LOSS OF COOLANT ACCIDENT

1.0 SYMPTOMS

NOTE: Many of the following Loss of Coolant Accident (LOCA) symptoms could be the result of steam/feedwater line ruptures, steam generator tube ruptures and CVCS malfunctions (including charging and letdown line breaks). Use Accident Identification Figures 1 and 2 (attached) in order to determine which emergency is in progress.

1.1 Alarms

1.1.1 Pressurizer Level Error Lo.

1.1.2 Pressurizer Level Lo-Lo.

1.1.3 Pressurizer Press Deviation Hi/Lo.

1.1.4 Pressurizer Press Hi/Lo.

1.1.5 Containment Pressure Hi.

1.1.6 Containment Temperature Hi.

1.1.7 Containment Atmospheric Humidity Hi.

1.1.8 Containment Sump Level Hi-Hi.

1.1.9 SIAS Actuation Train A(B).

1.1.10 CIAS Actuation Train A(B).

1.1.11 CCAS Actuation Train A(B).

1.1.12 CSAS Actuation Train A(B).

1.1.13 Pressurizer Safety Valves Open.

1.1.14 Quench Tank Level Hi/Lo.

1.1.15 Quench Tank Temp Hi.

1.1.16 Quench Tank Press Hi.

1.1.17 Containment atmosphere and/or radwaste area ventilation radiation monitor alarms.

1.0 SYMPTOMS (Continued)

1.2 Indications

1.2.1 Decreasing pressurizer pressure.

1.2.2 Decreasing or increasing pressurizer level.

NOTE: Pressurizer level may not always be a true indicator of RCS fluid inventory. Pressurizer steam space ruptures, void formation elsewhere in RCS, reference leg flashing and reference leg failures may cause indications which are contrary to true RCS fluid inventory conditions.

1.2.3 Increasing containment pressure.

1.2.4 Increasing containment temperature.

1.2.5 Increasing containment humidity.

1.2.6 Pressurizer safety valve open position indication.

1.2.7 Increasing quench tank level.

1.2.8 Increasing quench tank temperature.

1.2.9 Increasing quench tank pressure.

1.2.10 Sudden decrease in RCS subcooling noted by the subcooling margin monitor.

1.2.11 Decreasing RCP motor current or erratic RCP pressure differential.

1.2.12 RCP seal ΔP indicator abnormal-no pressure drop between seal stages.

1.2.13 Letdown flow decrease or total loss of letdown flow.

1.2.14 LOCA caused pipe whip and/or jet impingement may result in consequential failures such as:

1.2.14.1 Charging or letdown line break.

1.2.14.2 Sample line break.

1.2.14.3 Instrument sensing line break.

1.2.14.4 Steam Generator tube rupture.

2.0 AUTOMATIC ACTION (some or all of the following may occur)

NOTE: The time delay for initiation of these automatic actions varies considerably depending on the size of the break.

2.1 Reactor trip, if pressurizer pressure decreases to the DNBR setpoint.

2.2 Turbine trip (initiated by reactor tripped signal).

2.3 If pressurizer pressure drops below 1806 psia, a SIAS and CCAS will be generated. (SIAS also isolates containment, excluding the MSIVs and FWIVs.)

2.4 If containment pressure rises above 2.95 psig, a CIAS, SIAS and CCAS will be generated.

2.5 If containment pressure rises above 8.14 psig, a CSAS will be generated.

2.6 If steam generator level falls below 23% narrow range level, an EFAS will be generated.

2.7 If refueling water tank level decreases to 18.5% level, a RAS will be generated.

3.0 IMMEDIATE OPERATOR ACTION

3.1 Verify tripped or trip the reactor.

3.2 Carry out all immediate and subsequent post trip actions per Emergency Operating Instruction S023-3-5.1, "Emergency Plant Shutdown".

