Preliminary 27

TEST RESULTS REPORT

PROCEDURE NO. 92HF-1ZZ01

PROCEDURE TITLE PRECORE INSTRUMENTATION CORRELATION

REVISION AT THE COMMENCEMENT OF TESTING 00 DATE 05/05/83

REVISION AT COMPLETION OF TESTING 00 DATE 05/05/83

LATEST TEST CHANGE NOTICE NO. 43 DATE 07/01/83

DATES OF TEST PERFORMANCE 05/16/83 through 07/01/83

Review and Approval of Test Results

PREPARED BY: J. M. Putman DATE 10-5-83

TECHNICAL REVIEW: E T Chilcoat Jr DATE 10-5-83

GROUP SUPERVISOR REVIEW: C J Bush DATE 10-5-83

TEST WORKING GROUP MEETING NUMBER: _____ DATE _____

PLANT REVIEW BOARD MEETING NUMBER: _____ DATE _____

QUALITY ASSURANCE REVIEW: _____ DATE _____
(Required for Test Results Reports not reviewed by TWG)

STARTUP MANAGER APPROVAL: _____ DATE _____

54-528

1.0 PURPOSE AND SCOPE

The purpose of the Precore Instrumentation Correlation Test was to verify that similar plant instruments agreed within specific tolerances, and to collect a historical record of plant parameters during the Precore Hot Functional Test Program. In particular, its objectives were:

(1) To verify that the outputs from the Plant Protection System, Core Protection Calculators, Process Instruments and the Plant Monitoring System are in agreement.

(2) To verify that the narrow and wide range process instruments accuracy and operation by comparing similar channels of instruments.

(3) To monitor the Control Room and Remote Shutdown panel instrumentation during integrated plant operation.

(4) To provide a permanent record of plant parameters during Precore Hot Functional Testing.

The scope of the Precore Instrumentation Correlation Test was to ensure that the Plant Instrumentation met the following Acceptance Criteria:

(1) The differences in the outputs between the Plant Monitoring System, Plant Protection System, Core Protection Calculators, and Plant Process Instrumentation shall agree within the specified tolerances based on instruments accuracies (SFAR/CESSAR, Sections 14.2.12.2.2 and 14.2.12.2.7).

2.0 COMPLEMENTARY TEST

(1) Preoperational Test
None

(2) Post Core Hot Functional Tests
73HF-1ZZ02, Post Core Instrumentation Correlation Test

(3) Power Ascension Tests
None

3.0 TEST DESCRIPTION

The Instrumentation Correlation Test was conducted at eight different temperature and pressure test plateaus during the Precore Hot Functional Test Program. Specifically, these plateaus were:

(1) Ambient conditions (Appendix A)
(2) 260°F and 350 psia (Appendix B)
(3) 360°F and 460 psia (Appendix C)
(4) 460°F and 1100 psia (Appendix D)
(5) 505°F and 1550 psia (Appendix E)
(6) 520°F and 1750 psia (Appendix F)
(7) 545°F and 1950 psia (Appendix G)
(8) 565°F and 2250 psia (Appendix H & I)

At the final test plateau, instrumentation correlations were conducted twice, once at the beginning (Appendix H) and once at the end (Appendix I). In addition, in the time period between, plant parameters were recorded daily per Appendix J to provide data on instrumentation performance and historical record of plant conditions.

Each time the instrumentation was correlated, data was gathered from the Main Control Room Panels, Remote Shutdown Panels, Core Protection Calculators, Plant Protection System and Plant Monitoring System. The technique was to record the data for a particular comparison as simultaneously as possible. In cases where parameter indications were varying, due to signal fluctuation, a time average approach was employed. The test subdivided the instruments being correlated into the following groups:

(1) Channel to Recorder
(2) Channel to Channel and Plant Monitoring System
(3) Channel to Core Protection Calculators
(4) Channel to Plant Protection System
(5) Channel to Plant Monitoring System
(6) Channel to Remote Shutdown Panel
(7) Plant Monitoring System to Core Protection Calculators

The instrumentation comparisons performed consisted of two distinct types. They were denoted as "difference" and "channel difference". Their definitions are:

(1) Difference - Refers to a comparison between a Process Indicator reading to an associated Process Recorder, Remote Shutdown Panel Indicator, Core Protection Calculator, Plant Protection System or Plant Monitoring Computer reading.

(2) Channel Difference - Refers to the maximum difference between any number of Process Instruments which monitor the same parameter.

These comparisons were then checked against the allowable tolerance. If the value derived was within this tolerance it was acceptable, otherwise a TER was written, corrective action taken (if possible) and the instrument retested at the next test plateau. Furthermore, if the problem persisted at the next test plateau, it was documented by the same open TER or a new TER was written.

At the completion of Data Collection and Review, a list of deficient instruments was compiled. These instruments were then "yellow stickered" by Operations to prevent their use to satisfy Acceptance Criteria by any other Hot Functional Test Procedure. Furthermore, prior to continuing to the next test plateau, concurrence of the Shift Supervisor, Test Director and Hot Functional Test Group Lead Startup Engineer were obtained to ensure that adequate instruments were available to support this escalation.

4.0 TEST EVENTS

4.1 PRETEST INSTRUMENTATION WALKDOWN

Prior to conducting the test, a walkdown of the instruments to be correlated was conducted. It was done as a joint effort between the HFT and I&C Startup groups and both had to agree on the problem encountered. The check included, but was not limited to:

(1) Instruments monitoring similar parameters not in agreement
(2) Unreasonable values
(3) Instruments spiking or pegged up/down scale
(4) Zero reference problems
(5) Instruments not installed
(6) Instruments not or poorly labeled
(7) Recorders not having power on, no paper, not inking, etc.

The walkdown found 58 groups of instrument problems which equated to approximately 20 percent of those used for this test. These problems were then forwarded to Startup I&C for resolution. In addition, the walkdown also found procedural problems. To eliminate them, two TCN's, TCN 1 and TCN 2, were written.

4.2 PREREQUISITE AND INITIAL CONDITION

The procedure Prerequisites and Initial Conditions were then reviewed for compliance prior to signing these steps. This review revealed that they were adequately met, but that the exact wording employed was overly restrictive. As such three TCN's (TCN 3, TCN 4, and TCN 5) were written to add "To the extent necessary" to steps 4.2, 4.7 and 5.1, and to delete parts of step 4.4. Thus at the start of Section 8.0, five TCN's were written to correct procedure problems encountered.

4.3 TEST PROCEDURE CONDUCT

The test procedure was started on May 16, 1983 and continued through the Precore Hot Functional Test program until completion on July 1, 1983. In all 121 TER's written, 73 of which were resolved/retested and 48 were left open due principally to equipment problems. Furthermore, 43 TCN's were written of which 30 were non scope and 13 were scope intent. Of the scope intent TCN's, three were rewrites of earlier ones not submitted within the five working day requirements of 90AC-0ZZ02.

In general the Instrument Correlations (Appendices A through I) and the Test Data Records (Appendix J) were performed without significant problems experienced. The test method for each Appendix followed the steps below:

(1) Plant conditions were verified to be stable within allowed tolerance at the Test Conditions.

(2) Data collection and verification of Acceptance Criteria was done in accordance with the applicable Appendix for that test plateau.

(3) TER's and TCN's were written as necessary to document failures of Acceptance Criteria and to correct procedure problems encountered.

(4) TER's generated from previous test plateaus were retested.

(5) Upon completion of Data Collection, a review was conducted to ensure that the required data had been collected, TER's and TCN's were properly entered, and that all "N/A's" were explained in Test Log.

(6) TER's written were forwarded to Startup I&C for resolution.

(7) Based on the resolution furnished on the TER's, TCN's were written as necessary.

An overview of major events that occurred during the conduct of each Appendix is shown in Table 1.0.

At the final test plateau (565°F and 2250 psia), Appendix J was conducted daily except for two suspensions caused by RTD thermowell leakage problems which required a plant cooldown for repairs. Specifically:

(1) From 06/17/83 to 06/21/83 the plant was at reduced temperature and pressure during an unscheduled cooldown caused by leakage on RCA-TE-122CA thermowell.

