Abnormal Transient Operating Guidelines

(ATOG)

Comparison
of
Davis - Besse Unit 1
to
Oconee Unit 3

ATTACHMENT I

12-1153713-00

Babcock & Wilcox
a McDermott company

Abnormal Transient Operating Guidelines

(ATOG)

Comparison

Of

Davis-Besse Unit 1

To

Oconee Unit 3

12-1153713-00

Doc. ID - Serial No., Revision No.

For

Toledo Edison Company

Introduction

The Owners of Babcock and Wilcox designed nuclear power reactors have developed guidelines to aid preparation of operating procedures for the mitigation of transients and accidents in response to Item I.C.1 of NUREG-0737, "Clarification of TMI Action Plan Requirements". The approach selected by the B&W Owners Group resulted in plant specific Abnormal Transient Operating Guidelines (ATOG) based on generic symptoms of upsets in heat transfer.

Since there is no generic version of ATOG, the Nuclear Regulatory Commission reviewed the ATOG developed for the Oconee Nuclear Station, Unit 3 (ONS-3) and thus the Safety Evaluation Report issued in September of 1983 is based on the ONS-3 version of ATOG (Ref. 1).

The purpose of this document is to facilitate NRC review of the plant specific ATOG developed for the Davis Besse Nuclear Power Station Unit 1 (Reference 2) by comparison of the Procedural Guidelines (Part I) of the Davis Besse and Oconee ATOGs. The Davis Besse ATOG is consistent with the Oconee ATOG in overall philosophy, use of symptoms, and priority of major actions. However, the plant specific nature of ATOG does result in differences, the reasons for which are identified in this document.

Scope

This document contains sections correlating to each major heading of the Davis Besse ATOG Part I, Procedural Guidelines. Each section identifies differences between the Davis Besse version and the ONS-3 version previously reviewed by the NRC and explains the reasons for these differences. In general, each difference exists for one of the following reasons:

1. Plant specific differences in equipment, NSS design, setpoints, or procedures.

2. Improvements incorporated as a result of the NRC review of the ONS-3 ATOG. This primarily consists of items identified in References 3 and 4. Reference 5 was issued after completion of the final Davis Besse ATOG.

3. Preferential differences of a non-technical nature that reflect Davis Besse preferred methods for operation or training.

In addition, this document provides composite flowcharts (Figures 1-4) that use the Davis Besse logic diagrams from ATOG Part I as a base. The logic diagrams have been modified to show differences with respect to the ONS-3 versions, specifically:

1. Steps that are unique to the Davis Besse ATOG.

2. Steps that are unique to the Oconee ATOG.

3. Steps that are in a different sequence.

4. Differences in setpoints or wording.

A figure is provided for every Davis Besse Part I logic diagram except III.C, "Excessive Heat Transfer". The overall structure of the Davis Besse Figure IIIC is similar to the Oconee version. However, the additional steps required to address the Steam Feed Rupture Control System (SFRCS) on Davis Besse made it impractical to develop a composite flowchart. Therefore, logic diagrams for Section III.C from both Oconee and Davis Besse ATOGs are included.

Section I - Immediate Actions

1. Item a under "Forced Shutdown": There is a slight wording change but the functions are identical. The vacuum system discharge monitor on Davis Besse is the equivalent condenser monitor to the air ejector radiation monitor on Oconee. The SGTR section referenced in Davis Besse is the equivalent to Section III.D referenced in Oconee.

2. Item b under "Forced Shutdown": Different procedure numbers are referenced. These are plant specific procedures that accomplish the same basic function. In addition, the Davis Besse ATOG specifically states to continue with Section II while this is an implied condition on Oconee.

3. The Davis Besse ATOG contains an additional step, item c under "Reactor Trip", to summon the Shift Technical Advisor (STA). This is a plant specific administrative step.

Section II - Vital System Status Verification

1. Davis Besse Step 1.0 remedial action states to transfer makeup pump (MUP) suction to the borated water storage tank (BWST) while Oconee starts high pressure injection (HPI). The functions are identical, however Davis Besse uses the MUP's which have a higher shutoff head than the HPI pumps.

2. Davis Besse has an additional step (5.0) to verify or start a second makeup pump. This is a normal post-trip action at Davis Besse to aid makeup of the RCS post-trip contraction volume.

3. Davis Besse has an additional step (8.0) to provide specific remedial actions on loss of ICS power Oconee covers loss of ICS power by reference to a site procedure.

4. Davis Besse has an additional step (11.0) to verify proper SFRCS actuation. This step is provided for the same reason as step 10.0 for SFAS, to verify proper automatic actuations when they occur. Oconee does not have a system similar to SFRCS.

Section III.A - Lack of Adequate Subcooling Margin

1. Steps 2.0 and 3.0 are in reverse order from the same steps in the ONS-3 ATOG. Three actions are always required by ATOG on loss of subcooling margin: trip of all RC pumps, initiation of MU/HPI, and raising SG levels to the loss of subcooling margin setpoint. Of these three, trip of the RC pumps is always performed first due to the time dependence of this action. This is the first step in both the Davis Besse and Oconee ATOGs.

   The order of the other two actions is not as important, as long as both are performed. However, the order of these steps was reversed on Davis Besse for the following reasons:

   a. Davis Besse has automatic feedwater control up to their loss of subcooling margin setpoint upon SFAS actuation on low RC pressure. Oconee achieves their loss of subcooling margin setpoint with manual control (although the level will begin to increase automatically to the natural circulation setpoint after the RC pumps are tripped).

   b. The raised loop design of Davis Besse results in a lower SG level requirement (93" on the startup range) than that required for Oconee's lowered loop design (95% on the operate range).

   Therefore, Davis Besse will attain the required setpoint sooner than Oconee and, for most transients resulting in loss of subcooling margin, under automatic control.

   In actuality, both actions at both plants will be performed almost simultaneously. At Davis Besse, the automatic actions will be verified or initiated as necessary. At Oconee, they will begin to raise the SG levels and then verify or initiate HPI as necessary.

   In addition, the Davis Besse step (3.0) for raising SG levels specifically identifies the exception for excessive heat transfer due to loss of steam pressure control through reference to Specific Rule 4. The Oconee step (2.0) and referenced Specific Rule 3.0 do not contain this exception, but it is discussed in Part II of the Oconee ATOG.

2. Davis Besse has an additional step (4.0) to address excessive heat transfer. Both the Davis Besse and Oconee ATOG's address this symptom near the end of Section III.A, but Davis Besse also addresses it at this point (to cover the event where loss of subcooling margin occurred due to excessive heat transfer). In this case the operator would transfer to Section III.C to terminate

the overcooling transient. He would return to III.A if adequate subcooling margin still does not exist after stabilization of heat transfer.

3. Davis Besse step 7.0 checks for superheated conditions using only the incore thermocouples while the equivalent Oconee step (6.0) references use of hot leg RTD's in conjunction with incore thermocouples. This change was made in response to an NRC comment addressed in the March 14, 1983 supplement to the ONS-3 ATOG (Ref. 4, Item #13).

4. Davis Besse does not contain a specific step to control HPI as does Oconee (step 11.0). Davis Besse step 2.0 states to initiate and control MU/HPI per specific rules 1 and 2 and therefore control actions are not repeated here.

5. Davis Besse has an additional step (15.0) to check for indication of a steam generator tube rupture (SGTR). This step has been added to complete the verification of plant stability and to address the possibility that a tube rupture may have caused or contributed to the loss of subcooling margin.

Section III.B - Lack of Heat Transfer

1. Section III.B of the Davis Besse ATOG does not contain steps equivalent to steps 1.0-1.4 in Section III.B of the Oconee ATOG. These steps in the Oconee ATOG check for loss of subcooling margin and provide appropriate actions if adequate subcooling margin does not exist. Davis Besse, as does Oconee, treats loss of subcooling margin as an overriding top priority rule such that these actions are required anytime adequate subcooling margin does not exist. Therefore, inclusion of these steps is unnecessary and they were deleted from the Davis Besse ATOG.

2. Steps 2.0-4.0 in the Davis Besse ATOG are equivalent to steps 6.0-8.0 in the Oconee ATOG but are in a different sequence. While the Oconee ATOG allows additional attempts to restore feedwater before initiation of HPI cooling, the Davis Besse ATOG initiates HPI cooling first for the following reasons:

   a. Feedwater flow does not exist, as determined in step 1.0, and therefore a problem does exist within the feedwater systems which may require time to resolve.

   b. Davis Besse has low head HPI pumps requiring quick initiation of HPI cooling before pressure increases and the pumps become ineffective.

   c. Establishing HPI cooling will ensure adequate core cooling while attempts to restore feedwater are continued.

   d. Establishing HPI cooling as soon as possible will minimize the heatup of the RCS, thus maintining RCS saturation pressure as low as possible and maximizing injection flow.

3. Step 8.0 of the Davis Besse ATOG concerning PORV operation does not exist in the Oconee ATOG, but was added to the Oconee ATOG scope by the July 2,1983 supplement (Ref. 5, Attachment B).

4. Steps 11.0 and 12.0 of the Davis Besse ATOG are in reverse order from the equivalent steps (14.0 and 15.0) in the Oconee ATOG. There is no functional difference as both sequences accomplish the same actions.

5. The sequencing and actions of Davis Besse steps 13.0-15.0 are the same as Oconee steps 16.0-18.0. However, the flowchart for Davis Besse, Figure III.B "Lack of Heat

Transfer," has additional decision points between steps 13.0-14.0 and 14.0-15.0 to pictorially represent the intent of step 10.0.