3.3 If pressurizer pressure decreases below 1806 psia, verify actuated or actuate SIAS and CCAS.

3.4 If containment pressure increases above 2.95 psia, verify actuated or actuate CIAS, SIAS and CCAS.

3.5 If containment pressure increases above 8.14 psig, verify actuated or actuate CSAS.

3.6 Use the public address system to notify on-site personnel concerning the nature of the emergency.

4.0 SUBSEQUENT OPERATOR ACTION

INITIALS *

CAUTION: Do not place systems in "manual" unless misoperation in "automatic" is apparent. Systems placed in "manual" must be checked frequently to ensure proper operation.

4.1 Verify all immediate operator actions have been initiated as follows:

4.1.1 Verify all immediate and subsequent operator actions of Emergency Operating Instruction S023-3-5.1, "Emergency Plant Shutdown", are being performed concurrently with the steps in this instruction. _____

4.1.2 Go to Figure 1 and 2 attached and verify that the event in progress is a LOCA. _____

4.1.2.1 If use of another Emergency Instruction is indicated, in conjunction with a LOCA, perform applicable steps concurrently with the steps in this instruction. _____

4.1.2.2 If a LOCA is not in progress, use the indicated Emergency Instruction and terminate use of this instruction. _____

4.1.3 If pressurizer pressure decreases below 1806 psia, verify completed or complete the following:

4.1.3.1 Verify Train A and Train B SIAS and CCAS actuation alarms are received. If not, manually actuate SIAS and CCAS. _____

4.1.3.1.1 If manual actuation from the control room is not successful, dispatch an operator to Train A and Train B Auxiliary Relay Cabinets and open the associated trip leg circuit breakers. _____

* The initial column is an optional operator aid and is intended to be used as follows:

Initial each completed action. Do not write N.A. Leave blank, items that are not applicable. Proceed through the instruction performing all steps frequently re-checking those steps passed over to ensure action is taken when applicable.

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.1.3.2 After a SIAS due to low pressurizer pressure and as soon as possible after it has been verified that all CEAs have been fully inserted for at least five (5) seconds, stop all operating RCPs. _____

4.1.3.2.1 If SIAS is actuated due to containment high pressure, then when pressurizer pressure decreases to the SIAS setpoint, stop all RCPs. _____

4.1.3.2.2 After any SIAS or CIAS, then within 30 minutes restore CCW to the RCPs per Emergency Operating Instruction S023-3-5.26.1, "Loss of Component Cooling Water to a RCP", performing applicable steps concurrently with the steps in this instruction. _____

4.1.3.3 Verify the electric driven auxiliary feedwater pumps restart 30 seconds after SIAS actuation due to load sequencing. If not, manually restart them. _____

4.1.3.4 Verify aligned or align all SIAS and CCAS affected components per the Actuated Alignment Check-Off Lists contained in Operating Instruction S023-3-2.7, "Safety Injection System Operation", performing applicable steps concurrently with the steps in this instruction. _____

4.1.3.5 When pressurizer pressure decreases below the shutoff head (~ 1450 psia) of the HPSI pumps, verify HPSI flow to the cold legs from at least one train. _____

CAUTION: Adverse containment environment may increase instrument inaccuracies. Do not rely on single parameter indications to evaluate plant conditions. Utilize all indications and combinations of indications available to verify plant status.

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.1.4 If containment pressure increases above 2.95 psig, verify completed or complete the following:

4.1.4.1 Verify Train A and Train B CIAS, SIAS and CCAS actuation alarms are received. If not, manually actuate CIAS, SIAS and CCAS. _____

4.1.4.1.1 If manual actuation from the control room is not successful, dispatch an operator to the Train A and Train B Auxiliary Relay Cabinets and open the associated trip leg circuit breakers. _____

4.1.4.2 If SIAS is actuated due to containment high pressure, then when pressurizer pressure decreases to the SIAS setpoint, stop all operating RCPs. _____

4.1.4.2.1 After any SIAS or CIAS, then within 30 minutes restore CCW to the RCPs per Emergency Operating Instruction S023-3-5.26.1, "Loss of Component Cooling Water to a RCP", performing applicable steps concurrently with the steps in this instruction. _____

4.1.4.3 Verify the electric driven auxiliary feedwater pumps restart 30 seconds after SIAS actuation due to load sequencing. If not, manually restart them. _____