(2) From 06/24/83 to 06/25/83 the plant was at reduced temperature and pressure during an unscheduled cooldown caused by leakage on RCC-TE-112CC thermowell.

Testing resumed upon return to this test plateau and continued until terminated by the controlling HFT procedure.

All TER's generated were logged into a tracking system to ensure that the status of each could be maintained. This list is shown in Table 2.0. If equipment failure or deficiencies were observed, SFR's were written and NCR/DCP's were generated as appropriate. Even though a large number of TER's remained open at completion of testing, only a relatively few number of problems other than re-calibration were found.

The technique used to resolve TER's, was to obtain Startup I&C resolution and then retest at the next procedure test plateau. However, during testing from 460 to 545°F, TER resolution prior to test conduct was not completely possible, due to the rapid succession of testing. TER resolution was again conducted after reaching 565°F and 2250 psia test plateau, which resulted in clearing many of these TER's generated over these test plateaus.

To ensure that process instruments which failed their correlation requirements were not used by other HFT procedures for satisfying Acceptance Criteria, yellow stickers were employed per Operation Instruction 9, Rev. 1. Their status was reviewed periodically and after completion of each appendix of this procedure. The status of the "yellow stickers" which were put in place as part of this test is shown in Table 3.0. After Precore Hot Functional Testing was completed, these stickers were then turned over to Operations per APS Memo 83-019-419.

In summary, the procedure ran in a smooth fashion. No outstanding problems were experienced in test conduct. The accuracy tolerances were achievable for instrumentation in calibration, except for Primary DP flow signals which required averaging due to the high degree of fluctuation.

4.4 TER RETESTING PACKAGES

In general, TER's generated at one test plateau were retested at the next test plateau. However, in certain cases due to the extent of the problem observed and/or to resolve as many TER's as possible, two retest packages were generated to retest selected TER's. Specifically, they covered the following instruments:

(1) Retest Package 1 - Due to the extent of steam generator level problems experienced during test conduct, the level transmitter condensate pots on Steam Generator 2 were modified per DCP 1SJ-SB-0Z1 (See Figure 1.0). The intent was to verify this fix on Steam Generator 2 prior to implementing it on Steam Generator 1. Retesting was done at all test plateaus, except "ambient conditions" to prove the modification. All level indicators passed retest except SGB LI 1124B which had a level transmitter problem previously documented per SFR 1SB080 and NCR 1SJ2011. This level transmitter was replaced per Work Order 14839 and retested satisfactorily per Retest Package 2.

(2) Retest Package 2 - This was done to verify the comparison on Steam Generator Level Indicator SGB LI 1124B to remaining channels, Steam Generator Level Indicator SGA LI 1123A to Remote Shutdown panel, Letdown Pressure Control Indicator CHN PI 201 to Plant Monitoring System and Remote Shutdown panel, and safety injection tank narrow range pressure between indicators SIN PI 312 to SIN PI 313 and SIN PI 342 to SIN PI 343. All retesting that was performed passed successfully. Retesting on the safety injection pressure was not possible since during this time period the SIT's were not pressurized above 450 psig.

In all, the following TER's were retested and passed to the extent necessary to close them (TER 7, 18, 21, 22, 27, 30, 52, 55, 59, 68, 80, 81 and 82).

4.5 INSTRUMENT TAGGING

During the first run of Appendix J, Startup Q/A had concerns about the process instrument number, relative to the tag number utilized on the indicators/recorders. The problem was isolated to dual purpose instruments which had one tag number assigned. Initially, the Test Director elected to write TCN's 24 through 26 to correct the problem. However, due to the large number of changes, it was decided to delete the reference to tag number by TCN 27 and document Q/A's concern in an SFR.

At the completion of the test program, four SFR's were written to address various tagging concerns encountered and to satisfy committment made to Q/A. They were:

(1) SFR-1SI236 To document concerns on dual purpose indicators having only one tag number.

(2) SFR-1RC140 To ensure that recorders/indicators not having tags attached will be corrected.

(3) SFR-1RC139 To correct tagging inconsistencies on RCS wide range cold leg temperature indicators and recorders.

(4) SFR-1SB134 To address concerns about similar tagging numbers being used on the wide and narrow range RCS hot leg temperature indicators and recorders.

4.6 PLANT BETTERMENT

During testing, the level indication ranges used on the steam generators, pressurizer, safety injection tanks and refueling water tank was found to be confusing. This was due to the narrow and wide range indicators both having a range of 0 to 100 percent. Since the instruments currently are in compliance with plant design, SFR 1SB135 was written as a proposed Plant Betterment.

4.7 TWG COMMENTS ON PROCEDURES TCN'S

During the course of test performance, all original TCN's generated were forwarded to TWG. All comments received were reviewed and changes made as appropriate. On the scope intent TCN's, meetings were conducted on June 8, 9 and 16, 1983 for approval. Of these 2, 11, 14, 17, 23, 33 and 34 were disapproved and 20, 21, 22, 29, 30 and 32 were approved. An overview of changes incorporated on procedure TCN's are discussed below:

TCN	TYPE	CHANGE/STATUS
2	Scope	Rejected by TWG due to TCN not received within five working days per 90AC-0ZZ18. Change resubmitted as TCN 32.
8	Non-Scope	Interim approval not obtained prior to entry. Obtained Shift Supervisor's signature and added Note to TCN.
9	Non-Scope	Interim approval not obtained prior to entry. Obtained Shift Supervisor's signature and added Note to TCN.
10	Non-Scope	Reason was re-written to clarify purpose for incorporating changes.

TCN	TYPE	CHANGE/STATUS
11	Scope	Rejected by TWG due to TCN not received within five working days per 90AC-0ZZ18. Change resubmitted as TCN 33.
14	Scope	Rejected by TWG due to TCN not received within five working days per 90AC-0ZZ18. Change resubmitted as TCN 34.
15	Non-Scope	Interim approval not obtained prior to entry. Obtained Shift Supervisor's signature and added Note to TCN.
17	Scope	Rejected by TWG. Their position was to use an open TER.
19	Non-Scope	Added "procedure error" above reason stated.
20	Scope	The performance frequency of Appendix J changed from "approximately every 24 hours" to "once daily" per TWG request.
21	Scope	Appendix J performance log was made an "exhibit" to allow multiple copies to be used as necessary per TWG request.
22	Scope	Added "plus or minus" sign to Acceptance Criteria per TWG request.
23	Scope	Rejected by TWG. Their position was to use an open TER.
30	Scope	Proposed changes in Appendix I were deleted per TWG request.
32	Scope	Reason for TCN expanded by using an attached page.
33	Scope	Deleted by author based on TWG comments of TCN 11. Their position was to use an open TER.
34	Scope	Deleted by author based on TWG comments of TCN 14. Their position was to use an open TER.
37	Non-Scope	Changed reason to "change scale indication, procedure error".

5.0 TEST RESULTS

During the Precore Hot Functional Test Program, the Instrumentation Correlation Test identified, corrected, and documented numerous instrument problems which were encountered. Furthermore, it provided:

(1) An efficient method for correcting instrumentation problems, since I&C Personnel could perform work under open TER's.

(2) Verification that similar instruments correlated within their allowed tolerance as required per the procedures Acceptance Criteria. All exceptions were documented by TER's and resolved to extent possible in the HFT time frame.

(3) A monitoring program on the Control Room and Remote Shutdown panel instruments. If any instrument problem was encountered it was "yellow stickered" to prevent their use by other HFT procedures for Acceptance Criteria.

(4) A permanent record of plant parameters. This was accomplished by recording data at each major test plateau and daily while at the 565°F and 2250 psia test plateau.

The data collection process was performed smoothly with the instrument correlation requiring approximately 9.3 hours and the test data records requiring approximately 4.1 hours to collect the data. In general the instruments either correlated well within tolerance or were way out due to equipment or calibration problems. Some difficulties were experienced on the primary side differential pressures resulting from signal variation. These indications were time averaged but Steam Generator DP instruments consistently failed to correlate.

