	2.926962
194	303.70	0.993732	2.906364	2.930306
195	308.80	0.993632	2.909743	2.933097
196	313.90	0.993534	2.912535	2.935263
197	318.98	0.993434	2.914953	2.937051

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
139	08:47:40	Drywell	51396.32	90.915	0.4477	64.3085
		Torus	43475.08	81.782	0.4927	64.3231
		TOTAL	94871.40			
140	08:57:46	Drywell	51383.58	90.905	0.4475	64.2913
		Torus	43464.75	81.765	0.4926	64.3058
		TOTAL	94848.33			
141	09:07:52	Drywell	51370.49	90.886	0.4481	64.2733
		Torus	43453.67	81.753	0.4924	64.2880
		TOTAL	94824.16			
142	09:17:57	Drywell	51358.63	90.865	0.4485	64.2566
		Torus	43443.55	81.740	0.4921	64.2712
		TOTAL	94802.18			
143	09:28:03	Drywell	51348.65	90.836	0.4492	64.2415
		Torus	43433.21	81.740	0.4922	64.2562
		TOTAL	94781.86			
144	09:33:09	Drywell	51343.18	90.829	0.4493	64.2340
		Torus	43428.53	81.735	0.4921	64.2487
		TOTAL	94771.71			
145	09:38:17	Drywell	51338.17	90.813	0.4498	64.2265
		Torus	43423.91	81.730	0.4921	64.2412
		TOTAL	94762.08			
146	09:44:23	Drywell	51332.59	90.802	0.4495	64.2180
		Torus	43417.94	81.730	0.4921	64.2325
		TOTAL	94750.53			
147	09:49:38	Drywell	51327.66	90.791	0.4494	64.2105
		Torus	43413.89	81.720	0.4919	64.2252
		TOTAL	94741.55			
148	09:54:45	Drywell	51323.08	90.780	0.4493	64.2035
		Torus	43409.19	81.718	0.4919	64.2181
		TOTAL	94732.27			
149	09:59:56	Drywell	51317.09	90.776	0.4497	64.1960
		Torus	43403.91	81.722	0.4919	64.2108
		TOTAL	94721.00			
150	10:05:07	Drywell	51312.12	90.771	0.4498	64.1892
		Torus	43400.04	81.712	0.4919	64.2039
		TOTAL	94712.15			
151	10:10:13	Drywell	51307.13	90.764	0.4501	64.1825
		Torus	43396.10	81.705	0.4919	64.1973
		TOTAL	94703.23			
152	10:15:19	Drywell	51302.68	90.755	0.4502	64.1761
		Torus	43392.05	81.700	0.4918	64.1907
		TOTAL	94694.73			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
153	10:20:25	Drywell	51297.00	90.754	0.4507	64.1695
		Torus	43387.07	81.705	0.4920	64.1841
		TOTAL	94684.07			
154	10:25:31	Drywell	51292.18	90.749	0.4509	64.1630
		Torus	43382.71	81.705	0.4919	64.1777
		TOTAL	94674.89			
155	10:30:37	Drywell	51287.04	90.749	0.4510	64.1568
		Torus	43379.25	81.695	0.4919	64.1714
		TOTAL	94666.29			
156	10:36:43	Drywell	51280.60	90.749	0.4514	64.1491
		Torus	43374.62	81.690	0.4917	64.1638
		TOTAL	94655.23			
157	10:41:48	Drywell	51275.56	90.750	0.4513	64.1429
		Torus	43370.37	81.690	0.4917	64.1576
		TOTAL	94645.93			
158	10:46:54	Drywell	51269.84	90.754	0.4519	64.1368
		Torus	43366.29	81.688	0.4917	64.1514
		TOTAL	94636.13			
159	10:51:59	Drywell	51264.63	90.755	0.4521	64.1307
		Torus	43362.74	81.682	0.4916	64.1453
		TOTAL	94627.37			
160	10:57:05	Drywell	51259.83	90.751	0.4524	64.1247
		Torus	43358.54	81.683	0.4916	64.1393
		TOTAL	94618.37			
161	11:02:10	Drywell	51254.55	90.754	0.4525	64.1186
		Torus	43355.10	81.675	0.4916	64.1333
		TOTAL	94609.64			
162	11:07:16	Drywell	51249.08	90.759	0.4527	64.1125
		Torus	43351.17	81.673	0.4915	64.1272
		TOTAL	94600.25			
163	11:12:22	Drywell	51244.19	90.759	0.4529	64.1066
		Torus	43347.06	81.673	0.4915	64.1212
		TOTAL	94591.25			
164	11:17:27	Drywell	51238.89	90.763	0.4530	64.1006
		Torus	43343.33	81.670	0.4915	64.1154
		TOTAL	94582.22			
165	11:22:33	Drywell	51233.77	90.763	0.4534	64.0946
		Torus	43339.52	81.667	0.4916	64.1094
		TOTAL	94573.29			
166	11:27:39	Drywell	51228.41	90.770	0.4533	64.0887
		Torus	43335.84	81.663	0.4914	64.1035
		TOTAL	94564.25			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
167	11:32:44	Drywell	51222.86	90.777	0.4536	64.0829
		Torus	43332.11	81.660	0.4914	64.0976
		TOTAL	94554.98			
168	11:37:51	Drywell	51217.56	90.779	0.4539	64.0768
		Torus	43328.08	81.660	0.4914	64.0917
		TOTAL	94545.64			
169	11:42:57	Drywell	51211.72	90.790	0.4540	64.0710
		Torus	43324.58	81.655	0.4913	64.0858
		TOTAL	94536.29			
170	11:48:08	Drywell	51205.97	90.797	0.4542	64.0649
		Torus	43320.64	81.652	0.4913	64.0797
		TOTAL	94526.62			
171	11:54:09	Drywell	51200.45	90.797	0.4541	64.0578
		Torus	43316.54	81.645	0.4912	64.0727
		TOTAL	94516.99			
172	11:59:17	Drywell	51194.07	90.810	0.4546	64.0520
		Torus	43312.52	81.645	0.4911	64.0668
		TOTAL	94506.59			
173	12:04:22	Drywell	51188.60	90.814	0.4551	64.0462
		Torus	43309.43	81.637	0.4909	64.0610
		TOTAL	94498.03			
174	12:09:29	Drywell	51183.36	90.820	0.4552	64.0404
		Torus	43305.96	81.630	0.4909	64.0552
		TOTAL	94489.32			
175	12:14:35	Drywell	51178.34	90.823	0.4552	64.0344
		Torus	43301.94	81.630	0.4909	64.0493
		TOTAL	94480.28			
176	12:19:41	Drywell	51171.77	90.829	0.4553	64.0272
		Torus	43297.48	81.623	0.4909	64.0419
		TOTAL	94469.25			
177	12:24:47	Drywell	51165.09	90.831	0.4557	64.0194
		Torus	43292.93	81.615	0.4908	64.0342
		TOTAL	94458.02			
178	12:29:52	Drywell	51159.05	90.829	0.4555	64.0116
		Torus	43287.74	81.613	0.4907	64.0263
		TOTAL	94446.79			
179	12:34:58	Drywell	51152.23	90.829	0.4557	64.0033
		Torus	43282.93	81.605	0.4906	64.0182
		TOTAL	94435.16			
180	12:40:04	Drywell	51145.98	90.827	0.4557	63.9953
		Torus	43277.64	81.602	0.4906	64.0100
		TOTAL	94423.62			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
181	12:45:09	Drywell	51139.29	90.824	0.4560	63.9869
		Torus	43272.62	81.595	0.4904	64.0017
		TOTAL	94411.92			
182	12:50:15	Drywell	51133.26	90.815	0.4560	63.9784
		Torus	43267.80	81.583	0.4904	63.9932
		TOTAL	94401.06			
183	12:55:21	Drywell	51127.56	90.802	0.4559	63.9697
		Torus	43262.39	81.578	0.4903	63.9845
		TOTAL	94389.95			
184	13:00:26	Drywell	51121.03	90.792	0.4563	63.9608
		Torus	43256.34	81.578	0.4903	63.9757
		TOTAL	94377.37			
185	13:05:32	Drywell	51114.09	90.787	0.4567	63.9520
		Torus	43250.77	81.573	0.4902	63.9668
		TOTAL	94364.85			
186	13:10:37	Drywell	51108.36	90.770	0.4570	63.9433
		Torus	43246.04	81.560	0.4901	63.9583
		TOTAL	94354.40			
187	13:15:43	Drywell	51103.09	90.757	0.4574	63.9356
		Torus	43241.08	81.557	0.4901	63.9505
		TOTAL	94344.17			
188	13:20:48	Drywell	51097.93	90.745	0.4575	63.9280
		Torus	43236.03	81.555	0.4900	63.9429
		TOTAL	94333.97			
189	13:25:54	Drywell	51093.40	90.730	0.4575	63.9205
		Torus	43233.39	81.545	0.4900	63.9377
		TOTAL	94326.79			
190	13:31:00	Drywell	51087.79	90.723	0.4577	63.9130
		Torus	43226.86	81.543	0.4900	63.9280
		TOTAL	94314.65			
191	13:36:05	Drywell	51082.41	90.716	0.4578	63.9056
		Torus	43222.00	81.542	0.4898	63.9205
		TOTAL	94304.41			
192	13:41:11	Drywell	51077.59	90.705	0.4579	63.8984
		Torus	43217.51	81.537	0.4898	63.9133
		TOTAL	94295.09			
193	13:46:17	Drywell	51073.36	90.692	0.4576	63.8913
		Torus	43213.26	81.530	0.4898	63.9063
		TOTAL	94286.62			
194	13:51:22	Drywell	51068.24	90.685	0.4578	63.8844
		Torus	43208.51	81.530	0.4897	63.8993
		TOTAL	94276.75			

Containment Calculated Values

Browns Ferry Nuclear Plant
Unit 3

RDG	TIME		MASS	TEMP	VAPOR PRESS	PRESSURE
195	13:56:28	Drywell	51063.56	90.675	0.4577	63.8774
		Torus	43203.68	81.530	0.4898	63.8922
		TOTAL	94267.24			
196	14:01:34	Drywell	51058.01	90.671	0.4582	63.8705
		Torus	43199.97	81.520	0.4896	63.8854
		TOTAL	94257.98			
197	14:06:39	Drywell	51053.18	90.663	0.4583	63.8637
		Torus	43195.27	81.522	0.4895	63.8786
		TOTAL	94248.45			

APPENDIX F

Verification Analysis Summary

TTLR reported during Verification Test (%/day):	2.839886
MLR reported during Verification Test (%/day):	2.914953
TTLR reported during CILRT (%/day):	0.856166
MLR reported during CILRT (%/day):	0.911060
Imposed Leak (%/day)	2.000770
Maximum Allowable Leak Rate (%/day)	2.000000

$$\% \text{ Agreement} = \frac{LR_v - LR_i - LR_c}{L_a}$$

where:

LR_v = the calculated leakage rate measured during the verification test

LR_i = the imposed leakage rate during the verification test

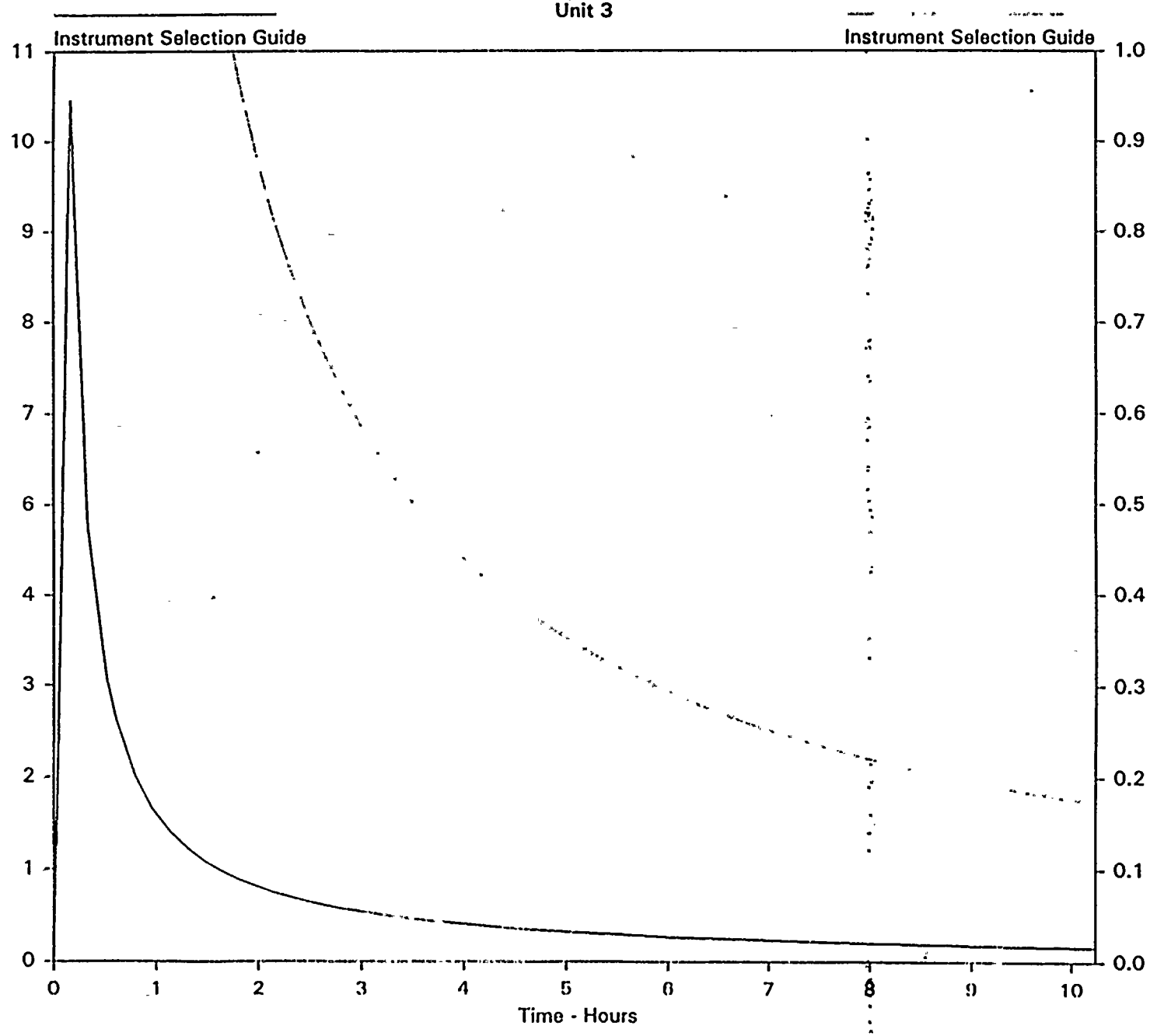
LR_c = the calculated leakage rate measured during the CILRT

L_a = the allowable leakage from containment

TTLR Agreement:	-0.852 %
MLR Agreement:	0.156 %

Instrument Selection Guide & Instrument Selection Guide

Browns Ferry Nuclear Plant
Unit 3



APPENDIX H

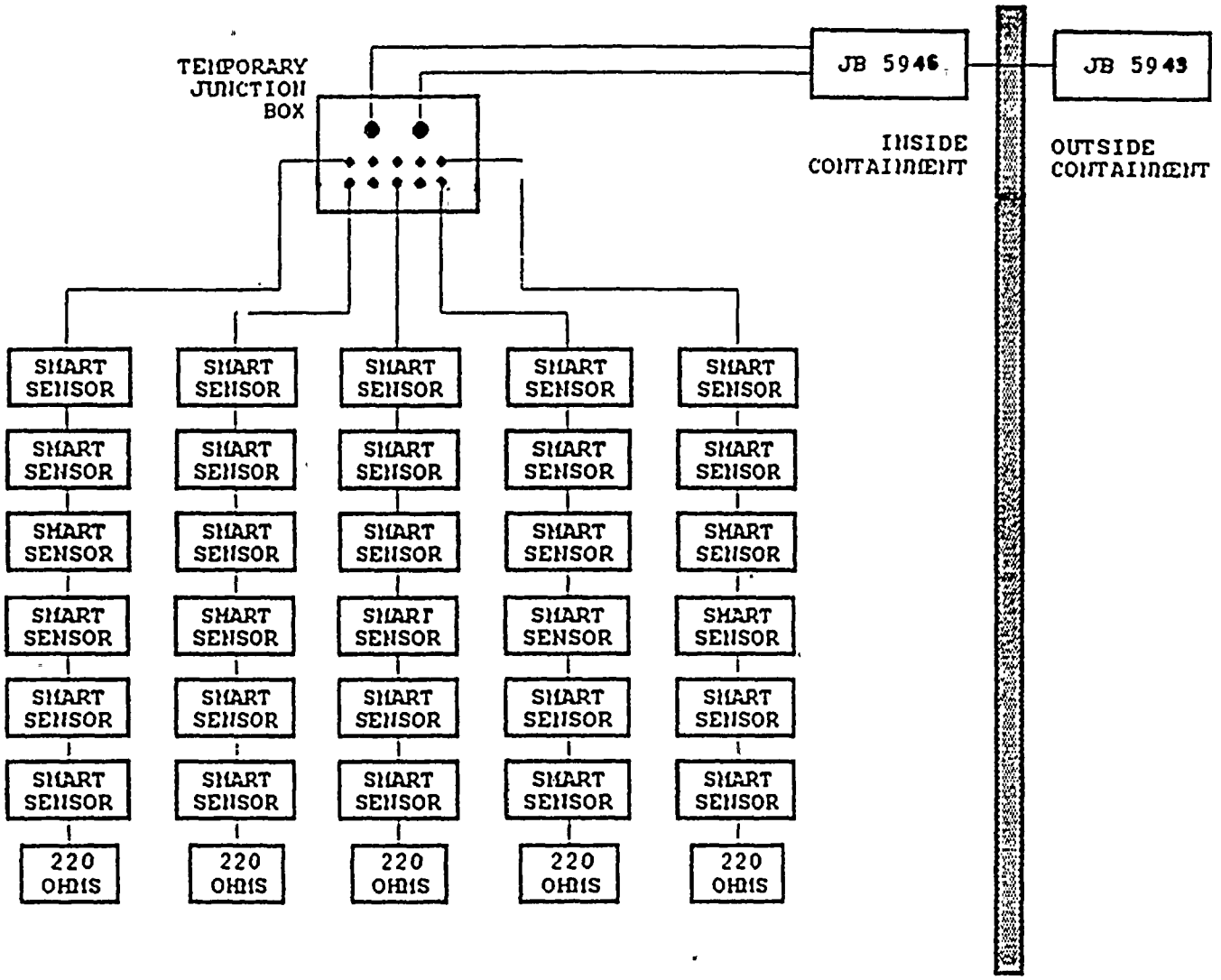
Penetrations Not Vented During the CILRT (in service or available for service)

Penetration Number	Description	Leak Rate in SCFH	Percent per Day Added to UCL
X-9B	"B" Feedwater, Reactor Water Cleanup Return, Control Rod Drive Return,Reactor Core Injection Cooling	0.5384	0.0010
X-12	Residual Heat Removal Shutdown Cooling suction	0.0004	0.0000
X-14	Reactor Water Cleanup Suction	0.0000	0.0000
X-18	Floor & Equipment Sump Drain	0.7329	0.0013
X-19	Floor & Equipment Sump Drain	0.0000	0.0000
X-42	Standby Liquid Control	0.5763	0.0011
	Total Leakage	1.8480	0.0034

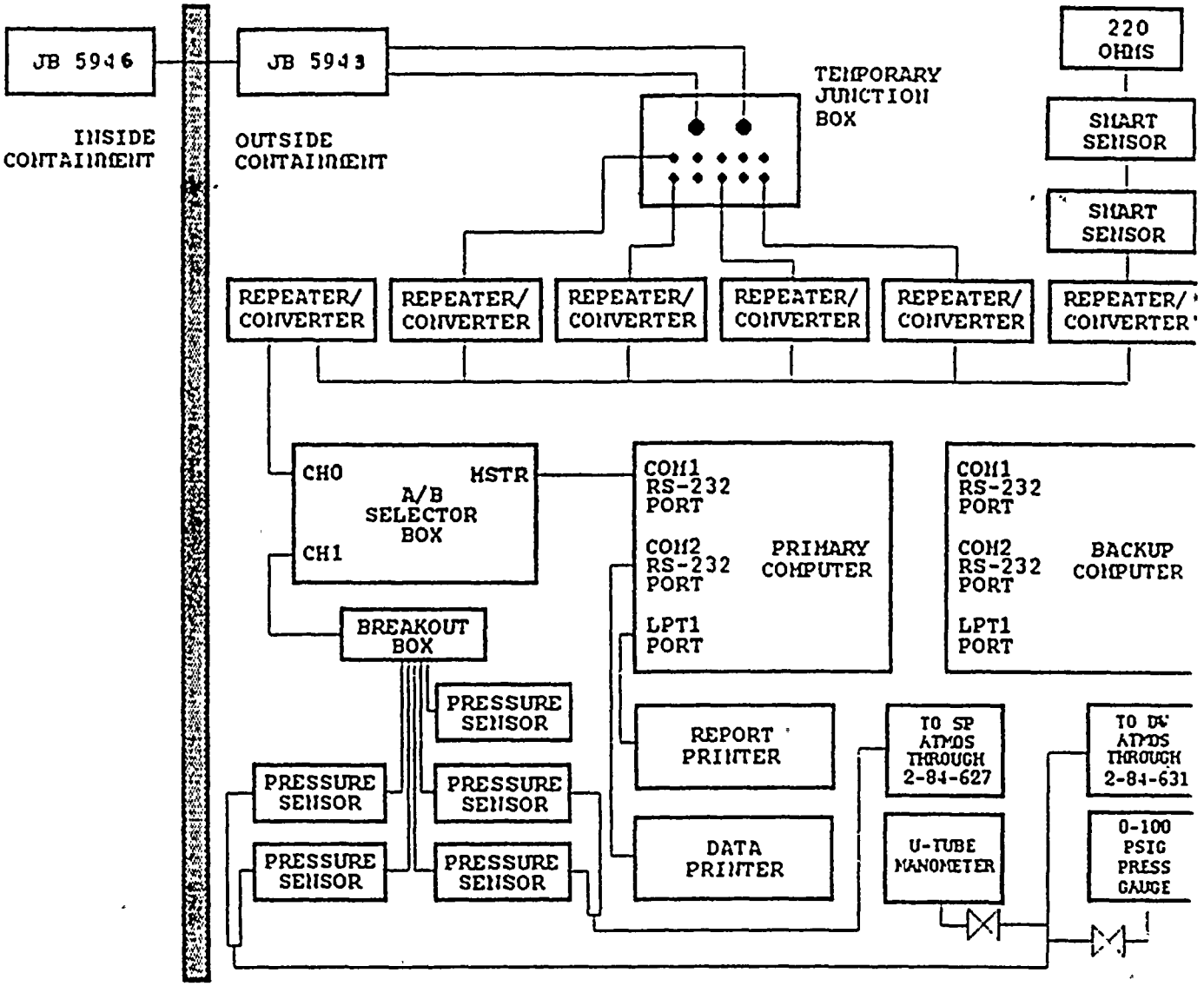
APPENDIX I

Computer System Block Diagram
(Typical)