4.1.4.4 Verify aligned or align all CIAS, SIAS and CCAS affected components per the Actuated Alignment Check-Off Lists contained in Operating Instruction S023-3-2.7, "Safety Injection System Operation", performing applicable steps concurrently with the steps in this instruction. _____

4.1.4.5 When pressurizer pressure decreases below the shutoff head ($\sim$ 1450 psia) of the HPSI pumps, verify HPSI flow to the cold legs from at least one train. _____

4.1.5 If containment pressure increases above 8.14 psig, verify completed or complete the following:

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.1.5.1 Verify Train A and Train B CSAS actuation alarms are received. If not, manually actuate CSAS. _____

4.1.5.1.1 If manual actuation from the control room is not successful, dispatch an operator to the Train A and Train B Auxiliary Relay Cabinets and open the associated trip leg circuit breakers. _____

4.1.5.2 Verify aligned or align all CSAS affected components per the Actuated Alignment Check-Off List contained in Operating Instruction S023-3-2.19, "Containment Spray System Operation", performing applicable steps concurrently with the steps in this instruction. _____

4.1.5.3 Verify containment spray flow of ∿ 1750 gpm and spray chemical addition (NaOH) flow of ∿ 15 gpm from at least one train. _____

4.1.5.3.1 If containment spray and chemical addition flow has not been established in at least one train, manually establish ∿ 1750 gpm spray flow and ∿ 15 gpm spray chemical flow. _____

4.2 For anti-core melt safety function, use the following indications and systems to determine and establish proper conditions within the reactor coolant system:

4.2.1 Use the Critical Function Monitoring System, subcooled margin meters, RCS Hot and Cold leg temperatures, incore thermocouples, and pressurizer pressure to determine if the RCS is subcooled or saturated. _____

NOTE: An increase in temperature equal to or greater than the saturation temperature for the existing pressure is an indication of voiding in the RCS. If the RCS is in a saturated condition void formation may impede heat removal.

4.2.2 If the RCS is in a saturated condition, verify HPSI flow is at least 415 gpm to ensure an adequate makeup to the RCS. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.2.2.1 Use the following HPSI cold leg injection flow indicators: FI-0311-2 (Loop 1A), FI-0321-1 (Loop 1B), FI-0331-1 (Loop 2A) & FI-0341-2 (Loop 2B). _____

4.2.2.2 If unsuccessful in establishing adequate HPSI flow, ensure charging flow is at maximum (∿ 132 gpm) and dispatch an operator to locally check HPSI pump status and manual valve alignment. _____

4.2.3 Continue to use the atmospheric steam dump valves to maintain steam generator pressure at ∿ 1000 psia. _____

4.2.4 Use Operating Instruction S023-3-2.31, "Natural Circulation Guidelines" to confirm that natural circulation has been established performing applicable steps concurrently with the steps in this instruction. _____

4.2.5 Use Operating Instruction S023-3-2.30, "Determination of Adequate Core Cooling", to confirm that conditions are not trending toward an inadequate core cooling event performing applicable steps concurrently with the steps in this instruction. _____

4.3 For Containment Integrity Safety Function, use the Critical Function Monitoring System to verify containment isolation, containment heat removal and containment pressure control. _____

4.3.1 Use the Actuated Alignment Check-Off Lists contained in the following instructions to confirm correct alignment, performing applicable steps concurrently with the steps in this instruction. _____

4.3.1.1 S023-1-4.1, "Containment Emergency Cooling System". _____

4.3.1.2 S023-3-2.27, "Controlroom Isolation System". _____

4.4 If conditions permit, attempt to locate and isolate the source of the leak. Possible leak locations include, but are not limited to, the pressurizer safety valves, reactor coolant pump seals, letdown line, charging line, sample line and steam generator tubes. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.5 The Watch Engineer shall notify the "duty" Station Administrator and Shift Technical Advisor and discuss the situation. _____

4.5.1 An assessment of the plant status and safety shall be made and the event classified per Table 4-1 of the SONGS 2 & 3 Emergency Plan. _____

4.5.2 If an emergency is declared (Alert, Site or General), use the following Emergency Procedures to implement the SONGS 2 & 3 Emergency Plan:

4.5.2.1 Alert - S023-(later) _____

4.5.2.2 Site - S023-(later) _____

4.5.2.3 General - S023-(later) _____

4.5.3 If unable to contact any Station Administrator in the normal reporting chain within fifteen (15) minutes following the declared emergency, notify the NRC via the red phone. _____

4.5.4 Notify the Systems Operating Supervisor concerning the nature of the emergency. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.6 When the following conditions are established, reset SIAS per Step 4.7 of this instruction. _____

4.6.1 RCS hot and cold leg temperatures are at least 50°F subcooled. _____

4.6.1.1 Use the Subcooled Margin Monitor indicators as the primary method of determining RCS subcooling. _____

4.6.1.2 Use pressurizer pressure and Thot, or incore thermocouples if indicating a higher temperature, as a backup method for determining subcooling. _____

4.6.2 Both pressurizer level safety channels indicate a level greater than 28% and levels are stable or increasing. _____

4.6.3 RCS cold leg temperatures are stable or decreasing. _____

4.6.4 Containment pressure less than 2.95 psig. _____

4.7 When all of the conditions in Step 4.6 of this instruction are satisfied, proceed as follows:

4.7.1 Lower the SIAS pressurizer pressure setpoint on all four safety related channels below the existing pressurizer pressure using the "Low Prz Press Setpoint Re-Set" on the PPS Remote Control Modules. _____

4.7.2 Unlock (arm) and depress the SIAS, CIAS and CCAS reset pushbuttons at the Plant Protection Panel. _____

4.7.3 Depress the Train A SIAS, CIAS and CCAS reset pushbuttons and Train B SIAS, CIAS and CCAS reset pushbuttons at the ESFAS Auxiliary Relay Cabinets. _____

4.7.4 Stop the LPSI, HPSI and Containment Spray pumps. _____

4.7.4.1 Restart the HPSI pumps as necessary to maintain a subcooled margin of 50°F. _____

4.8 Begin a RCS cooldown as soon as possible, and in any case within one hour post LOCA, as follows:

4.8.1 If the SBCS is available, override and open the MSIV bypass valves. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.8.1.1 Establish and maintain a RCS cooldown per Steps 6.2.3 and 6.2.4 of Operating Instruction SO23-3-2.18, "Steam Bypass System Operation", performing applicable steps concurrently with the steps in this instruction. _____

4.8.2 If the SBCS is not available, continue using the atmospheric steam dump valves. _____

4.8.3 Do not exceed a 75°F/hr cooldown rate. _____

4.8.3.1 If cooling down on Natural Circulation, and RCS hot leg temperatures are below 475°F, then observe the cooldown rates specified in Operating Instruction SO23-3-2.31, "Natural Circulation Guidelines". _____

4.8.4 If at least 50°F RCS subcooling is established, and pressurizer level is greater than 28% and the level is stable or increasing, perform the following:

4.8.4.1 Use the pressurizer heaters and sprays to aid in maintaining 50°F to 100°F RCS subcooling per Emergency Operation Instruction SO23-3-5.17, "Pressurizer Pressure Control System Malfunction", performing applicable steps concurrently with the steps in this instruction. _____

4.8.4.1.1 If pressurizer level is off scale high, and all available heaters cannot establish an increasing differential temperature between the pressurizer temperature and the loop 1 hot leg temperature within one hour, then terminate use of the pressurizer heaters and sprays. _____

4.8.4.2 If the HPSI pumps are maintaining greater than 100°F RCS subcooling, throttle HPSI flow as required to maintain 50°F to 100°F RCS subcooling. _____

4.9 Have the Chemical Radiation Technician commence sampling the reactor coolant and containment atmosphere using the post accident sampling system within one (1) hour post LOCA and at two hour intervals. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.9.1 Based on the results of the samples, evaluate the need to:

4.9.1.1 Declare a General Emergency. _____

4.9.1.2 Pre-align one Shutdown Cooling System train such that it could be placed into service remotely. _____

NOTE: Pre-alignment is required for very small break LOCAs if RCS activity would preclude manual valve alignment subsequent to RAS.