In all, the test procedure generated 121 TER's of which 73 were resolved/retested and 48 were left open due primarily to equipment problems. Furthermore, only a small number of equipment problems were present at the completion of Precore Hot Functional Testing. The large number of TER's left open resulted in multiple TER's against the same problem.

The following instruments or groups of instruments had problems which were not resolved at the end of Precore Hot Functional Testing.

(1) Steam Generator Levels

During the Initial Heatup to Hot Standby, steam generator level indications did not correlate to each other within their allowed tolerance. The following documents were written to describe and remedy the problem:

SFR: 1SB086, 1SB091, 1SB098, 1SB099
NCR: 1SJZ038
DCP: 1SJSB021

NOTE: See Figure 1.0 for a visual overview of the problem and resolution.

The DCP was implemented on Steam Generator 2 to permit verification of this design change during Precore Hot Functional Testing. All level indicators on Steam Generator 2 were retested and passed the correlation requirement. Modification of Steam Generator 1 level indications will be done after Precore Hot Functional Testing is completed.

In addition two steam generator level transmitters also had a problem, they were SGD LI 1113D and SGB LI 1124B. Their status is:

SGD LI 1113D - Problem documented per SFR 1SB079 and NCR 1SJ2012.

SGB LI 1124B - Problem documented per SFR 1SB080 and NCR 1SJ2011. Corrected per Work Order 14839 and retested satisfactory.

Currently there are 17 TER's still open against Steam Generator 1. They are, TER 04, TER 12, TER 13, TER 17, TER 29, TER 35, TER 37, TER 38, TER 39, TER 54, TER 66, TER 83, TER 88, TER 98, TER 100, TER 102, TER 119.

(2) RTD Cold Leg Failures

The RTD's used for monitoring cold leg temperatures had a higher than expected failure rate during the test program. Specifically, five RTD's failed of which two later developed leaks in the thermowell, resulting in two separate plant cooldowns to repair the leaks. The affected RTD's are listed below:

RTD	FAILURE DATE	PUMP LOCATION	LEAK DATE	SFR	NCR
RCA-TE-122CA	05/28/82	RCP 2A	06/17/83	1SB101	1SJ2250
RCC-TE-112CC	06/02/82	RCP 1A	06/21/83	1SB103	1SJ2123
RCA-TE-111Y	06/02/82	RCP 1A	(1)	1SF073	1SJ2257
RCA-TE-112CA	06/05/82	RCP 1A	(1)	1SB107	1SJ2172
RCA-TE-115	06/14/82	RCP 1B	(1)	1RC129	1SJ2473

NOTE (1): These RTD thermowells were capped to prevent leakage problems.

Since there is a RTD thermowell location/design or RCP problem resulting in these failures, numerous SFR's and NCR's have been written to document and correct this problem. Specifically beyond those listed above:

SFR: 1RC109, 1RC117, 1RC119
NCR: 1SM2185, 1SJ2201

Currently there are 12 TER's still open against these RTD's. They are, TER 42, TER 45, TER 57, TER 63, TER 69, TER 73, TER 77, TER 86, TER 91, TER 94, TER 104 and TER 111.

(3) Steam Generator Primary Differential Pressure

The steam generator differential pressure indicators consistently failed to correlate with each other and often failed to correlate during comparisons to the Plant Monitoring System and Plant Protection System. The problem was attributed to:

- The ITT Barton Electronic Transmitters were found to be experiencing drift over short time periods (days). This problem is documented per SFR 1SB119. Later resubmitted as SFR 1SB147 on CE request for additional data.

- The oscillation in the differential pressure signal was on the order of 2 to 5 times the allowed tolerance. This problem is documented per SFR 1SB112.

The signal oscillation problem was also experienced on the core and reactor coolant pump differential pressure signals. In cases where signal variations were experienced, obtaining the average reading was performed. This resulted in the core and reactor coolant pump differential pressure indicators generally close to their tolerance, but no failures were recorded. However, on the steam generator differential pressure this approach helped, but failure to correlate was experienced.

Currently there are 12 TER's open against the steam generator differential pressures. They are, TER 15, TER 16, TER 24, TER 32, TER 33, TER 47, TER 76, TER 101, TER 106, TER 117, TER 118 and TER 120.

(4) Safety Injection Tank 1 Pressure

The Safety Injection Tank narrow range pressures on SIT 1 did not meet the correlation requirement during the initial heatup to hot conditions. Recalibration was performed at 565°F and 2250 psia and channel comparison per Appendix J did pass, however, full correlation retest was not possible due to the SIT being depressurized mid way into this plateau.

Currently there are 4 TER's still open against these pressures (i.e., SIN PI 312 and SIB PI 313). They are, TER 36, TER 49, TER 67 and TER 78.

(5) Wrong Scales

The following indicators/recorders had the wrong scales still present at the completion of Precore Hot Functional Testing.

Instrument	SFR
CTA LR 35	1RM019
CHN LI 210	1CH353
CHN TI 224	1CH267
HCN TI 57	1HC066
SGA PI 1013A-1	1SB071
SGB PI 1013B-1	1SB071
SGA PI 1023A-1	1SB071
SGB PI 1023B-1	1SB071

NOTE: SFR 1SB082 and NCR SJ2212 were also written against all these scale problems as part of the instrumentation walkdown.

Verification of correlation requirements was done using correction factors during test conduct. As such there are no open TER's. Problem will be resolved without retest per SFR/NCR resolution.

(6) Safety Injection Tank Wide Range Levels

The safety injection tank wide range level indicators were out-of-service during Precore Hot Functional Testing. The ITT Barton Transmitter required modification from a dry leg to a wet leg transmitter. Problem documented per SFR 1SI190 and NCR 1SJ2116. Currently TER 10 is open against these indications.

(7) Computer Containment Sump Levels, RDL19 and RDL20

Computer points RDL19 and RDL20 were out-of-service for Precore Hot Functional Testing. The level probes were not installed. Problem documented per SFR 1RD085 and FMR 71230. Currently TER 11 is open against these points.

(8) Plant Protection System Bistable Select Switch

It was observed during test conduct that the Bistable Select switch (SG101 and SG102) did not always make a good contact thus giving an erroneous reading. The problem was documented per SFR 1SB111 and NCR 1SJ2269, which recommends that it be cleaned or replaced. Currently there are no open TER's against this problem, since retesting at the next test plateau always passed.

(9) Reactor Coolant Pump 1A Speed (Alternate)

During the final instrumentation correlation, the computer pump speed indication (RCS 155) was found to be zero. Investigation revealed that the sensor field cable was damaged. The problem was documented per SFR 1SB120 and is currently pending Combustion Engineering resolution whether to fix or replace. Work Order 16273 was written to accomplish repair/replacement. Currently TER 114 is open.

In addition, throughout the test, the refueling water tank level indications on CHA LI 203A, CHB LI 203B, CHC LI 203C and CHD LI 203D were off-scale high. As such, comparisons could not be done and "N/A's" were entered and explained in the Test Log. Therefore, confirmation of these levels correlating within tolerances were not achieved.

6.0 CONCLUSIONS*

The results of the test demonstrated that the Process Instruments, Plant Protection System, Core Protection Calculator and Plant Monitoring System met their correlation requirements with only a few equipment problems causing test exceptions to remain open. Therefore, this procedure adequately fulfills the intent of SFAR/CESSAR sections 14.2.12.2.2 and 14.2.12.2.7. The problems encountered have been of a nature that would be expected during the startup of a first-of-a-kind unit of this size. They have been appropriately documented in SFR's, NCR's and DCP's and the resolutions obtained give adequate assurance that they will be corrected. As such, based on a review of the test results and problem resolutions, it is felt that Unit 1 instrumentation covered by this test, will support escalation to the next test phase.

*Note: The conclusions reached are still pending CE response to SFR 1SB112 and SFR 1SB119 (Resubmitted as SFR 1SB147).

7.0 RECOMMENDATIONS

7.1 Additional Testing

Retesting of the procedure open TER's should be done per the guidance furnished in Table 4.0. If they are not resolved or retested prior to fuel loading, retesting can be done per 73HF-1ZZ02, Post Core Instrumentation Correlation Test.