Computer System Block Diagram
(Typical)



Computer System Block Diagram
(Typical)



APPENDIX J

Compartment Parameters and Instrument Locations

COMPARTMENT PARAMETERS

Temperature (35 Instruments)

Compartment	Segment Number	Segment Volume (ft^3)	Number of Instruments	Instrument Volume Fraction Initial	Final
Drywell (TS 1-29)	I	8,300.87	1	0.050563	--------
	II	50,332.38	8	0.038323	0.043798
	III	64,058.92	8	0.048775	0.055743
	IV	33,378.15	9	0.022590	--------
	V	8,099.86	3	0.016446	--------
Torus (TS 30-35)	IX	136,629.53	6	0.166667	--------

Relative Humidity (10 Instruments)

Drywell (HS 1-7)	VI (I+II)	58,633.25	3	0.119045	--------
	III	64,058.92	2	0.195099	--------
	VII (IV&V)	41,478.01	2	0.126326	--------
Torus (HS 8-10)	IX	136,629.53	3	0.333333	--------

Pressure (4 Instruments)

Drywell (PS 1-2)	VIII	164,170.18	2	0.500000	--------
Torus (PS 3-4)	IX	136,629.53	2	0.500000	--------

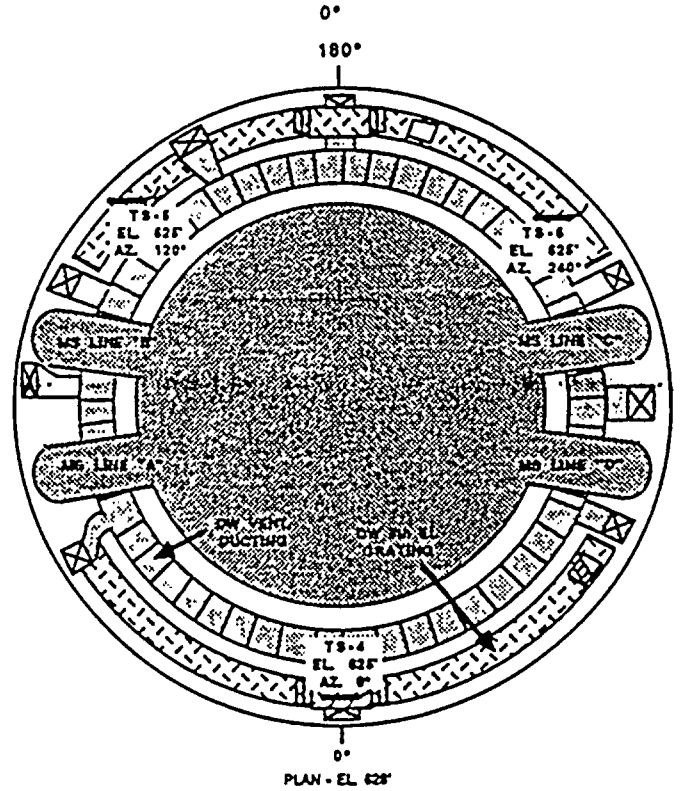
Compartment Volume Weights

Containment Compartment	Volume (ft^3)	Volumetric Weight
Drywell	164,170.18	0.545779
Torus	136,629.53	0.454221
Total Containment	300,799.71	1.000000

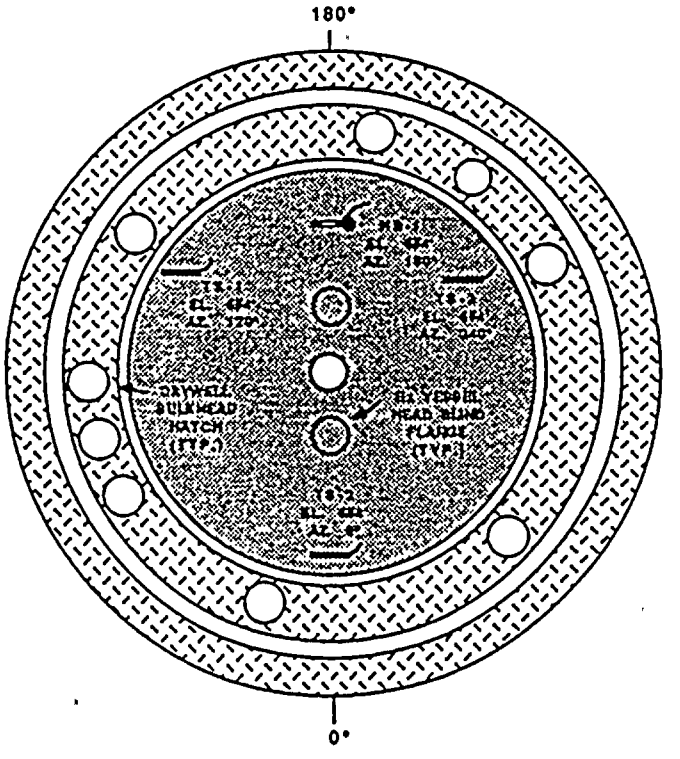
HS/TS Associations

Humidity Sensor	Temperature Sensor
HS 1	TS 1
HS 2	TS 7
HS 3	TS 13
HS 4	TS 17
HS 5	TS 22
HS 6	TS 26
HS 7	TS 29
HS 8	TS 30
HS 9	TS 32
HS 10	TS 34

Drywell Instrument Locations

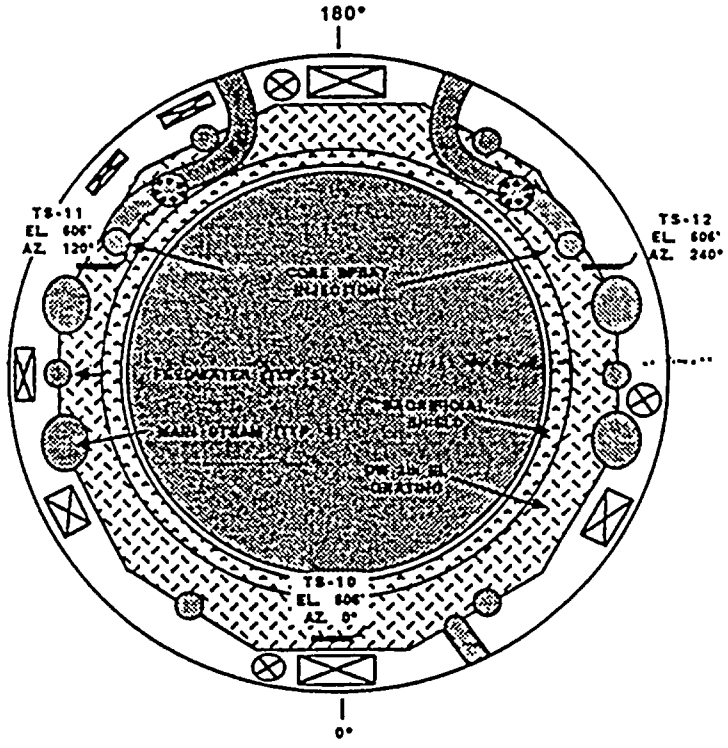


PLAN - EL 628'

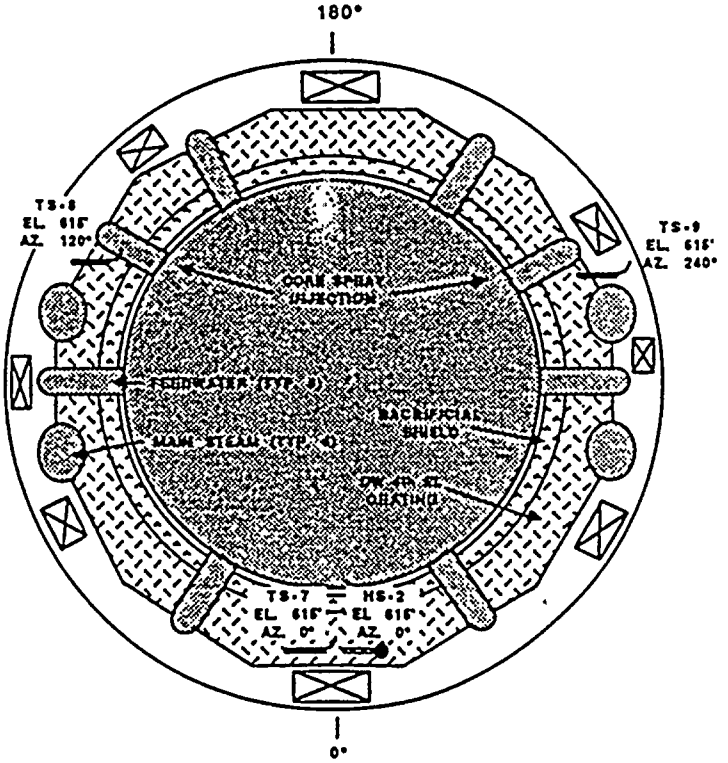


PLAN - EL 640'