4.9.1.3 Place the Containment Combustible Gas Control System into service per Operating Instruction S023-3-2.28, "Containment Combustible Gas Control System". _____

4.9.1.4 Establish High Radiation Area barricades in the areas surrounding the containment including the Safety Equipment Building, the Penetration Building and the Radwaste Building. _____

4.9.2 Continue to sample the Containment Atmosphere and the RCS at two hour intervals unless occupation dose limits dictate or stabilizing conditions allow less frequent samples. _____

4.10 If transient conditions have stabilized and ESF busses are being supplied from offsite power, stop the emergency diesel generators within 30 minutes per Operating Instruction S023-2-13, "Diesel Generator Operation". _____

4.10.1 If the diesels are providing power to the ESF busses, then when offsite power becomes available transfer the ESF busses to the reserve auxiliary transformers, and stop the diesels per Operating Instruction S023-2-13, "Diesel Generator Operation". _____

4.11 Terminate emergency boration of the RCS no sooner than 1.5 hours and not later than 2 hours from the time SIS initiated emergency boration as follows:

4.11.1 Override and stop the charging pumps and the boric acid makeup pumps. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.11.2 If pressurizer pressure is above the shutoff head of the HPSI pumps, return the charging pumps to service as follows:

4.11.2.1 Open LV-0277C, gravity feed valve from RWST. _____

4.11.2.2 Verify closed or close LV-0227B (VCT discharge). _____

4.11.3 If the RCS is subcooled, start and stop the charging pumps as necessary to maintain pressurizer level between 28% and 57%. If the RCS is not subcooled, run all available charging pumps continuously until 50°F subcooling can be maintained. _____

NOTE: In the above charging pump alignment HV-9247 (BAMU pump discharge), HV-9235 and HV-9240 (BAMT gravity feed), remain open for a back-up supply. Since the RWST elevation head is greater than the BAMT elevation head, the Boric Acid line check valves will close.

4.12 When the level in the Refueling Water Storage Tanks decreases to 18.5% level, as indicated on LI-0305-1, LI-0305-2, LI-0305-3 or LI-0305-4, a Recirculation Actuation Signal (RAS) will be generated. Immediately after the RWST level reaches 18.5% perform the following:

4.12.1 Verify open or open the following isolation valves from the Containment Emergency Sump to the suction header of the safety injection and containment spray pumps: _____

4.12.1.1 HV-9302 _____

4.12.1.2 HV-9304 _____

4.12.1.3 HV-9303 _____

4.12.1.4 HV-9305 _____

4.12.2 Verify stopped or stop the following LPSI pumps by checking motor breaker status lights. _____

4.12.2.1 P-015 _____

4.12.2.2 P-016 _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.12.3 If HPSI pumps are not running and 50°F subcooling cannot be maintained, start the HPSI pumps. _____

4.12.4 Verify closed or close the following minimum flow recirculation line stop valves to prevent depletion of the Containment Emergency Sump inventory. _____

4.12.4.1 HV-9306 _____

4.12.4.2 HV-9307 _____

4.12.4.3 HV-9347 _____

4.12.4.4 HV-9348 _____

4.12.5 Verify the Containment Emergency Sump level is adequate to provide the required suction head for the HPSI and Containment Spray pump. _____

4.12.5.1 Containment Sump level indicators LI-5853-1 and LI-5853-2 indicate greater than (later). _____

4.12.5.2 Containment Emergency Sump level indicators LI-9386-1 and LI-9389-2 indicate greater than (later). _____

4.12.6 If the containment level is inadequate, continue to draw down the RWSTs and initiate makeup to the RWSTs per Operating Instruction S023-3-2.2, "Makeup Operations" performing applicable steps concurrently with the steps in this instruction. _____

4.12.7 When the Containment Emergency Sump level is adequate, or if the RWST level decreases to (15%) perform the following:

4.12.7.1 Close HV-9300 _____

4.12.7.2 Close HV-9301 _____

4.12.7.3 If HPSI flow decreases or fluctuates due to low NPSH, throttle containment spray flow to reduce the velocity head losses and thus increase HPSI pump suction pressure. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.12.7.4 If HPSI flow decreases or fluctuates, due to the presence of non-condensable gases, and provided radiation levels do not preclude entry into the Safety Equipment Building, use temporary hoses to vent the HPSI suction header to the gas collection header. _____

4.12.7.4.1 If HPSI suction header manual venting is not possible, perform the following:

4.12.7.4.1.1 Stop the HPSI pump. _____

4.12.7.4.1.2 Intermittently stop and start the associated containment spray pump until gases are dislodged. _____

4.12.7.4.1.3 Start the HPSI pump. _____

4.12.7.5 If Containment Emergency Sump level is decreasing, use the area flooding and area radiation indicators to indentify the SIS train or penetration that is leaking. _____

4.12.7.5.1 Isolate the affected header or stop the affected pump as necessary to terminate the loss of inventory. _____

4.12.7.6 Insure HPSI pumps are not operating at less than 35 gpm per pump. This will ensure adequate HPSI pump cooling with the minimum flow line valves closed on RAS. _____

CAUTION: If the steam generator heat removal capacity is degraded, all of the flow from the HPSI and charging pumps may be required to keep the core covered. It is therefore essential, after each pump is stopped, to verify the RCS remains at least 50°F subcooled.

4.12.7.6.1 If the HPSI pumps are operating at less than 35 gpm per pump and the RCS is at least 50°F subcooled, stop one charging pump at a time, and then if both HPSI pumps are running, stop one HPSI pump. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.12.7.6.2 Restart the HPSI and charging pumps as necessary to maintain a subcooled margin of 50°F. _____

4.13 Provided activity levels permit entry into the Safety Equipment building, notify the Chemical Radiation Technician to sample the safety injection pump recirculation line for boron concentration as soon as possible after RAS. Continue sampling at one (1) hour intervals until boron concentration has stabilized. _____

4.13.1 If boron concentration is less than 1720 ppm restart emergency boration to increase RCS boron concentration to greater than 1720 ppm but less than 2300 ppm. _____

4.14 Provided RAS has not occured, when containment pressure decreases to 8 psig, the containment spray pump should be stopped. Containment spray must be placed in service if RAS occurs to provide containment sump cooling. (Only core heat sink available). _____

CAUTION: Do not initiate simultaneous hot and cold leg injection before 2 hours post LOCA, because high steam velocity in the hot legs may prevent injected water from reaching the core.

4.15 At two (2) hours post LOCA realign the discharge of the HPSI pumps so that the total injection flow is divided equally between the hot and cold legs by performing the following:

4.15.1 Verify closed or close HV-9339 and HV-9337, SDC inlet isolation. _____

4.15.2 Verify close or close HV-9378 and HV-9377, SDC inlet isolation. _____

4.15.3 Throttle closed the following loop 1 cold leg HPSI valves to the (later %) open position:

4.15.3.1 HV-9323 _____

4.15.3.2 HV-9324 _____

4.15.3.3 HV-9326 _____

4.15.3.4 HV-9327 _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.15.4 Gradually open HV-9434, loop 1 hot leg HPSI valve until the hot leg injection flow, indicate on FI-9435-2, matches the total cold leg injection flow indicated on FI-0311-2 and FI-0321-1. _____

4.15.5 Throttle closed the following loop 2 cold leg HPSI valves to the (later %) open position.

4.15.5.1 HV-9329 _____

4.15.5.2 HV-9330 _____

4.15.5.3 HV-9332 _____

4.15.5.4 HV-9333 _____

4.15.6 Gradually open HV-9420, loop 2 hot leg HPSI valve until the hot leg injection flow, indicated on FI-9421-1, matches the total cold leg injection flow indicated on FI-0331-1 and FI-0341-2. _____

4.15.7 When both loop 1 and loop 2 are aligned, use the cold leg injection valves to balance the total hot and cold leg injection flows to both loops. _____

4.15.8 If 50°F RCS subcooling has not been established, or is not being maintained, ensure that the total HPSI flow was not reduced by flow balancing. _____