7.2 Test Techniques

The procedure ran in a smooth fashion with no problems experienced other than minor typo's and changes documented by various TCN's written. As such, prior to performing the test again, they should be incorporated as appropriate, specifically:

(1) The Prerequisites and Initial Conditions given in steps 4.2, 4.4, 4.7 and 5.1 were overly restrictive and need to be rewritten to include "to the extent necessary to support this test" (TCN's 3, 4 and 5).

(2) The computer points for Containment Sump Level and Reactor Cavity Level have to be converted to inches prior to comparison to their respective process instruments (TCN 6).

(3) The process instruments which fail to meet the correlation requirements need to be "yellow stickered" out to assist in assuring that they are not used by other HFT procedures for satisfying their Acceptance Criterions (TCN 10).

(4) The frequency of performing Test Data Record (Appendix J) of "eight hours" was to often and needs to be changed to "once daily". Furthermore, provision for running this appendix numerous times should be incorporated (TCN's 20 and 21).

(5) The Reactor Coolant System temperatures on indicators RCA TI 112HA and RCA TI 122HA should not be compared to those on recorders RCA TR 112 and RCA TR 122. The indications monitor narrow range, whereas the recorders monitor wide range temperatures (TCN 22).

(6) The procedure should specify "Process Instrument Number" versus "Process Instrument Tag Number". The latter requires the procedure to duplicate exactly what is stated on the Instrument Tag (TCN 27).

(7) The CEDM Normal ACU Outlet temperatures and pressures should not be compared since they monitor different trains (TCN 29).

(8) The following comparisons should be deleted from the procedure (TCN 32):

- o Reactor Coolant Pump speeds on pumps not in service.
- o Safety Injection Tanks narrow range pressure indications on the first three test plateaus. They are not on scale.
- o Pressurizer Restrictive Range Pressure Recorder (RCA PR 103). It has been removed from Control Room panel per DCP 1SJRM092.
- o Condensate Storage Tank level indicator (CTN LI 13A). It has been removed from Control Room panel per DCP 1SJRM056.

(9) The collection of data per Appendix J is required at the 565°F, 2250 psia test plateau. As such if a plant equipment problem results in cooling down the plant for repair, its conduct can be suspended until return to this test plateau (TCN 39).

(10) The procedure typo's encountered should be corrected (TCN's 1, 7, 8, 9, 15, 16, 19, 28, 31, 35, 36, 37, 38, 40, 41 and 42).

In addition the following recommendations would be helpful in clearing up areas of confusion noted during testing:

(1) The Acceptance Criterions stated in each Appendix used a $\pm$ A tolerance. It would be clearer if the $\pm$ sign were deleted and the procedure "difference" and "channel difference" comparisons were defined as absolute values.

(2) The method of doing a "difference" and "channel difference" comparison should be expanded in more detail, specifically, an example should be provided in the procedure.

7.3 Further Use of Test

This test procedure was specifically written for Precore Hot Functional Testing, and as such, it only compares those instruments which are on scale during this test phase. However, it can be used as a bases for developing the following:

(1) Post Core Instrumentation Correlation Test

(2) Process Instrumentation Surveillance Test

7.4 Acceptance of Test Results*

The PSE recommends approval of these test results by the Reviewing Organization based on:

(1) All Acceptance Criterions were met except those noted by open TER's.

(2) The open TER's have been adequately documented by SFR's, NCR's and DCP's as appropritate to ensure that the problems addressed will be corrected.

(3) The open TER's will be retested per 73HF-1ZZ02, Post Core Instrumentation Correlation Test, if not resolved/retested prior to fuel loading.

Jon M. Putnam 10-5-83

Jon M. Putnam
APS Principal Startup
Engineer, Level III

*Note: The acceptance of test results are still pending CE response to SFR 1SB112 and SFR 1SB119 (Resubmitted as SFR 1SB147).

8.0 ATTACHED TABLES AND FIGURES

(1) Table 1.0 - Precore Instrumentation Correlation Test Summary

(2) Table 2.0 - Precore Instrumentation Correlation Test TER History

(3) Table 3.0 - Precore Instrumentation Correlation Test "Yellow Sticker" History

(4) Table 4.0 - Precore Instrumentation Correlation Test Open TER's Retest Metrix

(5) Figure 1.0 - Steam Generator Level Transmitters Condensate Pot Problem/Resolution.

PRECORE INSTRUMENTATION CORRELATION TEST SUMMARY

PROCEDURE STEP/APPX	START DATE	STOP DATE	TEST DIRECTOR	TER'S WRITTEN	TCN'S WRITTEN	TER'S RETESTED	COMPARISON DONE	COLLECTION TIME (HOURS)	PERFORMANCE RATE (MIN/COMP)
8.1.2/A	05/16/83 0520	05/17/83 0420	J. M. Putnam	1 - 22	6 - 14	None	284	12.00	2.54
8.2.2/B	05/24/83 1000	05/25/83 0141	J. M. Putnam	23 - 28	15 - 17	1,2,3,5,6, 8,14,19,20	276	10.00	2.17
8.3.2/C	05/27/83 1040	05/27/83 1930	J. M. Putnam	29 - 30	None	25,26,28	276	7.75	1.68
8.4.2/D	05/28/83 1700	05/29/83 0400	J. S. King T. C. Grizzard	31 - 40	None	9	300	11.90	2.20
8.5.2/E	05/29/83 1800	05/30/83 0310	T. C. Grizzard	41 - 48	18	34,40	344	5.80	1.01
8.6.2/F	05/30/83 1325	05/30/83 2210	J. S. King T. C. Grizzard	49 - 61	19	44,46	344	10.75	1.88
8.7.2/G	05/31/83 0210	05/31/83 0700	J. H. Todd T. C. Grizzard	62 - 72	None	53.56	344	4.83	0.84
8.8.2/H	06/02/83 0830	06/02/83 2220	J. M. Putnam T. C. Grizzard	73 - 83	None	41,43,48,50 58,60,61,62 64.65.70,71	344	13.65	2.38
8.8.5/J	06/04/83 0135	06/29/83 1756	J. S. King J. H. Todd J. M. Putnam W. A. Wheelis W. Asbury	84 - 113	20 - 41	84,85,87,89 90,92,93,95 96,97,99,103 109	5644	70.82	0.75
8.8.8/I	06/30/83 0730	06/30/83 1730	J. M. Putnam	114 - 120	42 - 43	72,74	344	4.67	0.81

Table 1.0

NOTE: Five TCN's (TCN 1 through TCN 5) were written prior to starting Section 8.0 of procedure.

NOTE: Appendix J was performed daily during testing at the 565°F and 2250 psia Test Plateau. In total it was done 17 times.

NOTE: The TER Retest Status at completion of review was 73 TER resolved/retested. This can be broken down to 47 retested per procedure, 13 retested per TER retest package and 13 did not require retesting