Drywell Instrument Locations

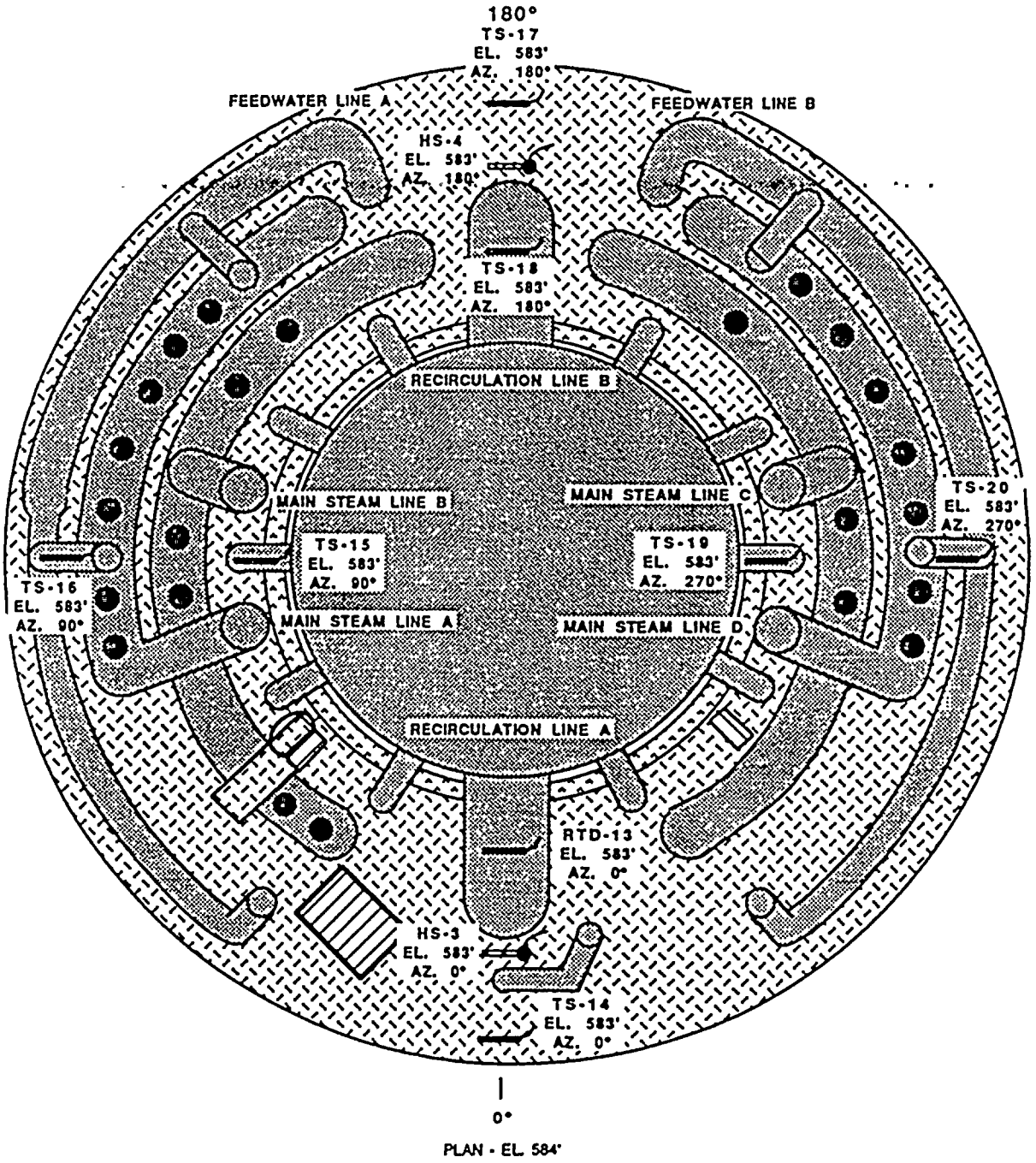


PLAN - EL 604'



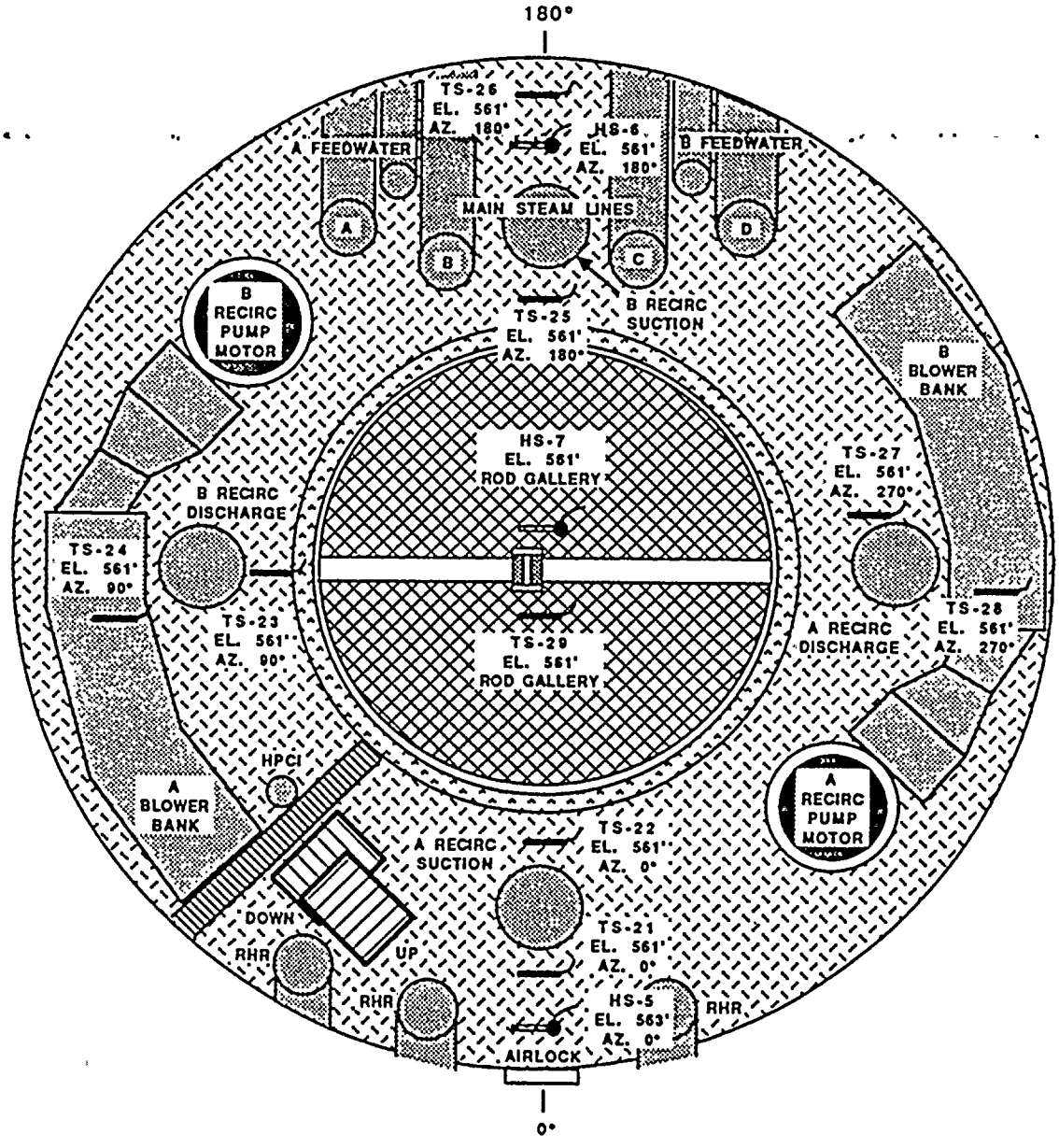
PLAN - EL 615'

Drywell Instrument Locations



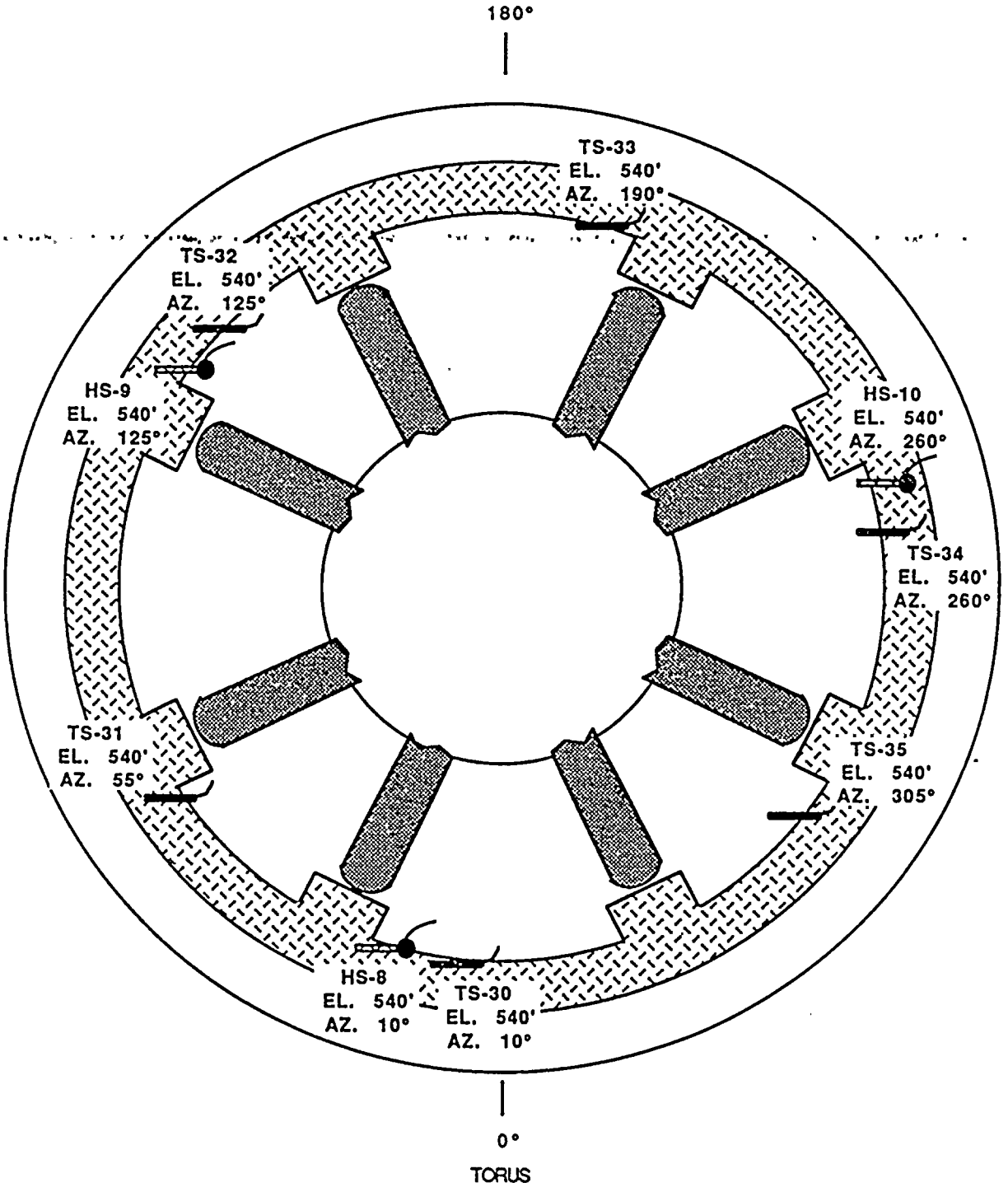
PLAN - EL. 584'

Drywell Instrument Locations



PLAN - EL. 563'

Torus Instrument Locations



APPENDIX K

INSTRUMENT SPECIFICATIONS

Measured Parameter	Manufacturer and Model No.	Number Used	Instrument Specifications
Containment Temperature	Graftel Model No. 9202 LT	30	Range: 0-114°F Accuracy: ±0.24°F Repeatability: 0.01°F
Containment Temperature	Graftel Model No. 9202	5	Range: 32-130°F Accuracy: ±0.24°F Repeatability: 0.01°F
Containment Relative Humidity	Graftel Model No. 9203	10	Range: 17-100% RH Accuracy: ±2°F dewpoint Repeatability: 0.1°F
Containment Pressure	Paroscientific Model No. 760-100A	4	Range: 0-100 psia Accuracy: ±0.015% F.S. Repeatability: ±0.005% F.S.
Verification Flow	Teledyne-Hastings Mass Flow Meter Model AHL-25	1	Range: 0-25 SCFM Accuracy: ±2% F.S. Repeatability ±0.5% F.S.
Atmospheric Temperature	Graftel Model No. 9202 LT	1	Range: 0-114°F Accuracy: ±0.24°F Repeatability: 0.01°F
Atmospheric Pressure	Paroscientific Model No. 760-100A	4	Range: 0-100 psia Accuracy: ±0.015% F.S. Repeatability: ±0.005% F.S.