6. Step 14.1 of the Davis Besse ATOG references an SG level of 40". The equivalent Oconee step (17.1) references an SG level of 30". The Oconee value equals the low level limit at Oconee, while the Davis Besse value is just above their low level limit of 35" and corresponds to their normal natural circulation setpoint. The Davis Besse and Oconee steps accomplish the exact same function of ensuring a heat sink is available.

7. Step 16.0 of the Davis Besse ATOG states "RECOVER FROM <u>MU/HPI COOLING</u>, IF INITIATED". The phrase "if initiated" does not exist in the Oconee ATOG but was added to the Oconee ATOG scope by the June 15, 1982 supplement (Ref. 3, Step 19.0 of III.B).

Section III.C - Excessive Heat Transfer

1. **General:**

   Section III.C of the Davis Besse ATOG contains a number of additional steps over the Oconee ATOG. These steps do not functionally alter the actions for excessive heat transfer, but are necessary to address manual or automatic SFRCS actuation. The following steps are included on Davis Besse to address SFRCS actuations: 3.0, 6.0, 7.0, 9.0, 25.0, and 26.0.

   A composite flowchart is not provided for this section since the number of discrete differences would make it difficult to use. A copy of each flowchart is provided for comparison. The functional similiarity is evident when the four flowpaths are compared. Both flowcharts have an initial branch depending on whether or not the overcooling SG is apparent (at step 5.0 on Davis Besse, 2.0 on Oconee). Each path contains an additional branch depending on whether or not the affected SG can be returned to service (steps 8.0 and 24.0 on Davis Besse, 4.0 and 15.0 on Oconee).

2. Step 1.0 of Davis Besse states to increase makeup flow if pressurizer level is below 100" while Oconee states to initiate HPI at 50". The Davis Besse value adds margin for possible instrument errors and specifies makeup flow since the RCS pressure is probably above shutoff pressure for the HPI pumps. If RCS pressure decreases to below HPI shutoff head, the HPI pumps would be started automatically by SFAS actuation.

3. In step 4.0, Davis Besse checks SG and pressurizer levels and trips the MFW pumps if either of the respective limits is exceeded. This is the same action as step 3.1 on Oconee, but is sequenced differently on Davis Besse since trip of the MFW pumps will actuate SFRCS.

4. SFRCS actuation on trip of MFW pumps (step 4.0) or on low SG level (step 6.0) will isolate steam and main feedwater on both SG's. If the overcooling continues and the affected SG is still not apparent, AFW is isolated to both SG's in step 10.0. This is functionally the same as step 3.0 of Oconee but sequenced differently due to SFRCS.

Section III.D - Steam Generator Tube Rupture

1. Davis Besse step 2.4 (letdown isolation) is identical to Oconee step 3.1 and is performed in the exact same sequence. This step was placed under step 2.0 of Davis Besse because it is functionally similar in controlling RC inventory.

2. Davis Besse step 3.1 states to reduce power "at as fast a rate as can be controlled". The equivalent Oconee step (3.2) states "at greater than 5% per minute". This step was revised on Davis Besse in response to an NRC comment addressed in the March 14, 1983 Supplement to the ONS-3 ATOG (Ref. 4, Item #38).

3. Davis Besse unloads and trips the turbine below 25% reactor power (step 3.4) while Oconee performs theseactions at less than 20% power (step 3.5). The power limitation is based on turbine bypass capacity in order to prevent unnecessary lifting of main steam safety valves. Both the Oconee and Davis Besse steps accomplish this function.

4. Davis Besse step 4.0 is identical to step 4.1 on Oconee, but since it is a separate step on Davis Besse it appears on the Davis Besse flowchart.

5. Davis Besse has an additional step (5.3) to place HPI and LPI in the "piggy back" mode if necessary to supplement makeup. This step is required due to lower head HPI pumps at Davis Besse.

6. The Oconee ATOG has a step (5.0) that checks for excessive heat transfer. In Davis Besse, this check is accomplished as part of step 4.0.

7. Davis Besse has two additional substeps under step 6.0. Substep 6.4 requires bypassing SFRCS to prevent closure of the MSIV's. Oconee does not have MSIV's. Substep 6.5 states to begin makeup to the BWST if MU/HPI was initiated. This was added in response to NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #8.b).

8. Davis Besse has an additional substep under step 11.0. Substep 11.2 provides direction for feeding an OTSG with a steam leak and was added in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #1). Similar substeps have also been added for the same reason at 14.2, 16.2, and 19.5. In addition, substep 11.3 has added steaming requirements in response to an NRC comment addressed in the June 15, 1982 supplement (Ref. 3, Item #2).

9. Davis Besse steps 11.7 and 16.4 state to "initiate" a rapid cooldown as opposed to the corresponding ONS-3 ATOG steps (11.6 and 16.3) which state to "perform" a rapid cooldown. This change is intended to clarify follow-on operator actions (i.e., the operator continues while the rapid cooldown is in progress) and was made in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #7.a).

10. Davis Besse has an additional substep under step 14.0. Substep 14.7.d provides specific direction if the RCP's cannot be restarted (this is implied in the ONS-3 ATOG). This clarification is in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #7.b).

11. Davis Besse has an additional substep under step 17.0. Substep 17.1 addresses the possibility of closed MSIV's. Oconee does not have MSIV's.

12. Davis Besse substep 18.7 states to continue with step 19.0 when 500F is reached. This clarification was added in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Step 18.8 of III.D).

13. Davis Besse substeps 19.5-19.7 are worded differently than the corresponding steps (19.5 and 19.6) in the ONS-3 ATOG in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #1). In addition, the Davis Besse steps acknowledge that the 100F tube to shell delta T limit may be in effect.

14. Davis Besse has two additional substeps under step 19.0. Substep 19.9 addresses hotwell level control that the ONS-3 ATOG covers in the referenced site procedure (step 20.0). Substep 19.10 addresses SFRCS bypass; ONS-3 does not have an equivalent system.

15. Davis Besse has added substeps under step 20.0. These substeps provide precautions to be considered in response to two NRC comments addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Item #5 and Step 20.0 of III.D) and consolidated in response to an NRC comment addressed in the March 14, 1983 supplement to the ONS-3 ATOG (Ref. 4, Item #51).

CP-101

1. Davis Besse step 1.0 does not contain the substeps under step 1.0 in the ONS-3 ATOG. Oconee substep 1.2, regarding makeup to the BWST, is not included since CP-101 is for a large LOCA where makeup is not feasible in the near term. Containment sump recirculation will be used after BWST depletion.

   Similarly, Oconee substep 1.3 regarding CFT isolation is not included since N_2 introduction is not a concern for large LOCA's. The CFT's are isolated in site procedures after tranfer out of CP-101. For small break LOCA's where N_2 introduction is not desired, the transfer to CP-103 or CP-104 will result in CFT isolation in those procedures.

2. The Davis Besse ATOG does not contain a step for personnel notification (step 2.0 on Oconee). This function is accomplished by site specific procedures.

3. Davis Besse does not contain step equivalent to Oconee step 4.0 regarding core flood line break. The minimum LPI flow requirement of 1000 gpm per line given in step 3.4 is based on providing adequate flow with a core flood line break.

4. Davis Besse does not contain separate steps for verifying building isolation by SFAS (steps 6.2 and 6.3 in Oconee). This action is covered by Davis Besse step 1.0. Since this is a large LOCA and an entry condition to CP-101 is the emptying of CFT's, then SFAS will have actuated and verification will be covered by step 1.0.

5. Davis Besse does not contain a step equivalent to step 6.4 of Oconee since the RCP's will not be running for a large LOCA.

6. The Davis Besse ATOG does not contain a step under long-term cooling for prevention of boron precipitation (step 7.9 on Oconee). These actions are covered by plant specific procedures (referenced in steps 6.3 and 6.5).

CP-102

1. Davis Besse does not have a specific step to transfer to CP-103 in the event a small break LOCA has occurred (step 2.0 in Oconee). Davis Besse does have steps for controlling MU/HPI (steps 1.0 and 5.4). In addition, entry conditions for CP-102 are adequate subcooling margin and primary to secondary heat transfer. If these conditions change, due to a small LOCA or for any reason, a symptom will develop (loss of subcooling margin or loss of heat transfer) and the appropriate portion of Section III will be entered.

2. Davis Besse has an additional step (2.0) for returning the condenser to service if isolated by SFRCS. Oconee does not have an equivalent system.

3. Davis Besse step 5.1 states a differential temperature limit of +100F while Oconee step 4.1 states ± 100F. The limit is a tensile limit (tubes colder) therefore + 100F is correct.

CP-103

1. Davis Besse has an additional substep, 4.4, to block SFRCS during the cooldown. Oconee does not have an equivalent system.

2. Davis Besse has an additional step, 10.0, to isolate the CFT's when the tanks are empty.

3. Davis Besse does not contain a step to close high point vents (step 10.0 on Oconee). The vents may be closed at this time, but Davis Besse has decided to leave the vents open until either subcooling is regained (covered by transfer to CP-105) or by eventual transfer to site procedures through tranfer to CP-101 at step 19.0. The vents will only be opened if ICC conditions had existed; leaving the vents open longer than required provides added assurance against blocking primary to secondary heat transfer due to non-condensibles.

3. Davis Besse has an additional step, 11.0, to address the option of switching to LPI/DHS cooling. At this point in the procedure, the RCS is in a saturated condition while cooling with the steam generators. This mode requires continuous injection flow and control of saturated natural circulation. Therefore, conditions permitting, a transition to LPI/DHS mode of cooling may be preferred.