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
1	Pressurizer Level Recorder Off-Scale Low	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 47
2	Pressurizer Pressure, RR, RCA-PI-105 failed to correlate with RCA-PI-103, RCA-PI-104 and RCA-PI-106	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 49
3	Steam Generator Pressure Recorder SGA-PR-1013A/1023A found to have wrong range scale	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 47
4	Steam Generatore WR Level Indicator failed to correlate (i.e. SGA-LI-1113A, 1113B, 1113C & 1113D)	8.1.2/A	Yes	No	Yes	Yes	1SB079	1SJ2012	N/A	No	LT 1113D Failed
5	Containment Pressure wide range recorder had wrong range scale	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 47
6	RWT Level recorder has wrong range scale	8.1.2/A	Yes	Yes	Yes	Yes	1SB082	1SJ2212	N/A	Yes	Page 47
7	Letdown Pressure Controller CHN-PI-210 failed to correlate with CHP-201	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	TER Retest
8	RMWT Level Indicator has wrong range scale	8.1.2/A	Yes	Yes	Yes	Yes	1SB082	1SJ2212	N/A	Yes	Page 62
9	Control Room and Remote Shutdown Steam Generator WR Indicator SGA-LI-1113A and SGA-1113A-1 did not correlate	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 125
10	SIT WR Level Indications SIB-LI-311, SIB-LI-321, SIB-LI-331 & SIB-LI-341 failed correlation test	8.1.2/A	Yes	No	Yes	Yes	1SI190	1SJ2116	N/A	No	OOS
11	Computer Point RDL19 and RDL20 failed to correlate with Indicator RDN-LI-410	8.1.2/A	Yes	No	Yes	Yes	1RD085	N/A	N/A	No	OOS
12	SG WR Level Recorder SGN-LR-1111, 1112, 1121 & 1122 failed to correlate with each other and the PMS	8.1.2/A	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
13	SG WR Level Indicators failed to correlate with each other (SGA-LI-1113A & SGA-LI-1113B) and the PMS	8.1.2/A	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
14	The Letdown Hx tube outlet Temperature Indicator on the Remote Shutdown Panel (CHN-TI-224) has wrong range scale	8.1.2/A	Yes	Yes	Yes	Yes	1CH267	N/A	N/A	Yes	Page 70
15	SG #2 Differential Pressure Indicator RCC-PDI-125C failed Low	8.1.2/A	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
16	SG #2 Differential Pressure Indicator RCA-PDI-125A, RCC-PDI 125C & RCD-PDI-125D failed correlation	8.1.2/A	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
17	SG #1 Level Indicators SGA-LI-1114A, SGB-LI-1114B, SGC-LI-1114C and SGD-LI-1114D failed to correlate	8.1.2/A	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
18	SG #2 Level Indicators SGA-LI-1124A, SGB-LI-1124B, SGC-LI-1124C and SGD-LI-1124D failed to correlate	8.1.2/A	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
19	RWT Level Indicator CHA-LI-200 failed to correlate with PMS	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 55
20	RWT Level Indicator CHA-LI-200 and CHB-LI-210 failed to correlate	8.1.2/A	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 55

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): NCR and DCP awaiting resolution of SFR,s 1SB112 and 1SB119

Table 2.0

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
21	SG WR Level Indicators SGA-LI-1123A and SGA-LI-1123B failed to correlate on Panel B06	8.1.2/A	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
22	SG #2 WR Level Indications SGA-LI-1123A, SGB-LI-1123B, SGC-LI-1123C and SGD-LI-1123D failed to correlate	8.1.2/A	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
23	PMS Point CHL-203B indicate negative off-scale where the remaining PMS points were off-scale high	8.2.2/B	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
24	SG #1 Differential Pressure Indications RCA-PDI-115A, RCB-PDI-115B, RCC-PDI-115C & RCD-PDI-115D failed to correlate	8.2.2/B	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
25	PPS Point D-14, Steam Generator #1 Differential Pressure off-scale low. Should have indicated approximately 40 PSID	8.2.2/B	Yes	Yes	Yes	Yes	1SB111	1SJ2269	N/A	Yes	Page 85
26	Containment Pressure Indicator HCB-PI-352B failed to correlate with PMS	8.2.2/B	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 77
27	Letdown Pressure Controller CHN-PI-201 failed to correlate with Remote Shutdown Panel CHN-PI-201-1.	8.2.2/B	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	TER Retest
28	Reg. Hx to changing line D/P Indicator CHN-PDI-240 failed to correlate with PMS	8.2.2/B	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 89
29	SG #1 WR Level Indicator SGA-LI-1113A failed to correlate with remaining similar channels	8.3.2/C	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
30	SG #2 WR Level Indicator SGA-LI-1123A and SGB-LI-1123B failed to correlate with each other	8.3.2/C	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
31	RCA-PI-102A and RCA-PR-102A failed to correlate	8.4.2/D	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
32	SG #1 Differential Pressure Indicator RCA-PDI-115A and PPS Point A-14 failed to correlate	8.4.2/D	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
33	SG #2 Differential Pressure Indicators RCA-PDI-125A and RCD-PDI-125D failed to correlate to their PMS Points	8.4.2/D	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
34	Computer Points RCP-102A, HCP-351A, HCP-352B, SIB-333 & SIB-343 not available	8.4.2/D	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Pages 135 136 & 140
35	SG #1 WR Level Indicator failed to correlate with the PMS PMS. Indicator was SGA-LI-1113A, PMS Point was SGL-1113A	8.4.2/D	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
36	SIT NR Pressure Indicators for SIT 1 & SIT 2 (i.e. SIN-PI-312, SIG-PI-313, SIN-PI-322 & SIB-PI-323) fail to correlate	8.4.2/D	Yes	Yes	No	N/A	N/A	N/A	N/A	No	Not Retested
37	SG #1 NR Level Indicators SGA-LI-1114A, SGB-LI-1114B SGC-LI-1114C and SGD-LI-1114D failed to correlate	8.4.2/D	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
38	SG #1 NR Level Recorder (SGN-LR-1111 & SGN-LR-1112) & (SGN-LR-1121 & SGN-LR-1122) failed to correlate	8.4.2/D	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
39	SG #1 & 2 indicators SGA-LI-1123A & SGA-LI-1113A failed to correlate with PMS Points	8.4.2/D	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
40	SIT NR Pressures on SIT #4 failed to correlate. They were SIN-PI-342 and SIA-PI-343	8.3.2/D	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 140

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): DCP will be written pending resolution of SFR's 1SB112 and 1SB119

Table 2.0 (Cont'd)

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
41	RCB-PI-101B failed to correlate with CPC B-9. They appear to have a transmitter failed	8.5.2/E	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 229
42	RCA-TI-122CA pegged high during correlation to CPC A-6	8.5.2/E	Yes	No	Yes	Yes	1SB101	1SJ2250	(2)	No	RTD Failed
43	Pressurizer Pressure Indicator, NR, RCA-PI-101A, RCB-PI-101B, RCC-PI-101C & RCD-PI-101d Failed Correlation.	8.5.2/E	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 234
44	Pressurizer Pressure Indicator, NR, RCA-PI-199A, RCB-PI-199B RCC-PI-199C and RCD-PI-199D Failed Correlation.	8.5.2/E	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 168
45	RCA-TI-122CA pegged high during correlation to PMS	8.5.2/E	Yes	Yes	Yes	Yes	1SB01	1SJ2250	(2)	No	RTD Failed
46	SG #2 WR Level Indicator failed to correlate with PPS (i.e. SGB-LI-1123B to PPS Point ID B-8)	8.5.2/E	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
47	SG #1 & #2 Differential Pressure Indicators RCA-PDI-115A and RCA-PDI-125A failed to correlate to PPS	8.5.2/E	Yes	No	yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
48	Reference Temperature on RCN-TIC-100 failed to correlate to the PMS	8.5.2/E	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 252
49	SIT #1 Pressure, NR, Indicators SIN-PI-312 & SIB-PI-313 failed to correlate	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	No	Not Retested
50	SIT #2 Pressure, NR, Indicators SIN-PI-322 & SIB-PI-323 failed to correlate	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 206
51	Comparison of RCN-TI-111X to RCN-TR-111X were both off scale low	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 231
52	SG #2 WR Level Indicators SGA-LI-1123A and SGB-LI-1123B failed to correlate	8.6.2/F	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
53	SIT #4 Pressure, NR, Indicators SIN-PI-342 and SIN-PI-343 failed to correlate	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 206
54	SG #1 NR Level Indicators SGA-LI-1114A, SGB-LI-1114B, SGC-LI-1114C, & SG-LI-1114D failed to correlate. Also #2 NR Ind.	8.6.2/F	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
55	SG #2 NR & WR Indicator/Recorders on Panel B06 failed to correlate SGN-LR-1121/1122 & SGA-LI-1123A/1123B	8.6.2/F	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
56	RCS Pressure Recorder RCN-PR-100Y and PMS Point RCP-100Y did not correlate	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 208
57	RCA-TI-122CA failed low during Indicator to PMS Comparison	8.6.2/F	Yes	No	Yes	Yes	1SB101	1SJ2250	(2)	No	RTD Failed
58	RCS Pressure, NR, Indicators RCC-PI-101C and RCD-PI-101D failed to correlate	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 234
59	SG #1 & #2 Pressures Indicator in the Control Room and RSP did not correlate. Also SG WR Levels	8.6.2/F	Yes	Yes	Yes	Yes	1SB082 (1)	1SJ2212 1SJ2038	1SJSB021	Yes	TER Retest
60	Reference Temperature on RCN-TR-100 failed to correlate to the PMS	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 252