APPENDIX L

Water Level Readings

CILRT Test Phase

Time	Reactor Vessel (2-L-3-55)	Suppression Chamber (2-L-64-54)	Drywell Floor Drain Sump	Drywell Equipment Drain Sump
1830	101.0	-6.5	13.0	18.0
1930	100.3	-6.6	13.0	18.0
2030	99.7	-6.6	13.0	18.0
2130	99.0	-6.7	13.0	18.0
2230	97.0	-6.9	13.0	18.0
2330	96.4	-6.9	13.0	18.0
0030	95.7	-6.9	13.0	19.0
0130	94.9	-7.0	13.0	19.0
0230	93.2	-7.0	13.0	19.0
0330	92.6	-7.0	13.0	19.0
0430	92.0	-7.0	13.0	19.0

Verification Test Phase

Time	Reactor Vessel (2-L-3-55)	Suppression Chamber (2-L-64-66)	Drywell Floor Drain Sump	Drywell Equipment Drain Sump
0530	91.0	-6.9	13.0	19.0
0630	89.1	-6.9	13.0	19.0
0730	88.2	-7.0	13.0	19.0
0830	87.7	-7.0	13.0	19.0
0930	86.7	-7.0	13.0	19.0
1030	85.0	-6.8	13.0	19.0
1130	84.3	-6.7	13.0	20.0

APPENDIX M

Summary of Local Leak Rate Tests

Introduction

Appendix J to 10 CFR 50 and BFN Technical Specifications (TS) require that the total leakage from all penetrations subject to type B and C testing be less than 0.60 L_a for return to power operations. In addition, TS 4.7.A.2.i requires that the main steam isolation valve leakage be less than 11.5 SCFH, and TS 4.7.A.2.g requires water-tested valves in the water seal system to provide a leakage limiting boundary which will ensure 30-day maintenance of the seal system inventory. TS 4.7.A.2.g also requires that water-tested valves in seismic Class I lines be tested and reported but not included in the leakage total. In the following listing, leak rates are given in SCFH for air/nitrogen-tested components, and in CFH for water-tested components. Water-tested valves in the seal system are denoted by "W" after the description,and water-tested valves in seismic Class I lines are denoted by "W/S". Valves which do not have these designations are air-tested valves.

Summary

These tests were conducted during the period from the cycle 4 CILRT until the cycle 6 CILRT. Testing was performed in accordance with plant-approved Surveillance Instructions 3-SI-4.7.A.2.g-1 through 3-SI-4.7.A.2.i.3/1.d.2, which are on file at the plant site. The Cycle 5 and Cycle 6 outage totals are summarized below. Individual component tests and leak rates are also listed.

The Unit 3, Cycle 6 shut down period began in March, 1985. Although it was BFN's in-house policy to perform As-Found leak rate tests, this practice was performed at that point in time to obtain information used for maintenance purposes, rather than obtaining leak rates for regulatory reporting. After the shutdown of Unit 3, it was anticipated that these As-Found tests would be performed prior to component maintenance. However, the lengthy delay of unit restart (ten and one-half years) resulted in deviations from normal practice, and not all components were tested prior to maintenance or modification. Therefore, an exact As-Found value for minimum path or maximum path total LLRT leakage is not available for the Unit 3, Cycle 6 shutdown period. However, since the unit only operated for about 3 months during Cycle 6 (November 28, 1984 to March 9, 1985) the, As Found maximum path value can be approximated as the As Left maximum path LLRT total from the previous refueling outage.

Leakage through the Main Steam System (system 01) primary containment isolation valves (measured by LLRT's) caused the Cycle 5 LLRT As Found total to exceed 0.6L_a.

Modifications performed on the Main Steam and Main Steam Drain isolation valves during the Cycle 5 and Cycle 6 outages should significantly improve the leakage performance of these valves as has been demonstrated by similar modificatrions on Unit 2.

Unit 3 Cycle 5

	As Found (Max.Path)	As Left (Max.Path)	T.S. Limit
Type B & C Total Leak Rate (SCFH)	5080.3905	116.1660	655.9 (60% L_a)
Seal System Total Leak Rate (CFH)	22.1512	0.3172	28.65

Unit 3 Cycle 6

	As Found (Max.Path)	As Left (Max.Path)	T.S. Limit
Type B &C Total Leak Rate (SCFH)	N/A	104.7270	655.9 (60% L_a)
Seal System Total Leak Rate (CFH)	N/A	0.9923	28.65

Type B Testing Summary

Personnel Air Lock

Penetration	Component Description	Leak Rate	Date Tested
X-2	Personnel Airlock	4.5573	01/23/83
		2.8467	09/07/83
		36.3709	10/14/84
		12.9469	10/19/84
		2.8602	11/27/84
		46.7044	12/16/84
		43.7000	02/13/85
		107.0159	04/13/85
		82.9788	04/13/85
		62.8054	08/21/86
		36.7216	11/06/95

Bellows

Penetration	Component Description	Leak Rate	Date Tested
X-7A	MS Line A Inboard Bellows	0.0000	05/30/84
		0.0002	07/19/95
	MS Line A Outboard Bellows	0.0000	05/30/84
		0.0000	07/19/95
X-7B	MS Line B Inboard Bellows	0.0000	05/30/84
		0.0013	07/19/95
	MS Line B Outboard Bellows	0.0005	05/30/84
		0.0009	07/19/95
X-7C	MS Line C Inboard Bellows	0.0000	05/24/84
		0.0009	07/20/95
	MS Line C Outboard Bellows	0.0005	05/24/84
		0.0005	07/20/95
X-7D	MS line D Inboard Bellows	0.0000	05/31/84
		0.0006	07/20/95
	MS Line D Outboard Bellows	0.0010	05/31/84
		0.0007	07/20/95
X-8	MS Drain Line Inboard Bellows	0.0003	05/30/84
		0.0001	07/21/95
	MS drain Line Outboard Bellows	0.0000	05/30/84
		0.0000	07/21/95
X-9A	A Feedwater Line Inboard Bellows	0.0001	05/31/84
		0.0000	07/21/95
	A Feedwater Line Outboard Bellows	0.0000	05/31/84
		0.0000	07/21/95

Penetration	Component Description	Leak Rate	Date Tested
X-9B	B Feedwater Line Inboard Bellows	0.0000	05/24/84
		0.0001	07/22/95
	B Feedwater Line Outboard Bellows	0.0000	05/24/84
		0.0001	07/22/95
X-10	RCIC Steam Supply Inboard Bellows	0.0003	05/31/84
		0.0001	07/22/95
	RCIC Steam Supply Outboard Bellows	0.0001	05/31/84
		0.0001	07/22/95
X-11	HPCI Steam Supply Inboard Bellows	0.0002	06/07/84
		0.0006	07/24/95
	HPCI Steam Supply Outboard Bellows	0.0003	06/07/84
		0.0001	07/24/95
X-12	RHR SDC Suction Inboard Bellows	0.0004	06/01/84
		0.0002	07/22/95
	RHR SDC Suction Outboard Bellows	0.0004	06/01/84
		0.0002	07/22/95
X-13A	RHR LPCI Inboard Bellows	0.0000	06/01/84
		0.0005	07/22/95
	RHR LPCI Outboard Bellows	0.0000	06/01/84
		0.0002	07/22/95
X-13B	RHR LPCI Inboard Bellows	0.0000	05/31/84
		0.0005	07/22/95
	RHR LPCI Outboard Bellows	0.0000	05/31/84
		0.0012	07/22/95
X-14	RWCU Suction Inboard Bellows	0.0001	06/03/84
		0.0001	07/25/95
	RWCU Suction Outboard Bellows	0.0002	06/03/84
		0.0000	07/25/95

Penetration	Component Description	Leak Rate	Date Tested
X-16A	CS Injection Inboard Bellows	0.0002	06/02/84
		0.0000	07/24/95
	CS Injection Outboard Bellows	0.0001	06/02/84
		0.0000	07/24/95
X-16B	CS Injection Inboard Bellows	0.0003	06/01/84
		0.0010	07/24/95
	CS Injection Outboard Bellows	0.0001	06/01/84
		0.0008	07/24/95
X-17[1]	RHR Head Spray Inboard Bellows	0.0001	06/01/84
	RHR Head Spray Outboard Bellows	0.0001	06/01/84

1 Bellows and line removed and penetration sealed during Cycle 6 outage

Electrical Penetrations

Penetration	Component Description	Leak Rate	Date Tested
X-100A	I&C Electrical Penetration	0.0229	09/16/83
		0.0234	05/18/84
		0.0077	07/28/95
X-100B	Neutron monitor Electrical Penetration	0.0229	09/16/83
		0.0467	05/18/84
		0.0385	07/26/95
X-100C	Neutron monitor Electrical Penetration	0.0245	09/18/83
		0.0375	05/19/84
		0.0556	07/28/95
X-100D	Neutron monitor Electrical Penetration	0.0000	09/18/83
		0.0876	05/19/84
		0.0062	07/28/95
X-100E	Neutron monitor Electrical Penetration	0.0305	09/18/83
		0.0000	05/19/84
		0.0309	07/28/95
X-100F	Neutron monitor Electrical Penetration	0.0000	09/18/83
		0.0376	05/18/84
		0.0371	07/28/95
X-100G	Neutron monitor Electrical Penetration	0.0230	09/17/83
		0.0779	05/18/84
		0.0309	09/17/95
X-101A	RCP POWER Electrical Penetration	0.0789	05/20/84
		0.0000	09/07/95
X-101B	RCP POWER Electrical Penetration	0.0813	05/20/84
		0.0187	07/27/95
X-101C	RCP POWER Electrical Penetration	0.0228	09/17/83
		0.0287	05/20/84
		0.0000	05/22/84
		0.0356	11/02/95

Penetration	Component Description	Leak Rate	Date Tested
X-101D	RCP POWER Electrical Penetration	0.0000	09/17/83
		0.0330	05/20/84
		0.0000	07/27/95
X-102	Thermocouple Electrical Penetration	0.0076	09/16/83
		0.0547	05/18/84
		0.0154	07/25/95
X-103	CRD Pos. Ind. Electrical Penetration	0.0123	09/18/83
		0.0313	05/18/84
		0.0371	07/28/95
X-104A	I&C Electrical Penetration	0.0194	09/17/83
		0.0198	05/18/84
		0.0196	07/26/95
X-104B	CRD Pos. Ind. Electrical Penetration	0.0129	09/18/83
		0.0527	05/18/84
		0.0261	07/25/95
X-104C	Neutron Monitor Electrical Penetration	0.0000	09/16/83
		0.0659	05/17/84
		0.0391	07/26/95
X-104D	Thermocouple Electrical Penetration	0.0061	09/18/83
		0.0000	05/23/84
		0.0031	07/28/95
X-104E	I&C Electrical Penetration	0.0257	09/18/83
		0.0133	05/19/84
		0.0000	07/28/95
X-104F	I&C Electrical Penetration	0.0000	09/18/83
		0.0001	05/19/84
		0.0001	07/28/95
X-105B	RCP POWER Electrical Penetration	0.0125	05/20/84
		0.0000	07/27/95
X-105C	RCP POWER Electrical Penetration	0.0000	09/18/83
		0.0389	05/20/84
		0.0000	07/27/95