4. Davis Besse has an additional step 18.0 to provide further guidance on LPI cooling. In addition, substep 18.4 provides specific guidance for the possibility of subsequent loss of subcooling margin in response to an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Step 16.8 of CP-103).

CP-104

1. Oconee step 2.0 provides guidance for observing the pressurized thermal shock limit under certain conditions. This limit is not applicable to the Davis Besse design and normal NDT limits apply, therefore an equivalent step is not included in the Davis Besse ATOG. Similarly, step 1.0 of the Oconee ATOG is not included in Davis Besse since the function of this step is to bypass step 2.0 if reactor coolant pumps are running. Step 5.0 of Oconee is also unnecessary for Davis Besse and is not included.

2. Davis Besse step 2.0 states to open or verify open the PORV and PORV block valve. This wording change accounts for entry into CP-104 from Section III.B (feedwater available) where HPI cooling has not yet been initiated as identified in an NRC comment addressed in the June 15, 1982 supplement to the ONS-3 ATOG (Ref. 3, Step 3.0 of CP-104).

3. Davis Besse step 6.0 has been expanded from the corresponding step in the Oconee ATOG (7.0) to clarify the two possible conditions that would not necessitate a transfer to CP-103.

4. Davis Besse substep 8.1 uses both incore thermocouples and hot leg RTD's to account for the condition specified in item a. under step 6.0.

5. The steam generator level given in Davis Besse substep 8.3 is the functional equivalent to the level given in Oconee substep 9.3. The difference is due primarily to the raised loop design of Davis Besse.

6. Davis Besse step 9.0 combines the functions of Oconee steps 10.0 and 11.0 and therefore is worded differently.

7. Davis Besse substep 13.2 specifies a steam generator level of at least 40" while the Oconee step (15.2) uses 30". This difference is for the same reason explained in item 6 under Section III.B - Lack of Heat Tranfer.

CP-105

1. The title of CP-105 in Davis Besse has been revised to note that RCS subcooling is an entry condition.

2. Davis Besse starts RCP's in step 3.0 while Oconee performs this action in step 8.3 (without a bubble) or step 1.0 of CP-102 with a bubble. Please note that substep 3.1 should tranfer to step 4.0 instead of 3.0. This is a typographical error.

3. Davis Besse substep 6.3 states a pressurizer level of approximately 180 inches while the corresponding Oconee step (5.3) states approximately 220 inches. These values are somewhat arbitrary and therefore given as approximates, but each value closely approximates the normal operating level at each plant.

Specific Rule 1 - Initiation of MU/HPI

The Davis Besse version of this rule is worded and structured differently than the Oconee version for the following reasons:

1. to clarify that this rule is applicable for loss of subcooling margin

2. to account for the use of both MU and HPI pumps at Davis Besse. These are different pumps at Davis Besse due to the lower shutoff head of the HPI pumps. Oconee uses the same pumps for both MU and HPI.

Specific Rule 2 - HPI Flow Control

This rule is worded and structured differently in the Davis Besse ATOG for the following reasons:

1. to clarify between guidelines for terminating HPI and guidelines for throttling HPI and MU flow

2. to include the LPI flow criterion for terminating HPI

3. to provide reference to the Technical Specification P-T limit as opposed to the pressurized thermal shock limits given in the Oconee version.

Specific Rule 3 - Feedwater Throttling Methods

This rule is worded and structured differently in the Davis Besse ATOG for the following reasons:

1. to simplify the full flow requirement by combining Oconee Items 3.1 and 3.4. In addition, this requirement has been clarified in response to an NRC comment addressed in the March 14, 1983 supplement to the ONS-3 ATOG (Ref. 4, Item #72).

2. to include the exception for excessive heat transfer conditions.

3. to delete the requirements for flow throttling based on SG pressure. The SG level requirements at Davis Besse are appreciably lower than those for Oconee and excessive SG preessure reduction due to AFW flow is not expected in obtaining those levels.

Specific Rule 4 - SG Level Setpoint

This rule is worded and structured differently in the Davis Besse ATOG for the following reasons:

1. to clarify between the level setpoint rule for loss of subcooling margin and the level setpoint guidelines for all other conditions.

2. to include the exception for loss of secondary pressure control.

3. to add the level setpoints dependent on SFRCS and SFAS actuation that are achieved automatically.

4. to provide guidance on manual control for level errors.

Section ICC - Followup Actions for Inadequate Core Cooling

1. Step 2.0 of Davis Besse specifies 93" for SG levels while Oconee (2.0) uses 90-95%. The raised loop design of Davis Besse results in a lower SG level requirement to support boiler-condenser cooling.

2. Step 7.0 of Davis Besse states to raise SG levels to 95% on the operate range. This raises the SG levels much higher than necessary for boiler-condenser cooling, but is a prudent action in that heat transfer does not exist and RC conditions have degraded into Region 3. Oconee does not have this requirement in step 7.0 since the levels were already established at 95% in step 2.0.

3. Davis Besse step 11.0 does not contain substep 11.3 as exists in the ONS-3 ATOG step 11.0. Substep 11.3 was deleted from the Oconee ATOG in response to an NRC comment addressed in the March 14, 1983, supplement (Ref. 4, Item #77).

4. Davis Besse step 13.0 states to open all high point vents. Oconee step 13.0 does not contain this action, but the action was added by the March 14, 1983 supplement in response to an NRC comment (Ref. 4, Item #272).

5. Davis Besse has expanded step 24.0 to provide further guidance on LPI cooling and to provide specific guidance for the possibility of subsequent loss of subcooling margin. This change resulted from the change noted under CP-103, item 4, and, although not specifically commented on by the NRC, the intent is the same.

References

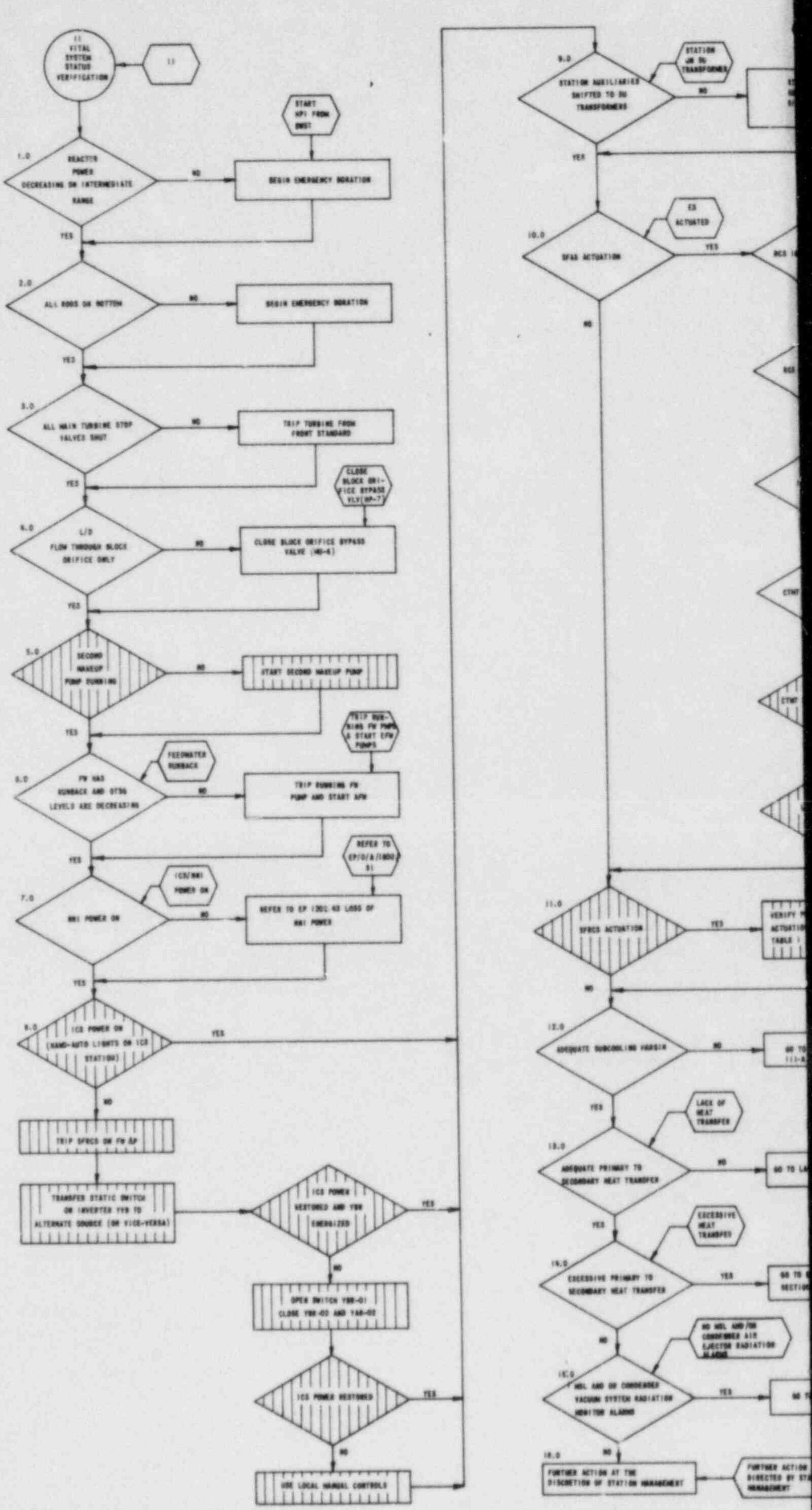
1. Abnormal Transient Operating Guidelines for Oconee Nuclear Station Unit 3, 74-1123297-00, March 23, 1982.