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): NCR and DCP awaiting resolution of SFR,s 1SB112 and 1SB119

Table 2.0 (Cont'd)

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
61	Comparison of RCN-TI-111X to RCT-111X (PMS) were both off-scale low	8.6.2/F	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 251
62	RCS Pressure, NR, Indicator RCB-PI-101B failed to correlate with CPC Point B-9	8.7.2/G	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 229
63	RCS Temperature Indicator RCA-TI-122CA and CPC Point ID A-6 off-scale high	8.7.2/G	Yes	No	Yes	Yes	1SB101	1SJ2250	(2)	No	RTD Failed
64	RCS Temperature RCN-TI-111X, RCN-TR-111X, RCN-TI-121X and RCN-TR-121X failed low/not in correlation	8.7.2/G	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 231
65	RCS Pressure Indicators RCB-PI-101B and RCC-PI-101C did not correlate	8.7.2/G	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 234
66	SG #1 & #2 NR & WR indicators SGA-LI-1123A - D, SGA-LI-1114A - D and SGA-LI-1124A - D fail correlation	8.7.2/G	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
67	SIT Pressure, NR on SIT #2 did not correlate. In particular SIN-PI-312 & SIB-PI-313	8.7.2/G	Yes	Yes	No	N/A	N/A	N/A	N/A	No	Not Retested
68	SG #2 NR & WR Indicators/Recorders on Panel B06 failed to correlate SGN-LR-1121/1122 & SGA-LI-1123A/1123B	8.7.2/G	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
69	RCS Temperature Indicator RCA-TI-122CA and PMS Point RCT-122CA off scale high	8.7.2/G	Yes	No	Yes	Yes	1SB101	1SJ2250	(2)	No	RTD Failed
70	Steam Generator pressures SGA-PI-1013A - D and SGA-PI-1023A thru D failed to correlate to PPS	8.7.2/G	Yes	No	Yes	Yes	1SB111	1SJ2269	N/A	Yes	Page 243
71	RCS Temperature Indicator RCA-TI-111X and RCT 111X are off-scale low	8.7.2/G	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 251
72	RSP Indicators SGA-PI-1013A-1/1023A-1, SGA-HIC-179A and RCA-TI-112HA does not correlate with Control Room	8.7.2/G	Yes	Yes	Yes	Yes	1SB082	1SJ2252	N/A	Yes	Page 290 292
73	RCS Temperature Indicator RCA-TI-112CC off-scale high during comparison to RCC-TI-112CA	8.8.2/H	Yes	No	Yes	Yes	1SB103	1SJ2123	(2)	No	RTD Failed
74	SG Pressure Indicator SGA-PI-1023A failed low during comparison to ramaining three channels	8.8.2/H	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 269
75	SG Pressure Indicator SGA-PI-1023B failed to correlate to PPS Point ID B-12	8.8.2/H	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
76	SG Differential Pressure Indicator RCC-PDI-115C failed to correlate with PPS Point ID C-14	8.8.2/H	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
77	RCS Temperature Indicator RCA-TI-111Y and computer point RCT-111Y were both off scale during comparison	8.8.2/H	Yes	No	Yes	Yes	1SF073	1SJ2257	(2)	No	RTD Failed
78	SIT #1 Pressure, NR, Indicators SIN-PI-312 and SIB-PI-313 failed to correlate	8.8.2/H	Yes	Yes	No	N/A	N/A	N/A	N/A	No	Not Retested
79	SIT #4 Pressure, NR, Indicators SIN-PI-342 and SIN-PI-343 failed to correlate	8.8.2/H	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
80	SG #2 WR Level Indicator SGA-LI-1123A and SGB-LI-1123B fail to correlate (Panel B06)	8.8.2/H	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest

Table 2.0 (Cont'd)

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): NCR and DCP awaiting resolution of SFR,s 1SB112 and 1SB119

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
81	SG #2 NR Level Recorders on Panel B06 failed to correlate (i.e. SGN-LR-1121/1122).	8.8.2/H	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
82	SG #2 WR Level Indicator SGA-LI-1123A failed to correlate with the remaining three channels.	8.8.2/H	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	TER Retest
83	SG #1 & #2 NR Level Indicators failed to correlate. They are SGA-LI-1114A - D and SGA-LI-1124A - D	8.8.2/H	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
84	Chem. Spray Tank Level Indicators SIB-LI-348 and SIA-LI-349 failed to correlate	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 296
85	RCP 2B D/P pegged high during comparison of RCN-PDI-122 to RCN-PDI-123 (i.e. RCN-PDI-122 pegged high)	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 302
86	RCS Temperature RCN-TI-111Y Pegged off-scale high	8.8.5/J	Yes	No	Yes	Yes	1SF073	1SJ2257	(2)	No	RTD Failed
87	SG #2 WR Level Indicator SGA-LI-1123A failed to correlate with the remaining three channels	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Pages 309 and 312
88	SG #1 and #2 NR Level Indicators failed to correlate. They are SGA-LI-1114A - 1114D and SGA-LI-1124A - D	8.8.5/J	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
89	SG #2 NR Level recorders on Panel B06 failed to correlate specifically: SGN-LR-1121 and SGN-LR-1122	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Page 312
90	SG #2 WR Level Indicators on the RSP Failed to correlate. Specifically: SGA-LI-1123A-1 and SGB-LI-1123B-1	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Page 317
91	RCS Temperature Indicator RCA-TI-112CC off scale high during comparison to RCC-TI-112CA	8.8.5/J	Yes	No	Yes	Yes	1SB103	1SJ2123	(2)	No	RTD Failed
92	Chem Spray Tank Level Indicators SIB-LI-348 and SIA-LI-349 failed correlation	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 296
93	RCP 2B D/P plegged high during comparison of RCN-PDI-122 to RCN-PDI-123 (i.e. RCN-PDI-122 pegged high)	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 302
94	RCS Temperature Indicator RCA-TI-112CC off-scale high during comparison to RCC-TI-112CA	8.8.5/J	Yes	No	Yes	Yes	1SB103	1SJ2123	(2)	No	RTD Failed
95	SG #2 WR Level Indicator SGA-LI-1123A failed to correlate with remaining three channels	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Page 309
96	SG #2 WR Level Indicators on Panel B06 (SGA-LI-1123A and SGA-LI-1123B) failed to correlate	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Page 312
97	SG #2 WR Level Indicators on RSP (SGA-LI-1123A-1 and SGB-LI-1123B-1) failed to correlate	8.8.5/J	Yes	Yes	Yes	Yes	(1)	1SJ2038	1SJSB021	Yes	Page 317
98	SG #1 WR Level Indicators on RSP (SGA-LI-1113A-1 and SGB-LI-1113B-1) failed to correlate	8.8.5/J	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
99	RCS Temperature Indicator RCB-TI-112CB off-scale low during comparison to RCD-TI-112CD	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 307
100	SG #1 WR Level Indicator SGA-LI-1113A failed to correlate with remaining three channels	8.8.5/J	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem

Table 2.0 (Cont'd)

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): NCR and DCP awaiting resolution of SFR's 1SB112 and 1SB119