Penetration	Component Description	Leak Rate	Date Tested
X-106A	CRD Pos. Ind. Electrical Penetration	0.0000	09/17/83
		0.0467	05/18/84
		0.0540	07/26/95
X-106B	Neutron Monitor Electrical Penetration	0.0152	09/16/83
		0.0078	05/17/84
		0.0232	07/25/95
X-107A	Neutron Monitor Electrical Penetration	0.0305	09/16/83
		0.0701	05/17/84
		0.0000	07/26/95
X-107B	Neutron Monitor Electrical Penetration	0.0299	09/16/83
		0.0382	05/17/84
		0.0680	07/26/95
X-108A	Power Electrical Penetration	0.0000	09/18/83
		0.0001	05/22/84
		0.0001	07/27/95
X-108B	CRD Pos. Ind. Electrical Penetration	0.0129	09/18/83
		0.0659	05/18/84
		0.0325	07/28/95
X-109	CRD Pos. Ind. Electrical Penetration	0.0129	09/16/83
		0.0000	05/22/84
		0.0131	07/26/95
X-110A	Power Electrical Penetration	0.0064	09/17/83
		0.0329	05/22/84
		0.0131	07/27/95
X-110B	CRD Pos. Ind. Electrical Penetration	0.0185	09/18/83
		0.0627	05/18/84
		0.0185	07/28/95
X-219	PSC Vacuum Breaker Electrical Penetration	0.0001	05/22/84
		0.0001	07/27/95

Resilient Seals

Penetration	Component Description	Leak Rate	Date Tested
X-1A	Equipment Hatch	0.4746	09/08/83
		0.0093	10/10/95
X-1B	Equipment Hatch	0.0275	09/08/83
		0.0016	09/14/84
		0.0011	10/08/95
X-4	DW Head Access Hatch	0.0000	07/11/84
		0.0007	09/30/95
X-6	CRD Hatch	0.1981	09/15/83
		0.0002	09/11/84
		0.0004	10/10/95
X-35A	TIP Indexer Flange	0.0000	05/21/84
		0.0000	09/14/84
		0.0001	08/06/95
X-35B	TIP Indexer Flange	0.0000	05/21/84
		0.0001	08/06/95
X-35C	TIP Indexer Flange	0.0000	05/21/84
		0.0000	09/07/84
		0.0000	09/14/84
		0.0001	08/06/95
X-35D	TIP Indexer Flange	0.0000	05/21/84
		0.0001	08/06/95
X-35E	TIP Indexer Flange	0.0000	05/21/84
		0.0001	08/06/95
X-35F	TIP Indexer Purge Flange	0.0001	05/21/84
		0.0000	09/07/84
		0.0000	09/14/84
		0.0001	08/06/95
X-35G	Spare	0.0001	05/21/84
		0.0000	09/07/84
		0.0001	08/06/95

Penetration	Component Description	Leak Rate	Date Tested	
X-47	Power Operations Test Flange	0.0000	06/03/84	
		0.0003	10/10/95	
X-200A	Torus Access Hatch	0.0042	09/12/83	
		0.0000	09/15/84	
		0.0007	11/06/95	
X-200B	Torus Access Hatch	0.0000	09/12/83	
		0.0002	09/10/84	
		0.0003	09/30/95	
X-213A[1]	Torus Drain Flange	0.0001	09/15/83	
		0.0037	05/05/84	X
		0.0000	10/15/84	
		0.0000	09/30/95	
N/A	Drywell Head	0.0516	09/08/83	
		0.0268	09/23/84	
		0.0282	11/05/95	
N/A	Shear Lug @ 0° Azmith	0.0004	06/03/84	
		0.0009	09/28/95	
N/A	Shear Lug @ 45° Azmith	0.0001	06/03/84	
		0.0000	09/28/95	
N/A	Shear Lug @ 90° Azmith	0.0000	06/03/84	
		0.0008	09/28/95	
N/A	Shear Lug @ 135° Azmith	0.0000	06/04/84	
		0.0015	09/28/95	
N/A	Shear Lug @ 180° Azmith	0.0000	06/04/84	
		0.0000	09/28/95	
N/A	Shear Lug @ 225° Azmith	0.0000	06/04/84	
		0.0022	09/28/95	

1 Flange seal-welded during Cycle 6 outage

Penetration	Component Description	Leak Rate	Date Tested
N/A	Shear Lug @ 270° Azmith	0.0000	06/03/84
		0.0000	09/28/95
N/A	Shear Lug @ 315° Azmith	0.0000	06/03/84
		0.0026	09/28/95

Type C Testing Summary

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-7A	3-FCV-1-14/15	"A" Main Steam Line MSIVs	2615.5389	09/17/83
			6.8072	06/07/84
			7.9440	06/17/84
			0.0000	10/18/95
X-7B	3-FCV-1-26/27	"B" Main Steam Line MSIVs	7.0563	09/18/83
			7.8765	05/15/84
			7.0845	05/15/84
			5.2861	10/33/95
X-7C	3-FCV-1-37/38	"C" Main Steam Line MSIV'S	37.5728	09/18/83
			3.7306	05/25/84
			2.2638	10/18/95
	3-FCV-1-37	"C" Main Steam Line I.B. MSIV	2.2049	03/14/84
	3-FCV-1-38	"C" Main Steam Line O.B. MSIV	35.3679	03/14/84
			1.5126	05/25/84
X-7D	3-FCV-1-51/52	"D" Main Steam Line MSIVs	2652.7217	09/18/83
			9.7966	05/31/84
			0.1246	10/25/95
	3-FCV-1-51	"D" Main Steam Line I.B. MSIV	5.4108	05/31/84
			5.4108	11/02/84
	3-FCV-1-52	"D" Main Steam Line O.B. MSIV	4.3858	05/31/84
X-8	3-FCV-1-55/56	Main Steam Drain Isolation Valves	139.5777	09/01/83
			0.0000	07/02/84
	3-FCV-1-55	Main Steam Drain I.B. Isolation Valve	0.0000	10/07/95
	3-FCV-1-56	Main Steam Drain O.B. Isolation Valve	0.0000	10/07/95

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-9A	3-CKV-3-558	"A" Feedwater O.B. Isolation Valve	9.1154 11.2151 6.2849	02/16/84 09/07/84 09/14/95
	3-CKV-3-554	"A" Feedwater I.B. Isolation Valve	0.0000 8.3457	02/16/84 09/07/84
	3-FCV-73-44[1]	HPCI Tie-in to "A" Feedwater O.B. Isolation Valve	1.5643 0.0000	02/17/84 09/08/84
	3-FCV-73-45	HPCI Tie-in to "A" Feedwater O.B. Isolation Valve	0.0000 8.3457 7.7180	02/16/84 09/07/84 09/18/95
	3-CKV-69-624	Reactor Water Clean-up Return Tie-in To "A" Feedwater O.B. Isolation Valve	0.0000 0.0000	02/17/84 09/09/84
	3-CKV-69-628[2]	Reactor Water Clean-up Return Tie-in To "A" Feedwater O.B. Isolation Valve	0.0000	09/18/95
X-9B	3-CKV-3-572	"B" Feedwater O.B. Isolation Valve	1.9320 3.3576	04/26/84 09/20/95
	3-CKV-3-568	"B" Feedwater I.B. Isolation Valve	6.5900 0.0006	04/26/84 09/20/95
	3-CKV-69-579	Reactor Water Clean-up Return Tie-in To "B" Feedwater O.B. Isolation Valve	2.3979	04/26/84
	3-FCV-71-39[3]	RCIC Tie-in to "B" Feedwater O.B. Isolation Valve	0.0000	04/26/84

1 Isolation valve designation removed during cycle 6 outage.
2 New designated isolation valve replaced 3-CKV-69-624 during cycle 5 outage.
3 Isolation valve designation removed during cycle 6 outage.

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-9B (cont.)	3-CKV-69-629[1]	Reactor Water Clean-up Return Tie-in To "B" Feedwater O.B. Isolation Valve	0.5302	09/20/95
	3-FCV-71-40	RCIC Tie-in to "B" Feedwater O.B. Isolation Valve	6.5900 0.0000	04/26/84 09/20/95
	3-CKV-85-576	CRD Return Tie-in to "B" Feedwater O.B. Isolation Valve	0.1940	04/26/84
X-10	3-FCV-71-2/3	RCIC Steam Supply Isolation Valves	0.2529 26.2549 0.1219 0.0000	09/17/83 05/17/84 06/13/84 10/08/95
X-11	3-FCV-73-2/3 /81	HPCI Steam Supply Isolation Valves	2.2129 0.0000 0.9155	09/18/83 05/17/84 11/01/95
X-12	3-FCV-74-47	RHR Shutdown Cooling Suction I.B. Isolation Valve	1.2465 0.0000	03/21/84 09/13/95
	3-FCV-74-48	RHR Shutdown Cooling Suction O.B. Isolation Valve	0.0000 2.3629	03/21/84 09/13/95
	3-CKV-74-661/ 662	RHR Shutdown Cooling Suction Bypass Isolation Valve	0.0000 0.1296	03/21/84 09/13/95
X-13A	3-FCV-74-53	RHR Loop 1 LPCI O.B. Isolation Valve (W/S)	0.0630 0.0225 0.0788	09/10/84 11/08/84 08/31/95
	3-FCV-74-54	RHR Loop 1 LPCI I.B. Isolation Valve (W/S)	44.1899 2.0409 1.4516 0.6750	01/18/84 04/19/84 10/08/84 08/31/95

1 New designated isolation valve replaced 3-CKV-69-579 and 3-CKV-85-576 during cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-13B	3-FCV-74-67	RHR Loop 2 LPCI O.B. Isolation Valve (W/S)	0.1017	01/18/84
			2.7000	03/24/84
			0.0158	09/18/84
			0.0225	08/29/95
	3-FCV-74-68	RHR Loop 2 LPCI I.B. Isolation Valve (W/S)	40.5000	01/17/84
			3.6269	01/31/84
			27.0000	09/18/84
			0.3555	09/30/84
			0.1238	08/29/95
X-14	3-FCV-69-1	Reactor Water Cleanup I.B. Isolation Valve	0.3703	09/08/83
			5.3323	06/05/84
			0.0000	09/20/95
	3-FCV-69-2	Reactor Water Cleanup O.B. Isolation Valve	0.3703	09/08/83
			1.2583	06/05/84
			2.5378	09/20/95
X-16A	3-FCV-75-25	CS Loop 1 Injection O.B. Isolation Valve (W/S)	0.0141	02/15/84
			0.1377	09/09/84
			0.0281	05/24/95
	3-FCV-75-26	CS Loop 1 Injection I.B. Isolation Valve (W/S)	40.5000	02/15/84
			0.2295	02/17/84
			1.0506	09/09/84
			0.0169	05/24/95
X-16B	3-FCV-75-53	CS Loop 2 Injection O.B. Isolation Valve (W/S)	0.0000	03/07/84
			0.0180	09/07/84
			0.0028	06/07/95
X-16B	3-FCV-75-54	CS Loop 2 Injection I.B. Isolation Valve (W/S)	0.0018	03/07/84
			0.0247	09/07/84
			2.1131	09/14/95
X-17[1]	3-FCV-74-77/78	RHR Head Spray	0.0000	03/29/84
X-18	3-FCV-77-2A/ 2B	Drywell Floor Drain Sump Isolation Valves	0.3243	09/18/83
			0.0000	05/20/84