2. Abnormal Transient Operating Guidelines for Davis Besse Nuclear Power Station, 74-1125531-00, July 6, 1982.

3. Enclosure to letter, D. D. Whitney to D. G. Eisenhut, June 15, 1982.

4. Enclosure to letter, D. A. Napior to B&W Owners Group, "Resolution of NRC Comments on Oconee ATOG," March 14, 1983.

5. Enclosures to letter, D. D. Whitney to D. G. Eisenhut, "Supplement to ONS-3 Final ATOG," July 2, 1983.


II
VITAL SYSTEM STATUS VERIFICATION
II
1.0
REACTOR POWER DECREASING ON INTERMEDIATE RANGE
NO
START HPI FROM BWST
BEGIN EMERGENCY BORATION
YES
2.0
ALL RODS ON BOTTOM
NO
BEGIN EMERGENCY BORATION
YES
3.0
ALL MAIN TURBINE STOP VALVES SHUT
NO
TRIP TURBINE FROM FRONT STANDARD
YES
4.0
L/D FLOW THROUGH BLOCK ORIFICE ONLY
NO
CLOSE BLOCK ORI-FICE BYPASS VLV(HP-7)
CLOSE BLOCK ORIFICE BYPASS VALVE (HP-6)
YES
5.0
SECOND MAKEUP PUMP RUNNING
NO
START SECOND MAKEUP PUMP
YES
6.0
FW HAS RUNBACK AND OTSG LEVELS ARE DECREASING
FEEDWATER RUNBACK
NO
TRIP RUN-NING FW PUMPS & START EFW PUMPS
TRIP RUNNING FW PUMP AND START AFW
YES
7.0
NNI POWER ON
ICS/NNI POWER ON
NO
REFER TO EP/0/A/1800/31
REFER TO EP 1202.43 LOSS OF NNI POWER
YES
8.0
ICS POWER ON (HAND-AUTO LIGHTS ON ICS STATION)
YES
NO
TRIP SFRCS ON FW ΔP
TRANSFER STATIC SWITCH ON INVERTER YVB TO ALTERNATE SOURCE (OR VICE-VERSA)
ICS POWER RESTORED AND YBW ENERGIZED
YES
NO
OPEN SWITCH YBB-01 CLOSE YBB-02 AND YAB-02
ICS POWER RESTORED
YES
NO
USE LOCAL MANUAL CONTROLS
9.0
STATION AUXILIARIES SHIFTED TO SU TRANSFORMERS
STATION ON SU TRANSFORMER
NO
YES
10.0
SFAS ACTUATION
ES ACTUATED
YES
NO
CTMT
11.0
SFRCS ACTUATION
YES
VERIFY
ACTUATIO
TABLE I
NO
12.0
ADEQUATE SUBCOOLING MARGIN
NO
GO TO
III-A
YES
13.0
ADEQUATE PRIMARY TO SECONDARY HEAT TRANSFER
LACK OF HEAT TRANSFER
NO
GO TO LA
YES
14.0
EXCESSIVE PRIMARY TO SECONDARY HEAT TRANSFER
EXCESSIVE HEAT TRANSFER
YES
GO TO
SECTIO
NO
15.0
HOL AND OR CONDENSER VACUUM SYSTEM RADIATION MONITOR ALARMS
NO HOL AND/OR CONDENSER AIR EJECTOR RADIATION ALARMS
YES
NO
16.0
FURTHER ACTION AT THE DISCRETION OF STATION MANAGEMENT
FURTHER ACTION
DIRECTED BY STA
MANAGEMENT

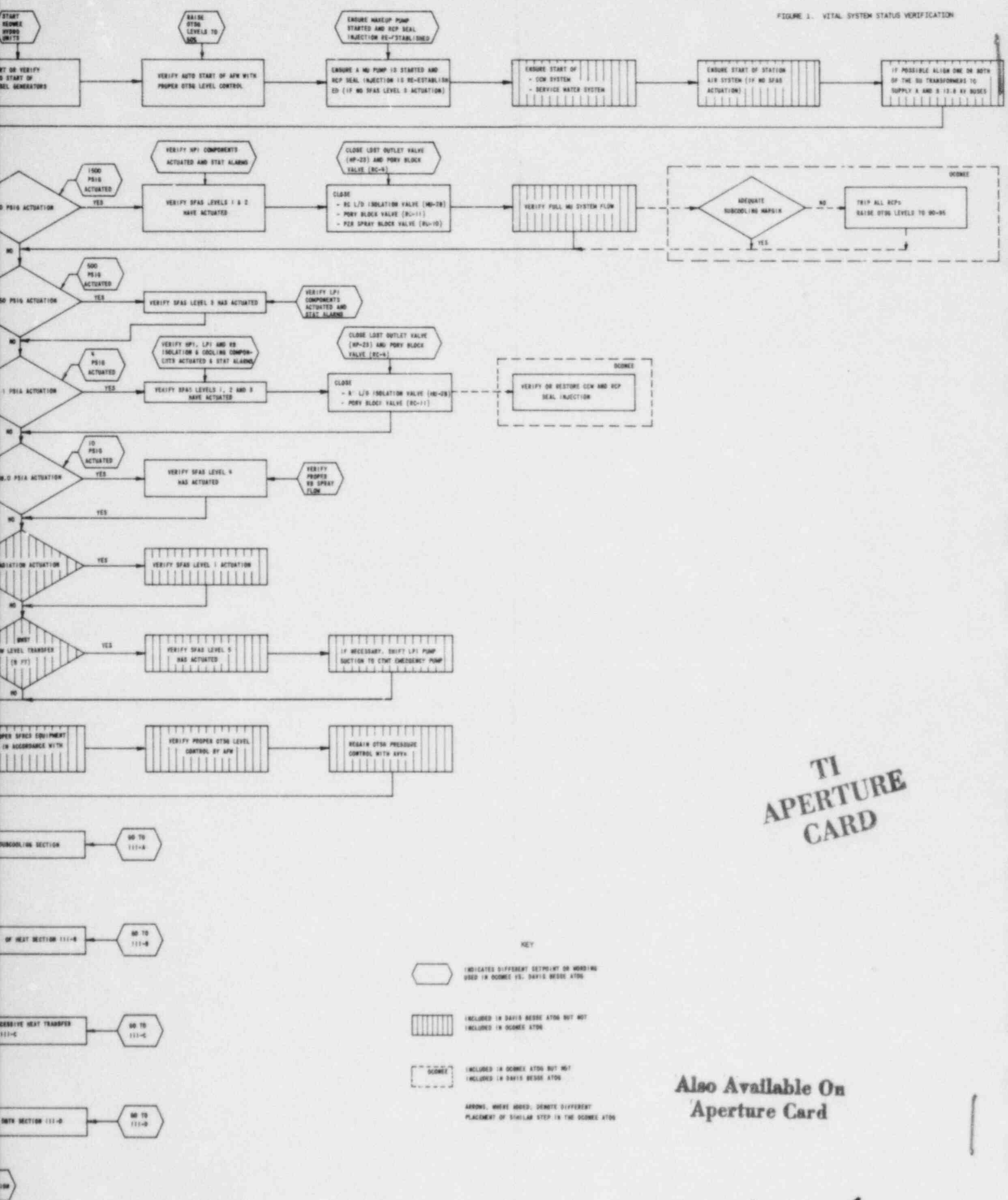


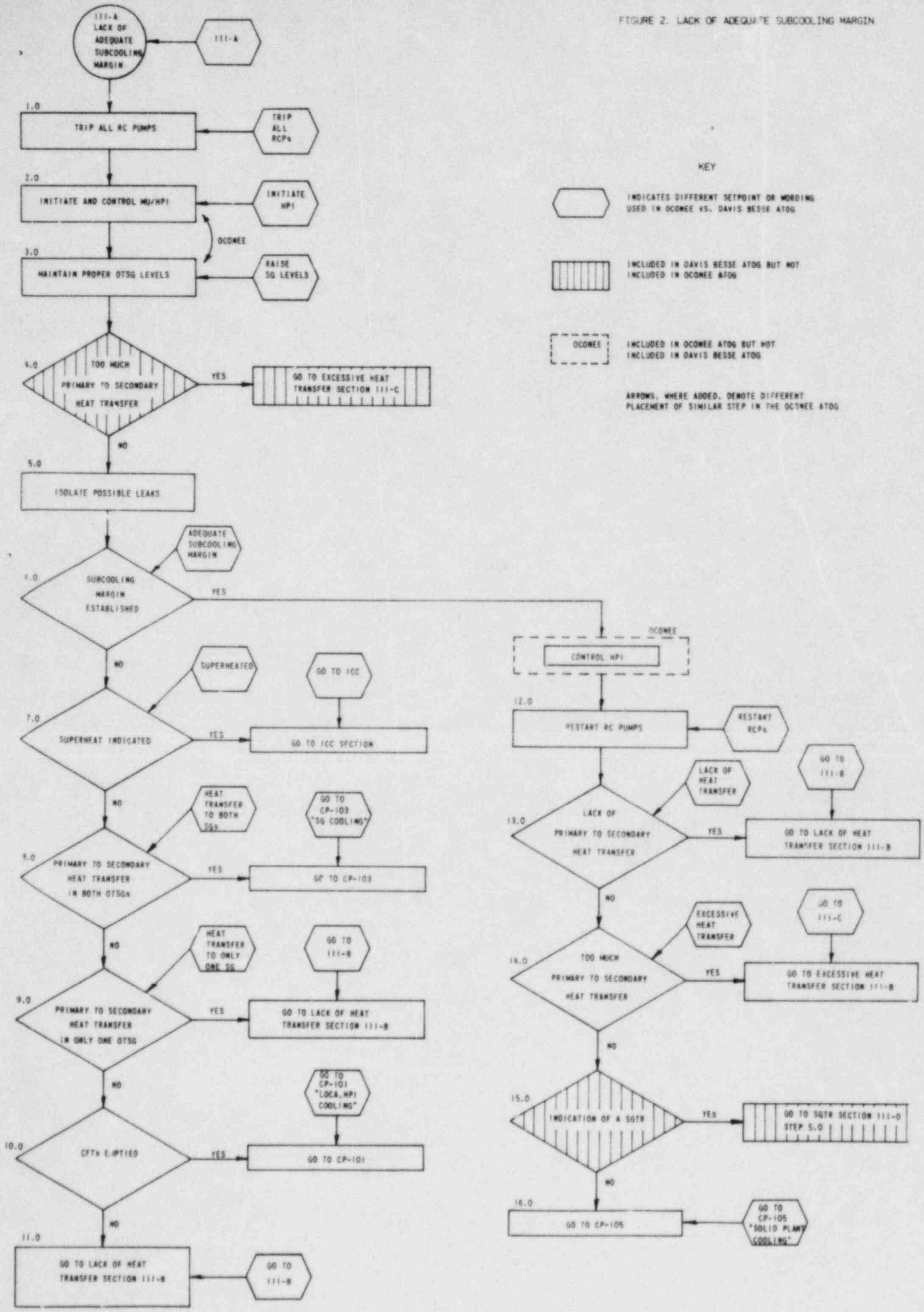
FIGURE 1. VITAL SYSTEM STATUS VERIFICATION