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
101	SG #1 Differential Pressure Indicators RCB-PDI-115B and RCC-PDI-115C failed to correlate with remaining channels	8.8.5/J	Yes	No	Yes	No	1SB112 1SB01119	(3)	(3)	No	SG DP Problem
102	SG #1 WR Level Indicators on Panel B06 (SGA-LI-1113A and SGA-LI-1113B failed to correlate	8.8.5/J	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
103	Chem. Spray Tank Level Indicators SIB-LI-348 and SIA-LI-349 failed to correlate	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 2960
104	RCS Temperature Indicator RCA-TI-112CA off-scale high during comparison to to RCC-TI-112CC	8.8.5/J	Yes	No	Yes	Yes	1SB107	1SJ217?	(2)	No	RTD Problem
105	RCS Temperature Indicator RCB-TI-112CB off-scale low during comparison to RCD-TI-122CD	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
106	SG #2 Differential Pressure Indicator RCB-PDI-125B failed to correlate with remaining three channels	8.8.5/J	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
107	RCS Pressurizer Level Recorders RCA-LI-110X-1 and RCB-LI 110Y-1 failed to correlate	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
108	RCS Pressurizer Level Recorder 110X, failed to correlate between channels X & Y	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
109	RCS Pressure, NR, Indicators failed to correlate. Specifically: RCA-PI-101A, RCB-PI-101B, RCC-PI-101C & RCD-PI-101D	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Page 307
110	RCS Pressurizer Level Recorder 110X, failed to correlate between channels X & Y	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
111	RCS Wide Range Temperature Indicator RCA-TI-115 and RCA-TR-115 off-scale low	8.8.5/J	Yes	No	Yes	Yes	1RC129	1SJ2473	(2)	No	RTD Failed
112	RCS Narrow range cold leg temperature indicator RCD-TI-112CD off-scale low	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
113	RCS Narrow range cold leg temperature indicator RCB-TI-122CB off-scale high	8.8.5/J	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
114	RCP 1A Pump Speed on PC and CMC did not correlate to CPC. RCP 1A speed on PC/CMC read zero	8.8.8/I	Yes	No	Yes	Yes	1SB120	N/A	N/A	No	RCS 155 Problem
115	RCS Temperature RCA-TI-122HA failed to correlate with recorder RCA-TR-122AA	8.8.8/I	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
116	Comparison of RMWT Level Indication to computer failed to correlate within allowed tolerance	8.8.8/I	Yes	Yes	No	N/A	N/A	N/A	N/A	Yes	Not Required
117	SG #1 Differential Pressure Indicators RCA-PDI-115A - D failed to correlate with each other and PMS	8.8.8/I	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
118	SG #2 Differential Pressure Indicators RCB-PDI-125B and RCD-PDI-125D failed to correlate with the PMS	8.8.8/I	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem
119	SG #1 NR Level indicators SGA-LI-1114A - D failed to correlate with each other	8.8.8/I	Yes	No	Yes	Yes	(1)	1SJ2038	1SJSB021	No	SG LVL Problem
120	SG #1 & #2 Differential Pressures Indicators RCD-PDI-115D, RCA-PDI-125A & RCD-PDI-125D failed to correlate with PMS	8.8.8/I	Yes	No	Yes	No	1SB112 1SB119	(3)	(3)	No	SG DP Problem

Table 2.0 (Cont'd)

Note (1): The steam generator level problem was documented by four SFR's. They were 1SB086, 1SB096, 1SB098 and 1SB099.

Note (2): The need for a DCP on the failed RTD's are still under evaluation, depending on whether they were caused by the RCP problems experienced.

Note (3): NCR and DCP awaiting resolution of SFR,s 1SB112 and 1SB119

PRECORE INSTRUMENTATION CORRELATION TEST TER HISTORY

TER #	TER DESCRIPTION	PROCEDURE STEP/APPX	RESOLUTION		SFR STATUS		DOCUMENT WRITTEN			RETEST STATUS	
			WRITTEN	DONE	WRITTEN	ANSWERED	SFR	NCR	DCP	COMPLETED	COMMENT
121	Initial conditions for starting section 8.6 (520°F and 1750 Psia Test Plateau) were outside tolerance	8.6.1	Yes	Yes	N/S	N/A	N/A	N/A	N/A	Yes	Not Required

Table 2.0 (Cont'd)

PRECORE INSTRUMENTATION CORRELATION TEST "YELLOW STICKER" HISTORY

INSTRUMENT NUMBER	REASON FOR "YELLOW STICKER"	PROCEDURE APPENDIX									
		A	B	C	D	E	F	G	H	J	I
SIB LI 311	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
SIB LI 321	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
SIA LI 331	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
SIA LI 341	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
SGN LR 1111	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGN LR 1112	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGN LR 1121	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
SGN LR 1122	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
SGA LI 1113A	Failed Instrumentation Correlation Requirements	T		T	T	T	T	T	T	T	T
SGB LI 1113B	Failed Instrumentation Correlation Requirements	T									
SGC LI 1113C	Failed Instrumentation Correlation Requirements	T									
SGD LI 1113D	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
SGA LI 1114A	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGB LI 1114B	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGC LI 1114C	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGD LI 1114D	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T	T
SGA LI 1123A	Failed Instrumentation Correlation Requirements	T		T	T	T	T	T	T	T/R	
SGB LI 1123B	Failed Instrumentation Correlation Requirements	T		T	T	T	T	T	T	T/R	
SGC LI 1123C	Failed Instrumentation Correlation Requirements	T									
SGD LI 1123D	Failed Instrumentation Correlation Requirements	T									

Note: T = Yellow stickered after completion of this test due to stated reason

R = Removed after successful retest per Appendix J and/or TER retest

Table 3.0

PRECORE INSTRUMENTATION CORRELATION TEST "YELLOW STICKER" HISTORY

INSTRUMENT NUMBER	REASON FOR "YELLOW STICKER"	PROCEDURE APPENDIX									
		A	B	C	D	E	F	G	H	J	I
SGA LI 1124A	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
SGB LI 1124B	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
SGC LI 1124C	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
SGD LI 1124D	Failed Instrumentation Correlation Requirements	T	T	T	T	T	T	T	T	T/R	
RCA PDI 115A	Failed Instrumentation Correlation Requirements		T		T	T				T	T
RCB PDI 115B	Failed Instrumentation Correlation Requirements		T	T	T	T	T	T	T	T	T
RCC PDI 115C	Failed Instrumentation Correlation Requirements		T	T	T	T	T	T	T	T	T
RCD PDI 115D	Failed Instrumentation Correlation Requirements		T	T						T	T
RCA PDI 125A	Failed Instrumentation Correlation Requirements	T					T			T	T
RCB PDI 125B	Failed Instrumentation COrrelation Requirements	T								T	T
RCC PDI 125C	Out-of-service for PreCore HFT	T	T	T	T	T	T	T	T	T	T
RCD PDI 125D	Failed Instrumentation Correlation Requirements	T								T	T
CHA LI 200	Failed Instrumentation Correlation Requirements	T									
CHB LI 201	Failed Instrumentation Correlation Requirements	T									
CHN TI 223	Failed Instrumentation Correlation Requirements	T									
CHN TI 224	Wrong range scale	T	T	T	T	T	T	T	T	T	T
SGA PR 1013A	Wrong range scale	T									
SGA PR 1023A	Wrong range scale	T									
RCA PI 105	FAiled Instrumentation Correlation Requirements	T									
RCN LR 110X	Failed Instrumentation Correlation Requirements	T									

Table 3.0 (Cont'd)

Note: T = Yellow stickered after completion of this test due to stated reason

R = Removed after successful retest per Appendix J and/or TER retest

PRECORE INSTRUMENTATION CORRELATION TEST "YELLOW STICKER" HISTORY

INSTRUMENT NUMBER	REASON FOR "YELLOW STICKER"	PROCEDURE APPENDIX									
		A	B	C	D	E	F	G	H	J	I
HCA PR 353A	Wrong range scale	T									
CTA LR 35	Wrong range scale	T	T	T	T	T	T	T	T	T	T
CHN PI 201	Failed Instrumentation Correlation Requirement	T	T	T	T	T	T	T	T	T	T
CHN LI 210	Wrong Range scale	T	T	T	T	T	T	T	T	T	T
HCB PI 352B	Failed Instrumentation Correlation Requirements		T								
SIN PI 342	Failed Instrumentation Correlation Requirements				T	T	T		T		
SIN PI 343	Failed Instrumentation Correlation Requirements				T	T	T		T		
RCN PR 100Y	Failed Instrumentation Correlation Requirements						T	T			
RCA TI 122CA	Failed Instrumentation Correlation Requirements					T	T	T	T	T	T
RCA PI 199A	Failed Instrumentation Correlation Requirements					T					
SIN PI 312	Failed Instrumentation Correlation Requirements						T	T	T	T	T
SIN PI 313	Failed Instrumentation Correlation Requirements						T	T	T	T	T
SIN PI 322	Failed Instrumentation Correlation Requirements						T	T			
SIN PI 323	Failed Instrumentation Correlation Requirements						T	T			
RCN TI 111X	Failed Instrumentation Correlation Requirements						T	T			
RCN TR 111X	Failed Instrumentation Correlation Requirements						T	T			
RCB PI 101B	Failed Instrumentation Correlation Requirements					T	T	T		T/R	
RCC PI 101C	Failed Instrumentation Correlation Requirements						T	T			
RCD PI 101D	Failed Instrumentation Correlation Requirements						T			T/R	
RCA TI 112CC	Failed Instrumentation Correlation Requirements								T	T	T