1 Line Removed and Sealed during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-18 (cont.)	3-FCV-77-2A	Drywell Floor Drain Sump I.B. Isolation Valve	4.0333	10/07/95
	3-FCV-77-2B	Drywell Floor Drain Sump O.B. Isolation Valve	0.7329	10/07/95
X-19	3-FCV-77-15A/ 15B	Drywell Floor Drain Sump Isolation Valves	0.0584 0.0000	09/18/83 05/20/84
	3-FCV-77-15A	Drywell Equipment Sump Drain I.B. Isolation Valve	0.1461	10/06/95
	3-FCV-77-15B	Drywell Equipment Drain Sump O.B. Isolation Valve	0.0000	10/06/95
X-20	3-ISV-2-1192	Demin. Water I.B. Isolation Valve	0.5594 0.9099	09/11/83 09/10/95
	3-CKV-2-1383	Demin. Water O.B. Isolation Valve	0.0000 0.0000	09/11/83 09/10/95
X-21	3-CKV-33-785	Service Air I.B. Isolation Valve	0.0381 0.1400 0.0000	09/11/83 05/18/84 09/24/95
	3-ISV-33-1070	Service Air O.B. Isolation Valve	0.0042 0.0000 0.6627	09/12/83 05/18/84 09/24/95
X-22	3-CKV-32-336	Control Air I.B. Isolation Valve	0.0000 1.2168	05/18/84 09/17/95
	3-CKV-32-2163	Control Air O.B. Isolation Valve	0.0000 0.0000	05/18/84 09/16/95
	3-FSV-84-49/[1] 686	Containment Atmosphere Dilution Tie-in to Control Air	0.1574	09/17/95
X-23	3-FCV-70-47[2]	Reactor Building Closed Cooling Water Isolation Valve	0.0000	09/18/95

1 Valves added during Cycle 6 outage.
2 Valves added to test program during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-24	3-CKV-70-506[1]	Reactor Building Closed Cooling Water Isolation Valve	4.7043	09/18/95
X-25	3-FCV-64-18	Ventilation Supply Isolation Valve	0.0002	09/19/84
	Flange	I.B. Flange	0.0002	09/21/95
	3-FCV-76-18	Drywell Inerting Supply	0.0000	05/23/84
	Flange	Isolation Valve I.B. Flange	0.0004	09/07/95
	3-FSV-84-8A	Flange[2]	0.0000	06/04/84
	3-FSV-84-8D	Flange[2]	0.0000	06/04/84
	3-FSV-84-8A/600[3]	CAD Isolation Valves	132.0000	09/12/83
			0.0000	10/02/84
	3-FSV-84-8A	CAD I.B. Isolation Valve	0.0340	08/09/95
	3-CKV-84-600	CAD O.B. Isolation Valve	0.0166	08/09/95
	3-FSV-84-8D/602[3]	CAD Isolation Valves	132.0000	09/12/83
			1.7143	10/04/84
	3-FSV-84-8D	CAD I.B. Isolation Valve	0.0031	08/09/95
	3-CKV-84-602	CAD O.B. Isolation Valve	0.0200	08/09/95
X-25/205	3-FCV-64-17/18/19/76-24	Ventilation Supply Isolation Valves	4.7941	09/13/83
			6.8909	09/26/84
			3.8101	09/21/95
	3-FCV-76-17/18/19	Containment Inerting Supply Isolation Valves	0.0000	09/13/83
			0.00000	05/05/84
			0.0000	06/06/84
			0.2346	09/21/95

1 Valves added to test program during Cycle 6 outage
2 Valve arrangement modified during Cycle 6 outage. Flange no longer tested.
3 Modification Performed to allow valves to be individually tested during Cycle 6.

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-26	3-FCV-64-29 Flange	Ventilation Exhaust Isolation Valve I.B. Flange	0.0028 0.1589 0.0000	09/08/84 09/08/84 10/09/95
X-26	3-FCV-64-31 Flange	Ventilation Exhaust Isolation Valve I.B. Flange	0.0000 0.0000 0.0001	09/08/84 10/04/84 09/21/95
X-26/ 231	3-FCV-64-29/ 30/32/33/84-19	Ventilation Exhaust Isolation Valves	86.8340 23.7464 3.7297	09/14/83 10/13/84 10/09/95
	3-FCV-64-31/34 /139/140/84-20	Ventilation Exhaust Isolation Valves	4.0922 7.2047 3.9963	09/13/83 10/05/84 10/26/95
X-27E	23-FSV-76-51[1]	H_2O_2 Sampling I.B. Isolation Valve	0.0000 0.0081	09/19/83 05/22/84
	23-FSV-76-52[1]	H_2O_2 Sampling I.B. Isolation Valve	0.0000 0.0081	09/19/83 05/22/84
X-27F	23-FSV-76-49	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Drywell Sample)	0.0000 0.0000 0.0000	09/19/83 05/22/84 10/08/95
	3-FSV-76-50	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Drywell Sample)	0.0000 0.0000	09/19/3 10/08/95
X-35A	3-FCV-94-501	TIP Isolation Valve	1.5518 0.0986 0.0993	05/21/84 10/10/84 08/08/95
X-35B	3-FCV-94-502	TIP Isolation Valve	0.9330 0.2780	05/21/84 08/07/95
X-35C	3-FCV-94-503	TIP Isolation Valve	4.9355 0.0000	05/21/84 10/10/84
			0.0664	08/07/95

1 Valves removed during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-35D	3-FCV-94-504	TIP Isolation Valve	0.0000	05/21/84
			0.0081	08/07/95
X-35E	3-FCV-94-505	TIP Isolation Valve	0.0000	05/21/84
			0.0396	08/07/95
X-35F	3-CKV-76-234	TIP Nitrogen Purge Isolation Valve	0.8886	05/21/84
			0.0000	10/10/84
	3-CKV-76-653[1]	TIP Nitrogen Purge Isolation Valve	0.0003	08/06/95
X-37C	3-CKV-68-508	CRD Seal Water to RCP "A" I.B. Isolation Valves	0.9957	09/17/83
			0.0000	03/13/84
			0.0000	09/08/84
			0.0000	09/11/95
	3-CKV-68-550	CRD Seal Water to RCP "A" O.B. Isolation Valves	401.7110	09/17/83
			0.0000	03/13/84
			0.0000	09/08/84
			0.0000	09/11/95
X-38C	3-CKV-68-523	CRD Seal Water to RCP "B" I.B. Isolation Valves	19.7078	09/17/83
			0.0000	03/13/44
			0.0000	09/08/84
			0.0000	09/09/95
	3-CKV-68-555	CRD Seal Water to RCP "B" O.B. Isolation Valves	73.6851	09/17/83
			0.0000	03/13/44
			0.0000	09/08/84
			0.0000	09/09/95
X-39A	3-FCV-74-74/75[2]	RHR Loop 2 Containment Spray Isolation Valves	0.0900	03/23/84
	3-FCV-74-74	RHR Loop 2 Containment Spray O.B. Isolation Valve (W/S)	0.0141	08/24/95
	3-FCV-74-75	RHR Loop 2 Containment Spray I.B. Isolation Valve (W/S)	0.2588	08/24/95

1 Valve 3-CKV-76-234 replaced by CKV-76-653 during Cycle 6 outage.
2 Test method tested valves separately during Cycle 6 outage.

Penetration	Valve No.	Description	Leak Rate	DateTested
X-39B	3-FCV-74-60/61[1]	RHR Loop 1 Containment Spray O.B. Isolation Valve (W/S)	2.0083	04/19/84
X-39B	3-FCV-74-60	RHR Loop 1 Containment Spray O.B. Isolation Valve (W/S)	0.0619	09/29/95
	3-FCV-74-61	RHR Loop 1 Containment Spray I.B. Isolation Valve (W/S)	0.8571	09/29/95
X-40B-B	3-FSV-43-70[2]	Post-Accident Sampling Isolation Valve.	0.0000	10/17/95
X-41	3-FCV-43-13	RCP Sample I.B. Isolation Valve	0.3614 0.4218	03/29/84 10/08/95
	3-FCV-43-14	RCP Sample O.B. Isolation Valve	0.5477 0.0000	03/29/84 10/03/95
X-42	3-CKV-63-525	Standby Liquid Control I.B. Isolation Valve	0.0000 0.5763	03/21/84 07/28/95
	3-CKV-63-526	Standby Liquid Control O.B Isolation Valve	0.0000 0.7608	03/21/84 07/12/95
X-48	3-FCV-32-62/63	Drywell Control Air Suction Isolation Valves	0.0000 1.2271	03/28/84 09/05/95
X-50A/D	3-FSV-90-254A/254B/255[3]	Radiation Monitoring Suction Isolation Valves	0.0000 0.0514	09/11/83 05/17/84
	3-FSV-90-254A	Radiation Monitoring Suction I.B. Isolation Valve	0.0000	09/15/95
	3-FSV-90-254B	Radiation Monitoring Suction I.B. Isolation Valve	0.0000	09/15/95

1 Test method tested valves separately during Cycle 6 outage.
2 Valve added during Cycle 6 outage.
3 Valves replaced with new valves during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-50A/D (cont.)	3-FSV-90-255	Radiation Monitoring Suction O.B. Isolation Valve	0.0000	09/15/95
X-50B	3-CKV-32-2516[1]	Control Air I.B. Isolation Valve	0.4300	09/14/95
	3-CKV-32-2521[1]	Control Air O.B. Isolation Valve	0.0000	09/14/95
	3-FSV-84-48/683[1]	Containment Atmosphere Dilution Tie-in to Control Air	0.1006	09/14/95
X-50C	3-FSV-90-257A/257B[2]	Radiation Monitoring Return O.B. Isolation Valve	0.4217 0.4161	09/11/83 05/17/84
	3-FSV-90-257A	Radiation Monitoring Return O.B. Isolation Valve	0.0000	09/15/95
	3-FSV-90-257B	Radiation Monitoring Return I.B. Isolation Valve	0.0000	09/15/95
X-52B	3-FSV-76-59	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Drywell Sample)	0.0000 0.0000 0.0000	09/19/83 06/21/84 08/15/95
	3-FSV-76-60	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Drywell Sample)	0.0000 0.0000 0.0051	09/19/83 06/21/84 08/15/95
X-52C	3-FCV-76-61	H_2O_2 Sampling I.B. Isolation Valve (Analyzer B, Drywell Sample)	0.0000 0.0000	09/19/83 06/21/84
	3-FCV-76-62	H_2O_2 Sampling O.B. Isolation Valve (Analyzer B, Drywell Sample)	0.0000 0.0000	09/19/83 06/21/84
X-205	3-FCV-64-19	Ventilation Supply Isolation Valve I.B. Flange	0.0000 0.0000 0.0001	09/08/84 10/04/84 09/21/95

1 Valve added during Cycle 6 outage.
2 Valves replaced with new valves during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-205 (cont.)	3-FCV-64-20/ 800	Reactor Building-to-Torus Vacuum Breaker Isolation Valves	0.0000 0.0000 1.0749	09/13/83 09/10/84 10/01/95
	3-FCV-64-20	Reactor Building-to-Torus Vacuum Breaker Isolation Valve I.B. Flange	0.0000 0.0000	09/06/84 10/01/95
	3-FCV-64-21/ 801	Reactor Building-to-Torus Vacuum Breaker Isolation Valves	0.0000 0.3268 0.0000	09/13/83 09/18/84 10/20/95
	3-FCV-64-21	Reactor Building-to-Torus Vacuum Breaker Isolation Valve I.B. Flange	0.0024 0.0000	09/06/84 10/20/95
	3-FCV-64-221/ 222[1]	Hardened Wetwell Vent Isolation Valves	1.7670	08/26/95
	3-FCV-64-222[1]	Hardened Wetwell Vent I.B. Isolation Valve Flange	0.0000	08/26/95
	3-FCV-76-19 Flange	Torus Inerting Supply Isolation Valve I.B. Flange	0.0000 0.0000	05/23/84 09/07/95
	3-FSV-84-8B/[2] 601	CAD Isolation Valves	0.0000 0.0000	09/12/83 10/08/84
	3-FSV-84-8B	CAD I.B. Isolation Valve	0.0672	08/09/95
	3-CKV-84-601	CAD O.B. Isolation Valve	0.0148	08/09/95
	3-FSV-84-8C/[2] 603	CAD Isolation Valves	0.0000 0.0701 0.1253	09/12/83 10/02/84 10/08/84
	3-FSV-84-8C	CAD I.B. Isolation Valve	0.2750	08/09/95
	3-CKV-84-603	CAD O.B. Isolation Valve	0.0064	08/09/95

1 Line and valves added during Cycle 6 outage
2 Modification performed to allow valves to be individaully tested during Cycle 6.