TI APERTURE CARD

Also Available On Aperture Card

8412060456-01

FIGURE 2. LACK OF ADEQUATE SUBCOOLING MARGIN



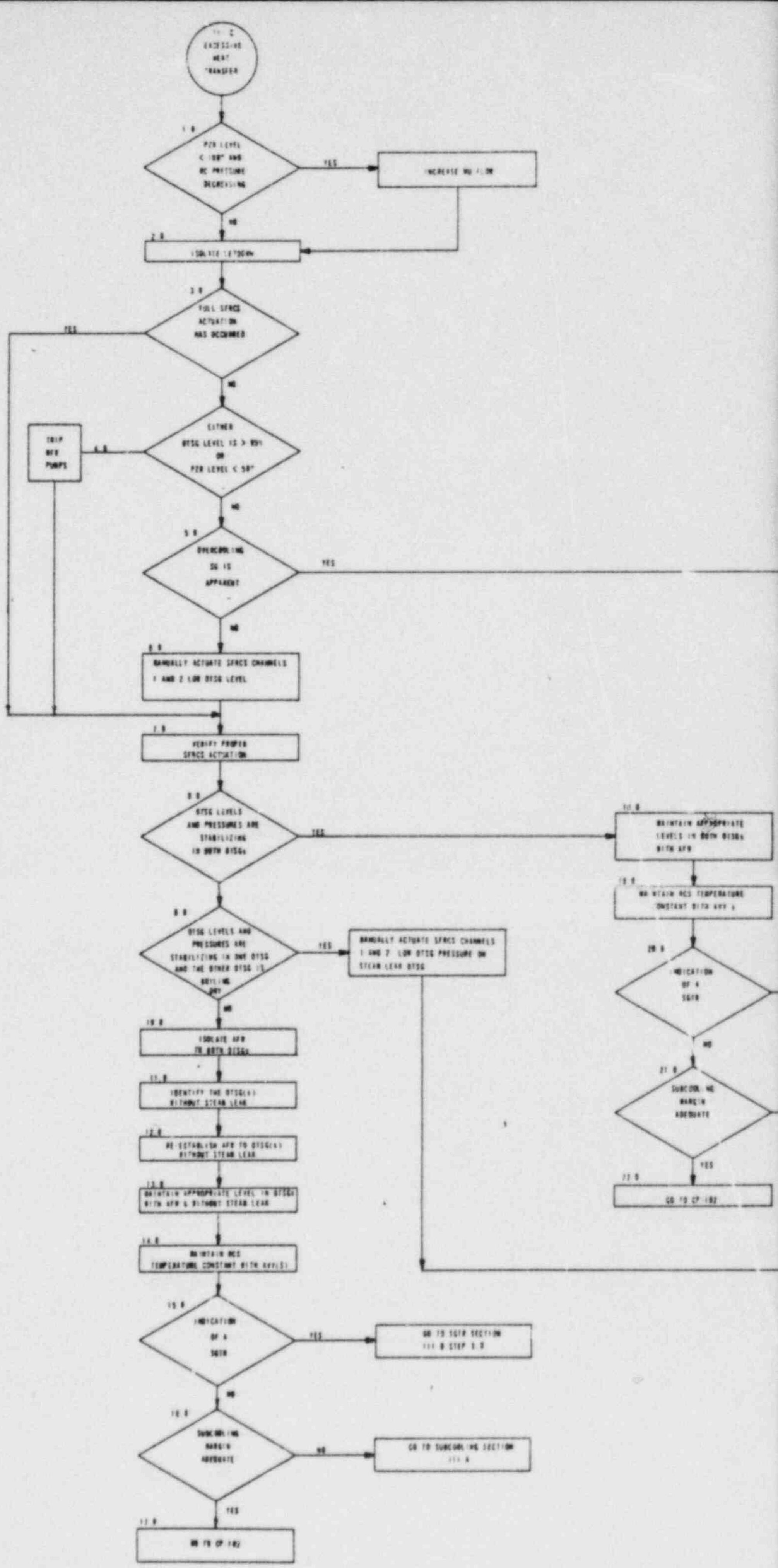
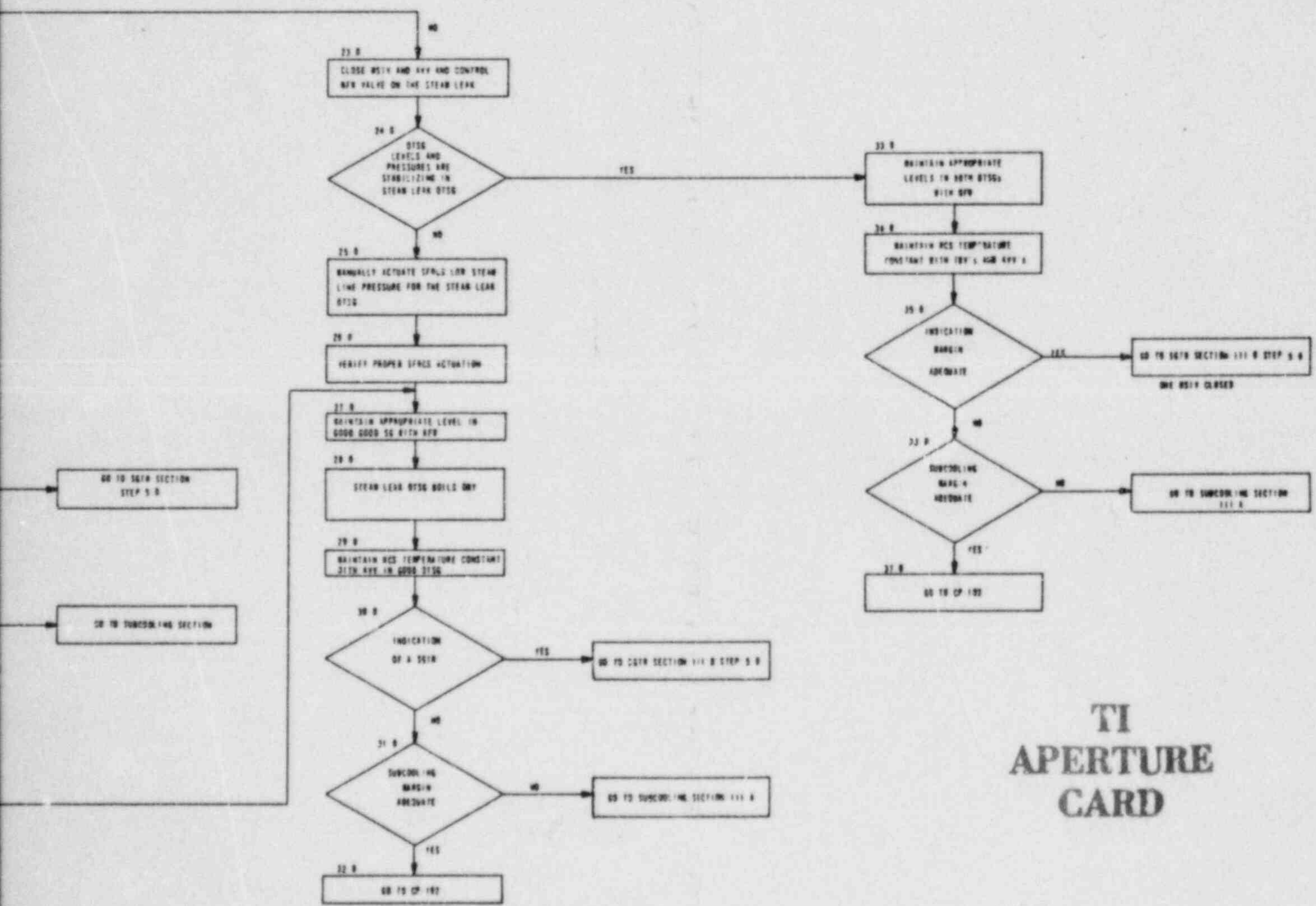