Table 3.0 (Cont'd)

Note: T = Yellow stickered after completion of this test due to stated reason

R = Removed after successful retest per Appendix J and/or TER retest

PRECORE INSTRUMENTATION CORRELATION TEST "YELLOW STICKER" HISTORY

INSTRUMENT NUMBER	REASON FOR "YELLOW STICKER"	PROCEDURE APPENDIX									
		A	B	C	D	E	F	G	H	J	I
SGA PI 1013A-1	Wrong Range scale						T	T	T	T	T
SGB PI 1013B-1	Wrong Range Scale						T	T	T	T	T
SGA PI 1023A-1	Wrong Range Scale						T	T	T	T	T
SGB PI 1023B-1	Wrong Range Scale						T	T	T	T	T
SGA LI 1113A-1	Failed Instrumentation Correlation Requirements									T	T
SGA LI 1123A-1	Failed Instrumentation Correlation Requirements						T	T	T	T/R	
RCB TI 122CB	Failed Instrumentation Correlation Requirements									T	T
RCD TI 112CD	Failed Instrumentation Correlation Requirements									T	T
RCA TI 112CA	Failed Instrumentation Correlation Requirements									T	T
RCA TI 115	Failed Instrumentation Correlation Requirements									T	T
RCA TR 115	Failed Instrumentation Correlation Requirements									T	T
RCA TI 111Y	Failed Instrumentation Correlation Requirements									T	T

Note: T = Yellow stickered after completion of this test due to stated reason

R = Removed after successful retest per Appendix J and/or TER retest

Table 3.0 (Cont'd)

PRECORE INSTRUMENTATION CORRELATION TEST OPEN TER's RETEST MATRIX

PARAMETERS	COMPARISONS	AMBIENT CONDITIONS	RCS TEMPERATURE AND PRESSURE TEST PLATEAUS 260 Deg. F. 350 Psia	360 Deg. F. 460 Psia	460 Deg. F. 1150 Psia	505 Deg. F. 1550 Psia	520 Deg. F. 1720 Deg. F.	545 Deg. F. 1950 Psia	565 Deg. F. 2250 Psia
SG #1 Levels	Channel to Channel Channel to PMS Channel to RPS	TER 4,12 TER 13,17	TER 12,17	TER 12,17 TER 29	TER 12,35 TER 37,38 TER 39	TER 37,38	TER 29,54	TER 66	TER 83,88 TER 98,100 TER 102,119
RCS Cold Leg Temps. (failed)	Channel to PMS Channel to CPC					TER 42,45	TER 42,57	TER 63,69	TER 73,77
SG #1 and #2 Primary DP's	Channel to Channel Channel to PMS Channel to PPS	TER 15,16	TER 24	TER 24	TER 24,32 TER 33	TER 47			TER 76,101 TER 106,117 TER 118,120
SIT 1 NR Pressures	Channel to Channel Channel to PMS				TER 36	TER 36	TER 49	TER 67	TER 78
SIT's WR Levels	Channel to PMS	TER 10	TER 10	TER 10	TER 10	TER 10	TER 10	TER 10	TER 10
Containment Sump Levels	Channel to PMS	TER 11	TER 11	TER 11	TER 11	TER 11	TER 11	TER 11	TER 11
RCP 1A Speed	PMS to PMS PMS to CPC								TER 114

TABLE 4.0

NOTE: Retesting at the exact test plateaus noted above is not mandatory, provided suitable alternative test plateaus are available and they give adequate assurances of verifying the instrument correlation requirements.

NOTE: RCP 1A speed can be retested at any test plateau provided this pump is in service. Pump speed is not a function of reactor coolant system temperature and pressure.

NOTE: Containment sump levels need only be retested once at any of the above test conditions since they are not function of reactor coolant system temperature and pressure.

STEAM GENERATOR LEVEL TRANSMITTER CONDENSATE POT PROBLEM/RESOLUTION

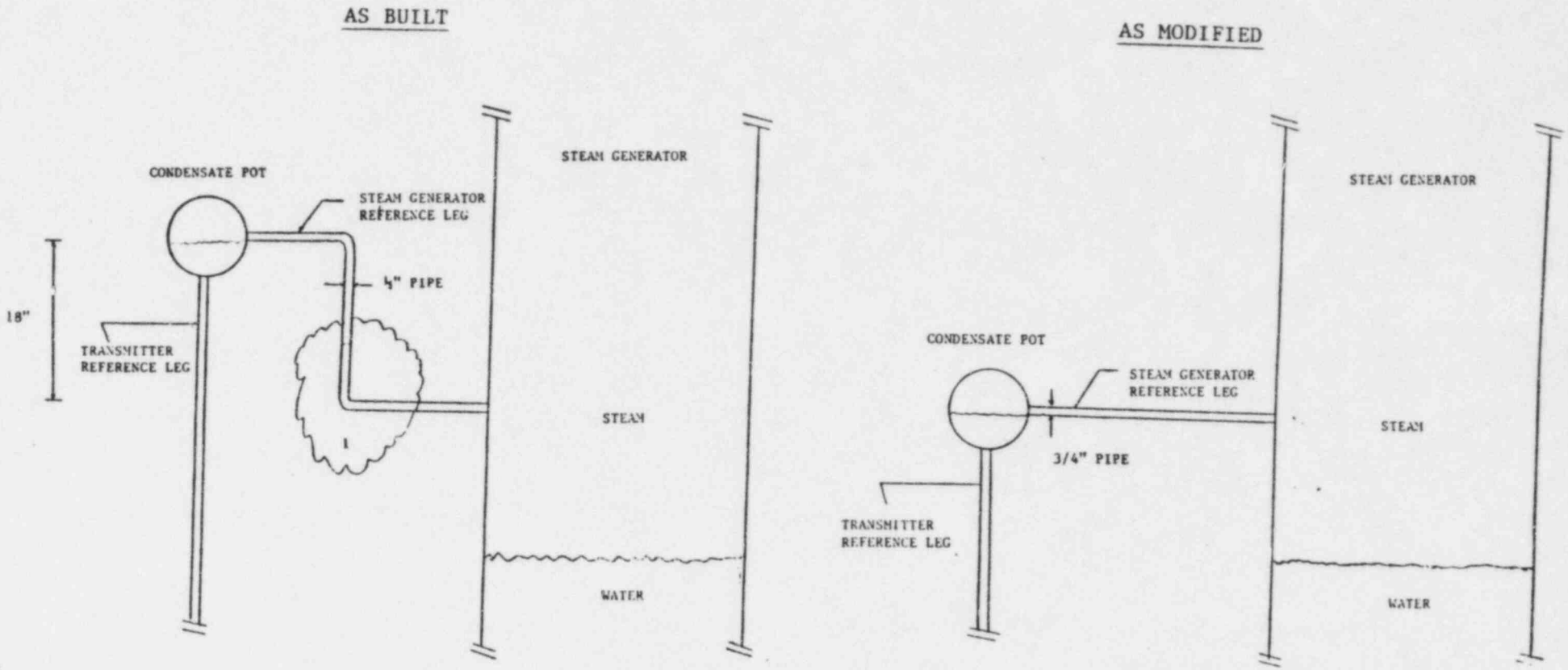

Figure 1.0

Note (1): This design allowed water to buildup in the reference leg between the steam generator and condensate pot.