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-205	3-FSV-84-8B[1]	Flange	0.0000	06/07/84
			0.0000	10/08/84
	3-FSV-84-8C[1]	Flange	0.0000	06/04/84
			0.0000	09/28/84
			0.0000	10/15/84
X-210A	3-CKV-12-738[2]	Auxiliary Boiler Tie-in to torus I.B. Isolation Valve (W)	0.0079	09/11/83
			0.0073	05/19/84
	3-CKV-12-741[2]	Auxiliary Boiler Tie-in to torus O.B. Isolation Valve (W)	0.0152	09/11/85
			0.0076	05/19/84
X-210A	3-FCV-71-34[3]	RCIC Minimum Flow I.B. Isolation Valve (W)	0.0000	09/06/95
X-210A	3-CKV-71-547[3]	RCIC Minimum Flow O.B. Isolation Valve (W)	0.0000	09/06/95
X-210B	3-FCV-73-30[3]	HPCI Minimum Flow I.B. Isolation Valve (W)	0.0000	09/24/95
	3-CKV-73-559[3]	HPCI Minimum Flow O.B. Isolation Valve (W)	0.0000	09/24/95
X-211A	3-FCV-74-57/ 58/59	RHR Loop 1 Torus Spray Isolation Valves (W/S)	37.3846	11/19/83
			0.0900	11/20/83
			0.0630	05/31/84
			0.3853	09/26/95
X-211B	3-FCV-74-71/ 72/73	RHR Loop 2 Torus Spray Isolation Valves (W/S)	0.5175	11/06/83
			0.2412	06/06/84
			3.3986	08/25/95
X-212	3-HCV-71-14/ 580	RCIC Turbine Exhaust Isolation Valves	8.5263	09/13/83
			0.0072	09/06/84
			3.5470	09/06/95

1 Valve arrangement modified during Cycle 6 outage. Flange no longer tested.
2 Valves removed and line permanently terminated during Cycle 6 outage.
3 Added to test program during Cycle 6 outage.

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-212 (cont.)	3-HCV-71-14[1] Bonnet	RCIC Turbine Exhaust I.B. Isolation Valve Bonnet Flange	0.0000	09/06/95
	3-HCV-71-14[1] Packing	RCIC Turbine Exhaust I.B. Isolation Valve Packing	0.0000	09/06/95
X-213B	3-ISV-74-722	Torus Drain Isolation Valve (W)	2.9847 0.0699	09/12/83 05/05/84
	3-ISV-74-722[1] Flange	Torus Drain Isolation Valve Blind Flange (W)	0.1260	09/11/95
X-214	3-ISV-73-23/ 603	HPCI Turbine Exhaust Isolation Valves	16.2000 0.3375 0.1635 7.9192	09/14/83 01/09/84 09/08/84 09/19/95
	3-ISV-73-23[1] Bonnet	HPCI Turbine Exhaust I.B. Isolation Valve Bonnet	0.0000	09/19/95
	3-ISV-73-23[1] Packing	HPCI Turbine Exhaust I.B. Isolation Valve Packing	0.0000	11/07/95
X-218	3-FCV-71-59/[1] 597/598/ 599/600/601 Bonnet & Packing	RCIC Turbine Exhaust Vacuum Breaker Line Valves Bonnet/Packing	0.0000	09/17/95
X-220	3-FCV-73-64/[1] 633/634/ 635/636/642 Bonnet & Packing	HPCI Turbine Exhaust Vacuum Breaker Line Valves Bonnet/Packing	0.0000	09/17/95
X-221	3-SHV-71-32/ 592	RCIC Vacuum Pump Discharge Isolation Valves (W)	0.0076 0.0563 0.0038	09/13/83 05/20/84 09/15/95
	3-SHV-71-32[1] Bonnet & Packing	RCIC Vacuum Pump Discharge I.B. Isolation Valve Bonnet and Packing	0.0000	09/15/95

1 Added to test program during Cycle 6 outage.

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-222	3-ISV-73-24/ 609	HPCI Turbine Exhaust Drain Isolation Valves	0.0113 0.0000 0.0492	09/14/83 05/20/84 08/21/95
X-222 (cont.)	3-ISV-73-24[1] Bonnet & Packing	HPCI Turbine Exhaust Drain I.B. Isolation Valve Bonnet and Packing	0.0000	11/07/95
X-225A	3-FSV-43-28A[2]	RHR Sample I.B. Isolation Valve	0.0051 0.0000	09/13/83 05/19/84
	3-FSV-43-28B[2]	RHR Sample O.B. Isolation Valve	0.0000 0.0000	09/13/83 05/19/84
X-225B	3-FSV-43-29A[2]	RHR Sample I.B. Isolation Valve	0.0030 0.0038	09/13/83 05/19/84
	3-FSV-43-29B[2]	RHR Sample O.B. Isolation Valve	0.0000 0.0127	09/13/83 05/19/84
X-226	3-FCV-73-26[1]	HPCI Torus Suction I.B. Isolation Valve (W)	0.7033	10/17/95
	3-FCV-73-27[1]	HPCI Torus Suction O.B. Isolation Valve (W)	0.7594	10/17/95
X-227A	3-FCV-71-17[1]	RCIC Torus Suction I.B. Isolation Valve (W)	0.0000	09/10/95
	3-FCV-71-18[1]	RCIC Torus Suction O.B. Isolation Valve (W)	0.0126	10/05/95
	3-FCV-75-57/58	CS Torus Drain Isolation Valves (W)	0.0135 0.0000 0.0000 0.0338	02/17/84 02/17/84 09/09/84 08/22/95

1 Added to test program during Cycle 6 outage.
2 Isolation boundary changed, valve removed from program during Cycle 6 Outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-228	3-HCV-2-1143[1]	Demin. Water to Torus	0.0438	09/11/83
X-229A[2]	3-FSV-76-57[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Sample Return to Torus)	0.1541	09/12/95
	3-FSV-76-58[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Sample Return to Torus)	0.0000	09/12/95
X-229B[2]	3-FSV-76-57[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Sample Return to Torus)	0.0000	06/03/84
	3-FSV-76-58[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Sample Return to Torus)	0.0000	06/03/84
X-229C	3-FSV-76-53[4]	H_2O_2 Sampling I.B. Isolation Valve	0.0000	06/03/84
	3-FSV-76-54[4]	H_2O_2 Sampling O.B. Isolation Valve	0.0000	06/03/84
X-229D[5]	3-FSV-76-55[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Torus Sample)	0.0000	06/02/84
	3-FSV-76-56[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Torus Sample)	0.0000	06/02/84
X-229G	3-FSV-76-67[3]	H_2O_2 Sampling I.B. Isolation Valve	0.0000	09/12/95
		(Analyzer B, Sample Return to Torus)	0.0983	06/03/84
	3-FSV-76-68[3]	H_2O_2 Sampling O.B. Isolation Valve	0.1114	06/03/84
		(Analyzer B, Sample Return to Torus)	0.0000	09/12/95

1 Valve removed and line permanently terminated during Cycle 6 outage.
2 Line changed from X-229B to X229A during Cycle 6 outage
3 Valves installed during Cycle 5 outage
4 Valves installed during Cycle 5 outage, removed during Cycle 6 outage
5 Line changed from X-229D to X229N during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
X-229J	3-FSV-76-63[4]	H_2O_2 Sampling I.B. Isolation Valve	0.0769	06/03/84
	3-FSV-76-64[4]	H_2O_2 Sampling O.B. Isolation Valve	0.0000	06/03/84
	3-FSV-43-40[6]	Post-Accident Sampling Isolation Valve	0.1670	10/11/95
	3-FSV-43-42[6]	Post-Accident Sampling Isolation Valve	0.4630	10/11/95
X-229K[7]	3-FSV-76-65[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer B, Torus Sample)	0.2060	06/02/84
	3-FSV-76-66[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer B, Torus Sample)	0.2321 0.0983	06/02/84 06/03/84
X-229N[5]	3-FSV-76-55[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer A, Torus Sample)	0.1571	08/15/95
	3-FSV-76-56[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer A, Torus Sample)	0.1546	08/15/95
X-229P[7]	3-FSV-76-65[3]	H_2O_2 Sampling I.B. Isolation Valve (Analyzer B, Torus Sample)	0.0001	08/14/95
	3-FSV-76-66[3]	H_2O_2 Sampling O.B. Isolation Valve (Analyzer B, Torus Sample)	0.0487	08/14/95
X-231	3-FCV-64-32	Ventilation Exhaust Isolation Valve I.B. Flange	0.0041 0.0427 0.0000	09/06/84 09/08/84 10/09/95
X-231	3-FCV-64-34	Ventilation Exhaust Isolation Valve I.B. Flange	0.0000 0.1588	09/06/84 10/26/95

3 Valves installed during Cycle 5 outage
4 Valves installed during Cycle 5 outage, removed during Cycle 6 outage
5 Line changed from X-229D to X229N during Cycle 6 outage
6 Valves installed during Cycle 6 outage
7 Line changed from X-229K to X229P during Cycle 6 outage

Penetration	Valve No.	Description	Leak Rate	Date Tested
N/A	3-FSV-43-50[1]	Post-Accident Sampling Isolation Valve (W)	0.0075	09/11/95
N/A	3-FSV-43-56[1]	Post-Accident Sampling Isolation Valve (W)	0.0045	09/11/95
N/A	3-CKV-74-792[2]	RHR Loop 1 keep fill O.B. Isolation Valve (W)	0.0000	09/06/95
N/A	3-CKV-74-804[2]	RHR Loop 1 keep fill I.B. Isolation Valve (W)	0.0047	09/06/95
N/A	3-CKV-74-802[2]	RHR Loop 2 keep fill O.B. Isolation Valve (W)	0.0030	09/17/95
N/A	3-CKV-74-803[2]	RHR Loop 2 keep fill I.B. Isolation Valve (W)	0.0038	09/17/95
N/A	3-CKV-75-606[2]	CS Loop 1 keep fill I.B. Isolation Valve (W)	0.0000	05/18/95
N/A	3-CKV-75-610[2]	CS Loop 2 keep fill O.B. Isolation Valve (W)	0.0084	05/18/95
N/A	3-CKV-75-607[2]	CS Loop 1 keep fill O.B. Isolation Valve (W)	0.0059	07/11/95
N/A	3-CKV-75-609[2]	CS Loop 2 keep fill I.B. Isolation Valve (W)	0.0047	07/11/95

1 Valves installed during Cycle 6 outage
2 Valves added to to test program during Cycle 6 outage