III C
EXCESSIVE
HEAT
TRANSFER
1.0
PZR LEVEL
< 100" AND
RC PRESSURE
DECREASING
YES
INCREASE HPI FLOW
NO
2.0
ISOLATE LETDOWN
3.0
FULL SFRCS
ACTUATION
HAS OCCURRED
YES
NO
EITHER
OTSG LEVEL IS > 95%
OR
PZR LEVEL < 50"
4.0
TRIP
MFW
PUMPS
NO
5.0
OVERCOOLING
SG IS
APPARENT
YES
NO
6.0
MANUALLY ACTUATE SFRCS CHANNELS
1 AND 2 LOW OTSG LEVEL
7.0
VERIFY PROPER
SFRCS ACTUATION
8.0
OTSG LEVELS
AND PRESSURES ARE
STABILIZING
IN BOTH OTSGs
YES
9.0
OTSG LEVELS AND
PRESSURES ARE
STABILIZING IN ONE OTSG
AND THE OTHER OTSG IS
BOILING
DRY
YES
MANUALLY ACTUATE SFRCS CHANNELS
1 AND 2 LOW OTSG PRESSURE ON
STEAM LEAK OTSG
NO
10.0
ISOLATE AFW
TO BOTH OTSGs
11.0
IDENTIFY THE OTSG(S)
WITHOUT STEAM LEAK
12.0
RE-ESTABLISH AFW TO OTSG(S)
WITHOUT STEAM LEAK
13.0
MAINTAIN APPROPRIATE LEVEL IN OTSGs
WITH AFW & WITHOUT STEAM LEAK
14.0
MAINTAIN RCS
TEMPERATURE CONSTANT WITH ADV(S)
15.0
INDICATION
OF A
SGTR
YES
GO TO SGTR SECTION
III B STEP 1.0
NO
16.0
SUBCOOLING
MARGIN
ADEQUATE
NO
GO TO SUBCOOLING SECTION
III A
YES
17.0
GO TO CP 102
MAINTAIN APPROPRIATE
LEVELS IN BOTH OTSGs
WITH AFW
MAINTAIN RCS TEMPERATURE
CONSTANT WITH ADV s
20.0
INDICATION
OF A
SGTR
NO
21.0
SUBCOOLING
MARGIN
ADEQUATE
YES
GO TO CP 102

Figure III C EXCESSIVE HEAT TRANSFER

DAVIS BESSE ATOG



TI
APERTURE
CARD

Also Available On
Aperture Card

8412060456-03

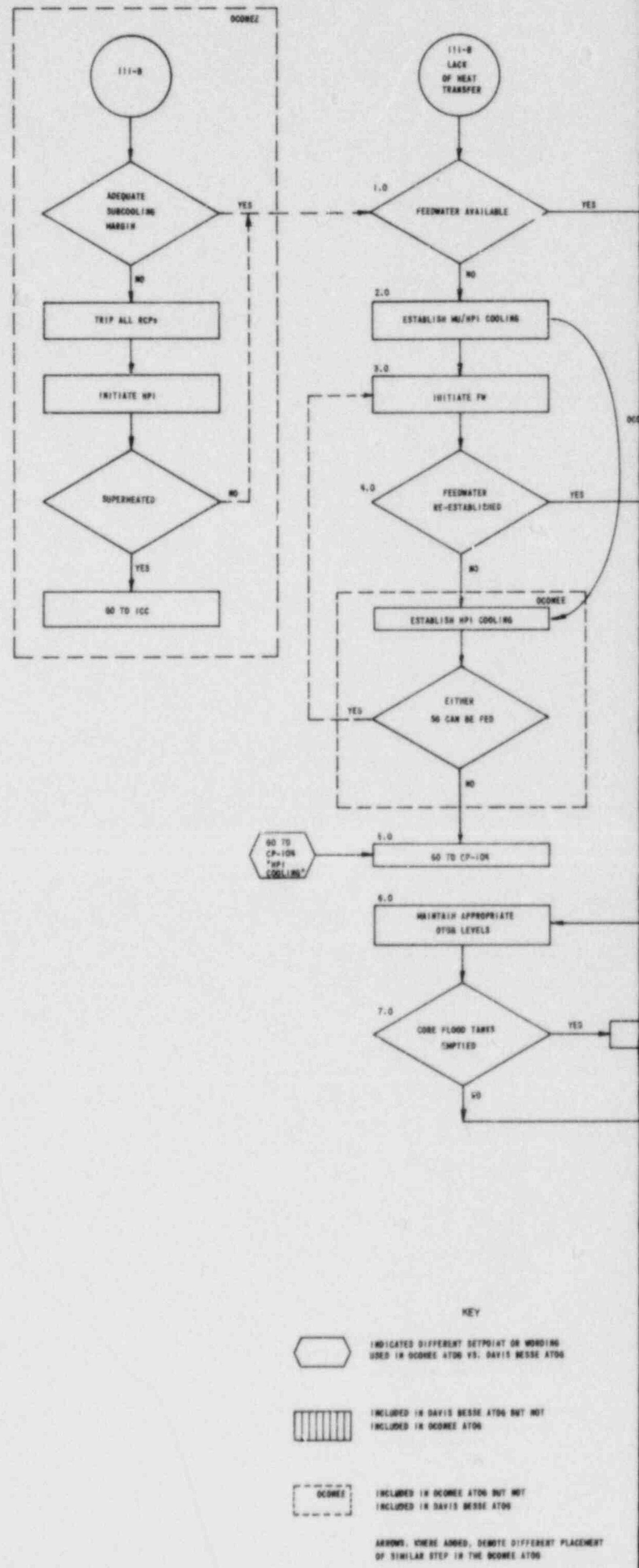
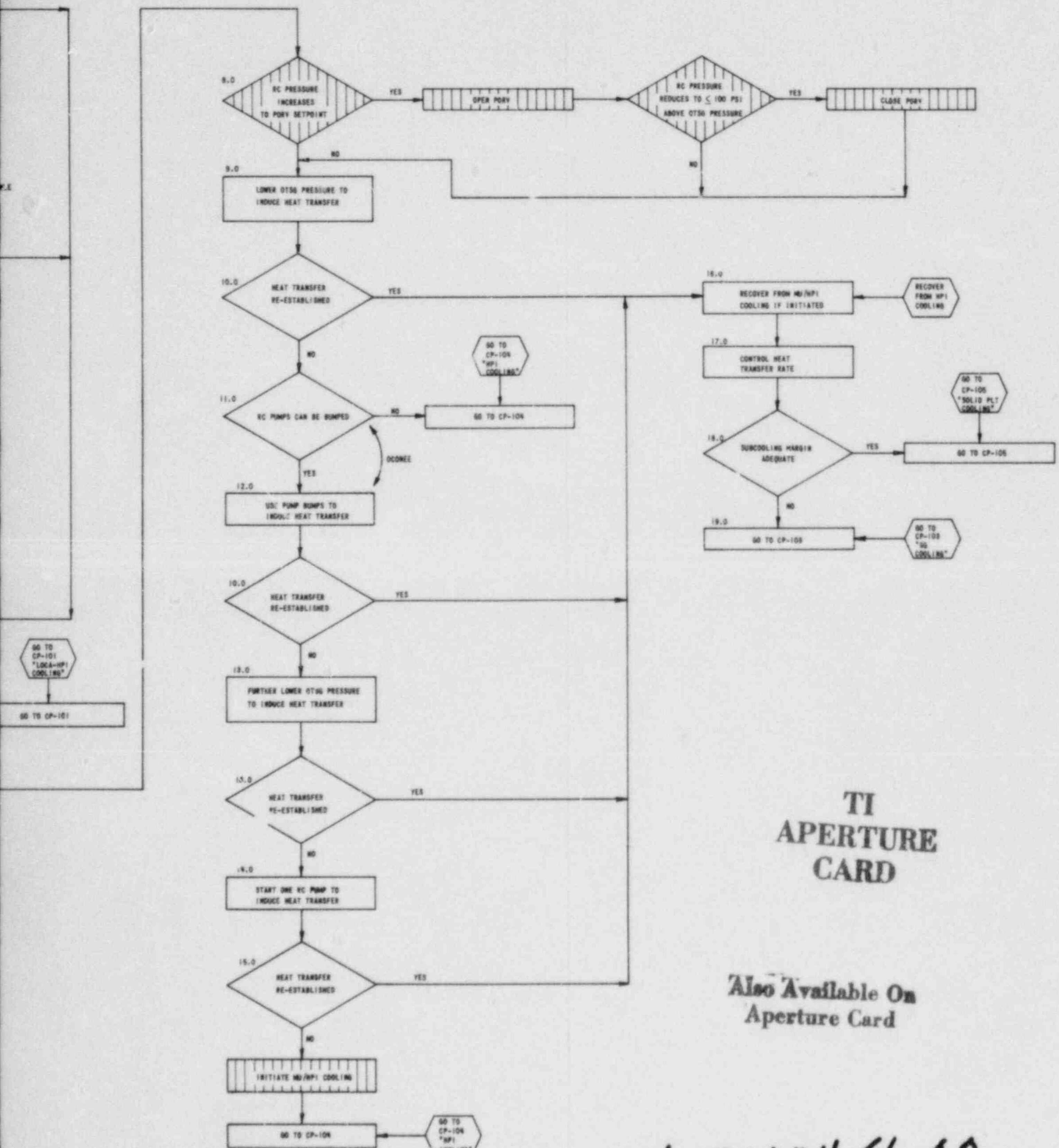

OCONEE
III-B
ADEQUATE
SUBCOOLING
MARGIN
YES
NO
TRIP ALL RCPs
INITIATE HPI
SUPERHEATED
NO
YES
GO TO ICC
III-B
LACK
OF HEAT
TRANSFER
1.0
FEEDWATER AVAILABLE
YES
NO
2.0
ESTABLISH MU/HPI COOLING
3.0
INITIATE FW
4.0
FEEDWATER
RE-ESTABLISHED
YES
NO
OCONEE
ESTABLISH HPI COOLING
EITHER
SG CAN BE FED
YES
NO
5.0
GO TO
CP-106
"HPI
COOLING"
GO TO CP-106
6.0
MAINTAIN APPROPRIATE
OTSG LEVELS
7.0
CORE FLOOD TANKS
EMPTIED
YES
NO
KEY
INDICATES DIFFERENT SETPOINT OR WORDING
USED IN OCONEE ATOG VS. DAVIS BESSE ATOG
INCLUDED IN DAVIS BESSE ATOG BUT NOT
INCLUDED IN OCONEE ATOG
OCONEE
INCLUDED IN OCONEE ATOG BUT NOT
INCLUDED IN DAVIS BESSE ATOG
ARROWS, WHERE ADDED, DENOTE DIFFERENT PLACEMENT
OF SIMILAR STEP IN THE OCONEE ATOG

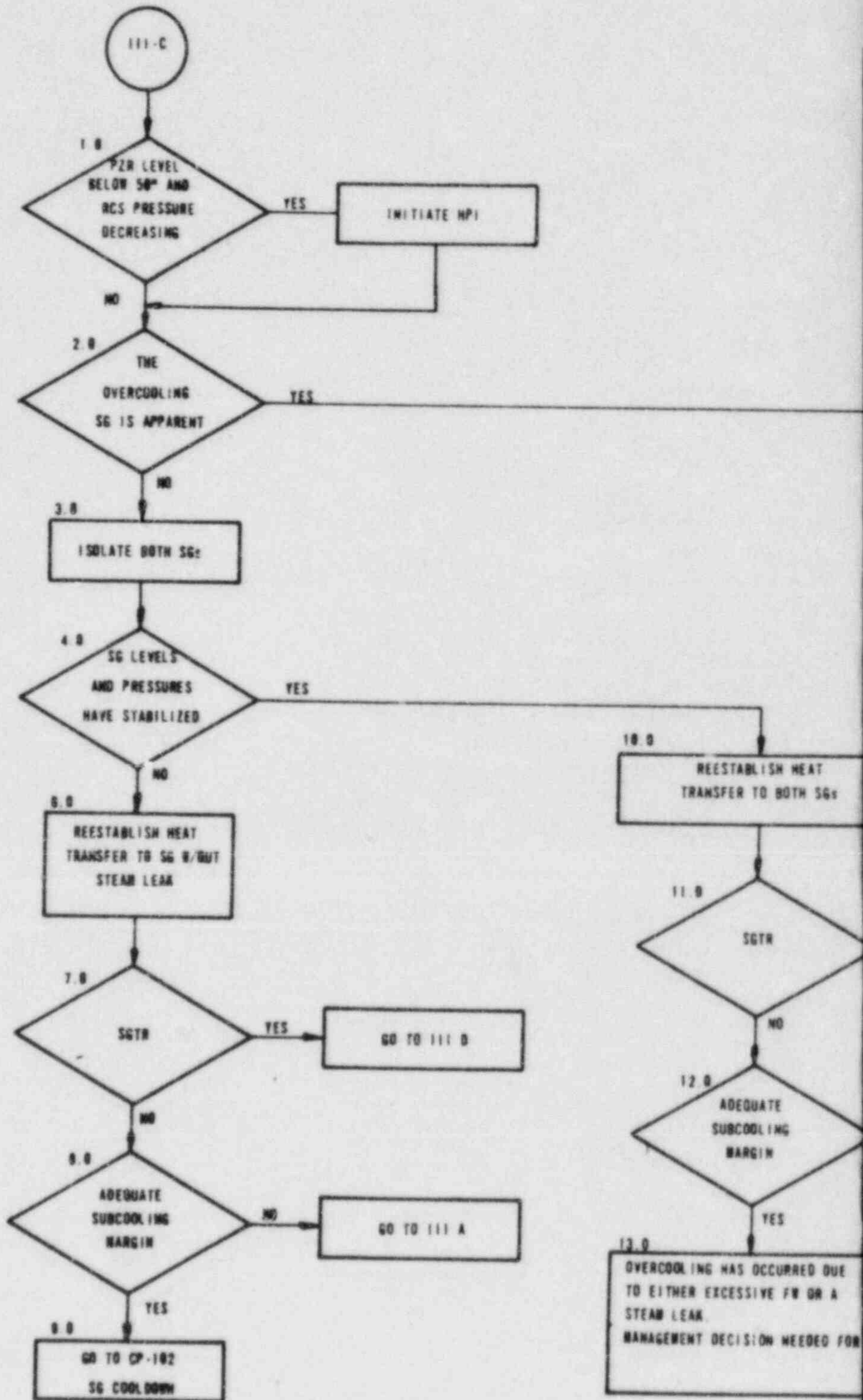
FIGURE 3. LACK OF HEAT TRANSFER



TI
APERTURE
CARD

Also Available On
Aperture Card

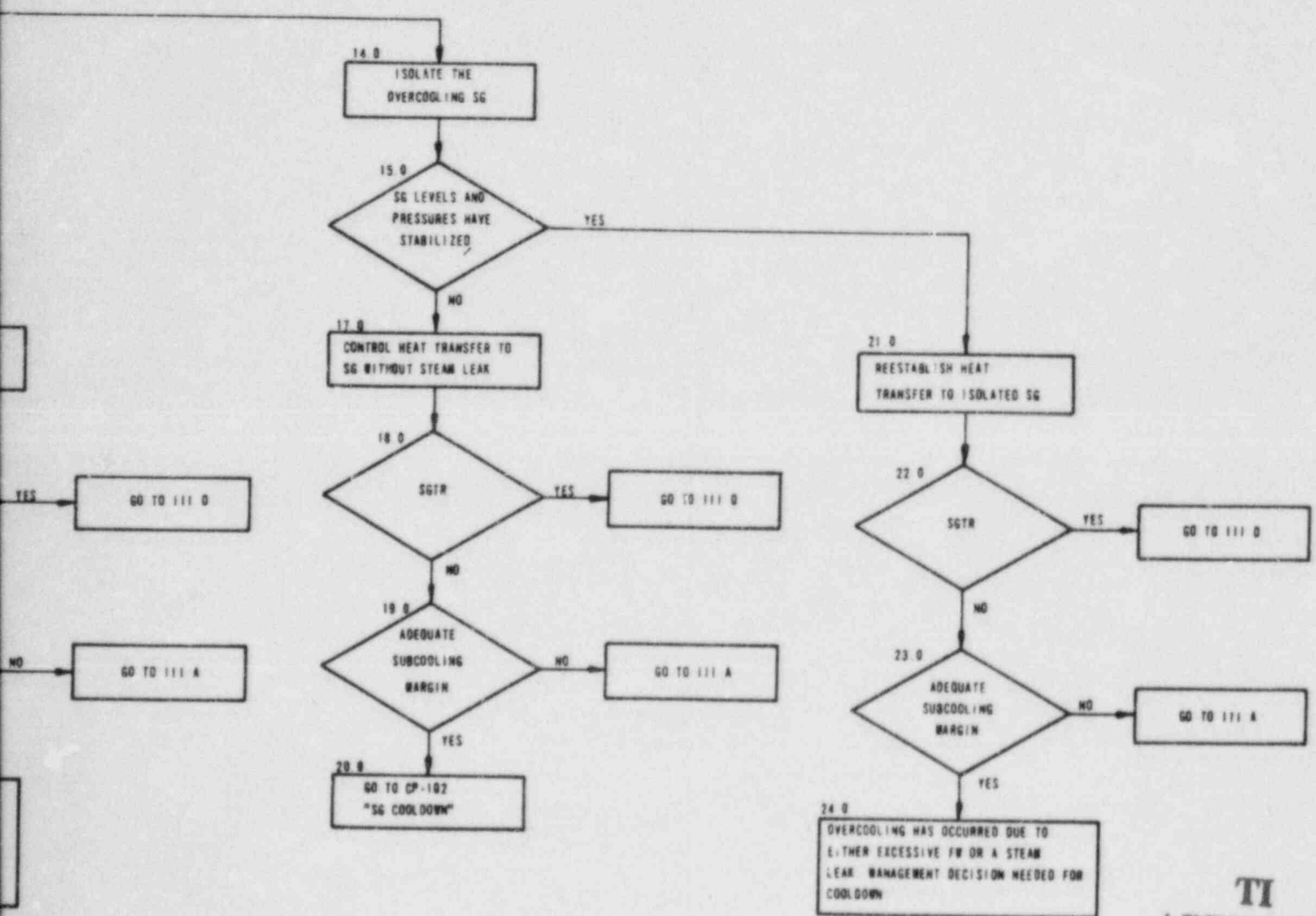
8412060456-02



III-C
1.0
PZR LEVEL BELOW 50" AND RCS PRESSURE DECREASING
YES
INITIATE HPI
NO
2.0
THE OVERCOOLING SG IS APPARENT
YES
NO
3.0
ISOLATE BOTH SGs
4.0
SG LEVELS AND PRESSURES HAVE STABILIZED
YES
NO
6.0
REESTABLISH HEAT TRANSFER TO SG W/OUT STEAM LEAK
7.0
SGTR
YES
GO TO III D
NO
8.0
ADEQUATE SUBCOOLING MARGIN
NO
GO TO III A
YES
9.0
GO TO CP-102 SG COOLDOWN
10.0
REESTABLISH HEAT TRANSFER TO BOTH SGs
11.0
SGTR
NO
12.0
ADEQUATE SUBCOOLING MARGIN
YES
13.0
OVERCOOLING HAS OCCURRED DUE TO EITHER EXCESSIVE FW OR A STEAM LEAK.
MANAGEMENT DECISION NEEDED FOR

Figure III C EXCESSIVE HEAT TRANSFER

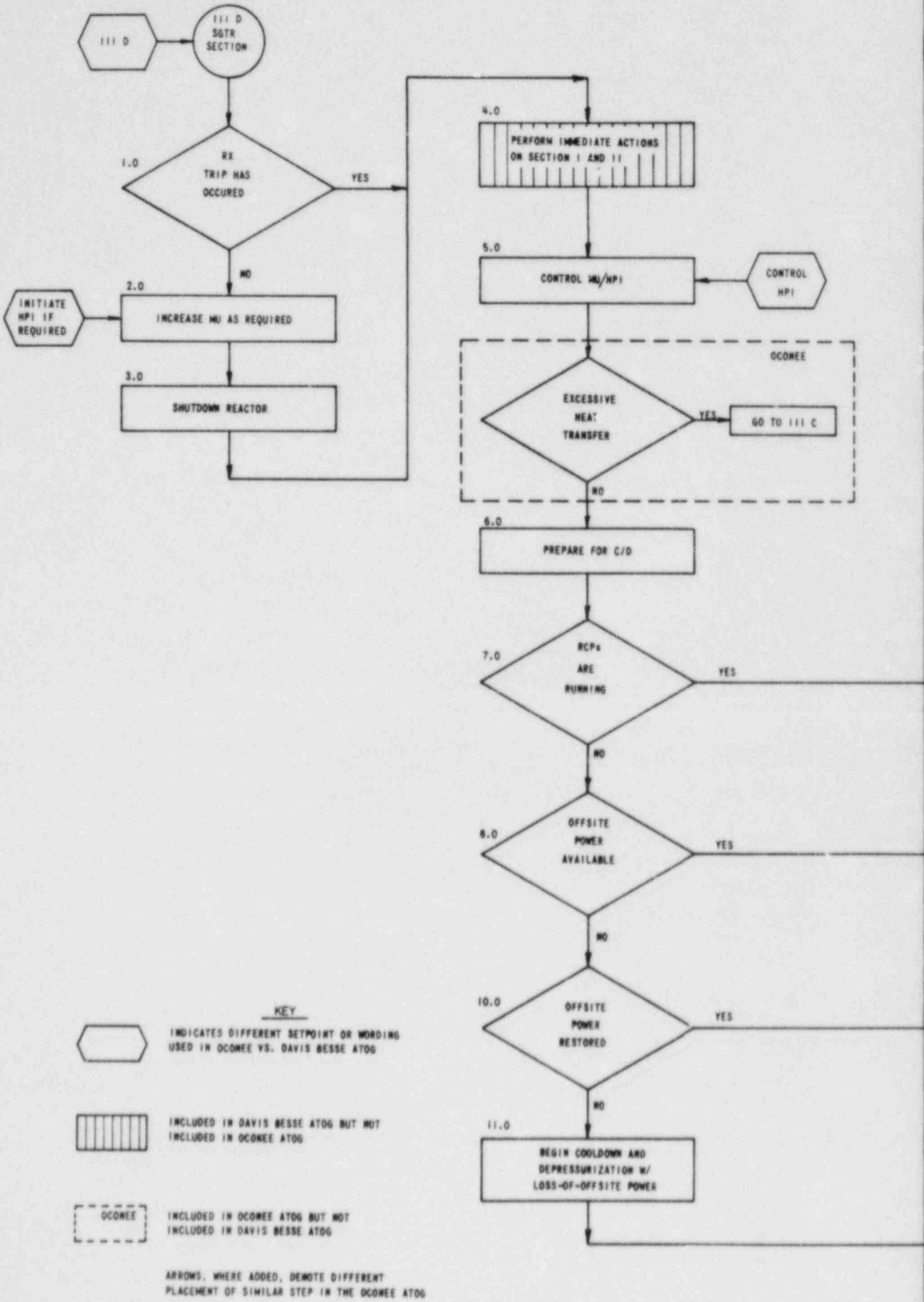
OCONEE UNIT 3 ATOG

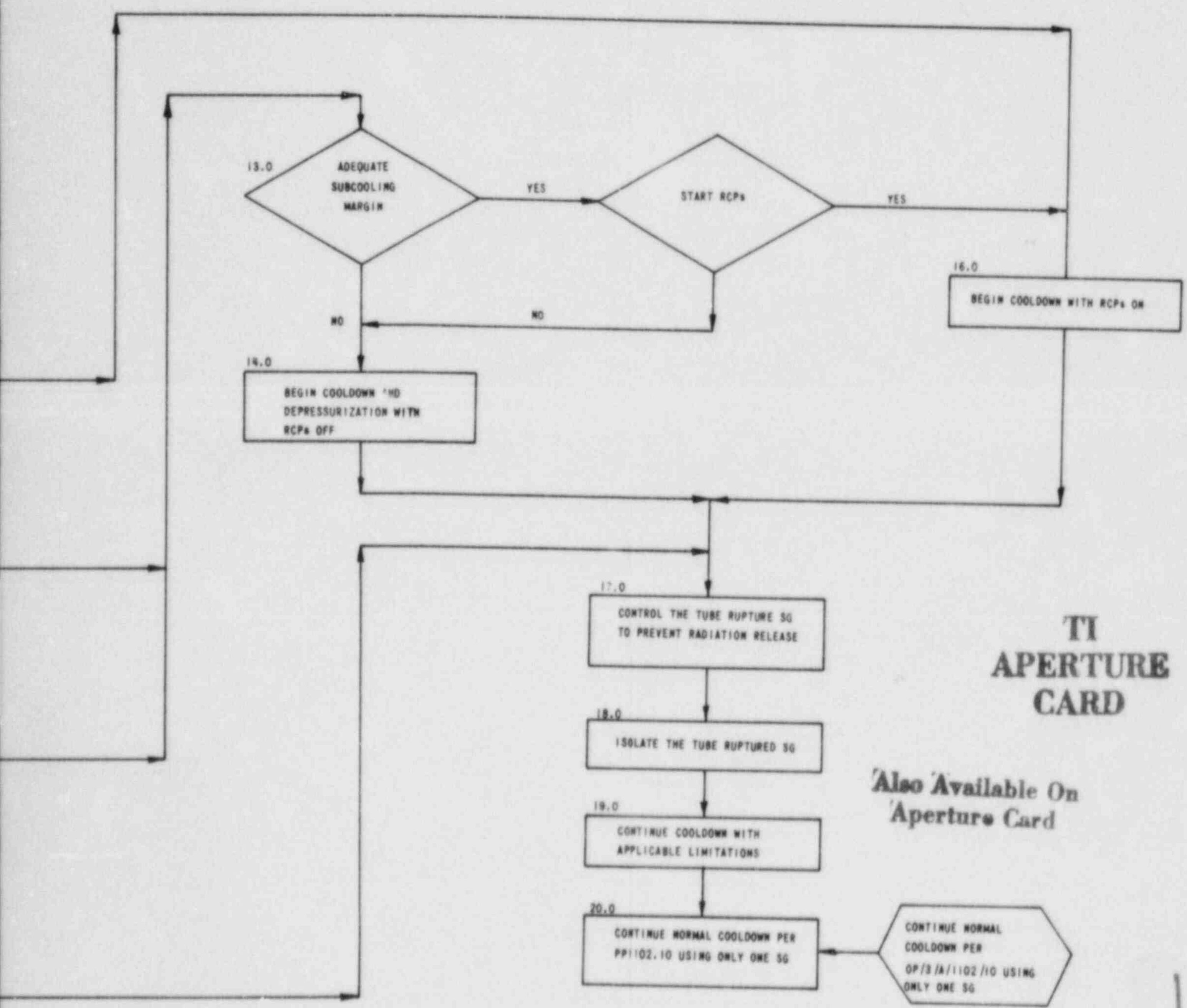


TI APERTURE CARD

Also Available On Aperture Card

8412060456-04


III D
III D SGTR SECTION
1.0
RX TRIP HAS OCCURED
YES
NO
2.0
INITIATE HPI IF REQUIRED
INCREASE MU AS REQUIRED
3.0
SHUTDOWN REACTOR
4.0
PERFORM IMMEDIATE ACTIONS ON SECTION I AND II
5.0
CONTROL MU/HPI
CONTROL HPI
OCONEE
EXCESSIVE HEAT TRANSFER
YES
GO TO III C
NO
6.0
PREPARE FOR C/D
7.0
RCPs ARE RUNNING
YES
NO
8.0
OFFSITE POWER AVAILABLE
YES
NO
10.0
OFFSITE POWER RESTORED
YES
NO
11.0
BEGIN COOLDOWN AND DEPRESSURIZATION W/ LOSS-OF-OFFSITE POWER
KEY
INDICATES DIFFERENT SETPOINT OR WORDING USED IN OCONEE VS. DAVIS BESSE ATOG
INCLUDED IN DAVIS BESSE ATOG BUT NOT INCLUDED IN OCONEE ATOG
OCONEE
INCLUDED IN OCONEE ATOG BUT NOT INCLUDED IN DAVIS BESSE ATOG
ARROWS, WHERE ADDED, DENOTE DIFFERENT PLACEMENT OF SIMILAR STEP IN THE OCONEE ATOG



8412060456-05