4.16 At six hours post LOCA, evaluate the RCS conditions and determine which long term cooling method to use as follows:

4.16.1 If pressurizer pressure is equal to or greater than 300 psia, and the RCS is subcooled, use the shutdown cooling system per Steps 4.17 and 4.18 of this instruction. _____

4.16.2 If pressurizer pressure is less than 300 psia, or the RCS is not subcooled, continue to use the SIS recirculation mode per Step 4.19 of this instruction. _____

4.17 Establish entry conditions for SDC mode by continuing to cooldown the RCS to less than 350°F, and depressurizing to less than 361 psig as follows:

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.17.1 Use the SBCS and the auxiliary feedwater system to cooldown the RCS. _____

4.17.1.1 Is the SBCS is not available, use the atmospheric steam dumps and the auxiliary feedwater system. _____

4.17.2 Lower pressurizer pressure as the RCS cools down to maintain 50°F to 100°F RCS subcooling. _____

4.17.2.1 If the HPSI pumps are maintaining greater than 100°F subcooling, throttle HPSI flow as required to establish and maintain 50°F to 100°F RCS subcooling. _____

4.17.2.2 If the pressurizer heaters and sprays are in use, continue to maintain 50°F to 100°F RCS subcooling per Emergency Operating Instruction S023-3-5.17, "Pressurizer Pressure Control System Malfunction". _____

NOTE: SDC System entry conditions (361 psig and 350°F) correspond to ∿ 85°F RCS subcooling.

4.17.3 Align all HPSI flow to the cold legs by closing HV-9420 and HV-9434. _____

4.17.4 Vent or isolate the SITs as necessary to prevent injecting nitrogen into the RCS per Operating Instruction S023-3-2.7, "Safety Injection System Operation", performing applicable steps concurrently with the steps in this instruction. _____

4.17.5 Determine the activity level of the RCS prior to initiating SDC flow. _____

CAUTION: If there is high radioactivity in the RCS, circulation of the fluid in the SDC system may result in high area radioactivity readings in the safety equipment building. _____

4.17.5.1 If the RCS activity exceeds (later), ensure that the Safety Equipment Building is evacuated and High Radiation warning barriers are set up. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.17.5.2 If it is known that one SDC train has less leakage (i.e. valve packing leaks, pump seals, etc.) than the redundant train, consider using just the one train to minimize coolant inventory loss and radioactivity release. _____

4.18 Place the Shutdown Cooling System into service per Operating Instruction S023-3-2.6, "Shutdown Cooling System Operation", with the following procedural modifications: _____

4.18.1 Do not warm up the Shutdown Cooling System and do not open the warmup valves, HV-9353 and HV-9359. This is to avoid the possibility of these valves failing in the open position which renders the SDC system inoperable. _____

CAUTION: Minimize LPSI pump cavitation during post LOCA shutdown cooling operation which may occur due to LOCA conditions.

4.18.2 Closely monitor LPSI pump discharge pressure, SDC flow and LPSI pump amps for fluctuating or abnormally low readings (signs of cavitation) which may result from inadequate NPSH or non-condensible gases, contained within the RCS. _____

4.18.3 If unable to establish SDC flow, return at least one train of Containment Spray flow through a Shutdown Heat Exchanger to service to provide Containment Emergency Sump Cooling and proceed as follows: _____

4.18.3.1 If non-condensible gases are in the SDC system inlet header, and provided radiation levels do not preclude entry into the Safety Equipment Building, use temporary hoses to vent the SDC loop high point vents to the gas collection header. _____

4.18.3.2 If the SDC system manual venting is not possible or if the SDC system inlet temperature is too high to meet LPSI pump NPSH requirements, perform the following:

4.18.3.2.1 Return HPSI alignment to hot and cold leg injection. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.18.3.2.2 Continue to use the steam generators to cooldown or maintain RCS temperature. _____

4.18.3.2.3 Periodically bump a RCP in loop 1 and in loop 2 per Operating Instruction S023-3-1.7, "RCP Operation". _____

4.18.3.2.4 Vent the reactor vessel head and pressurizer to dislodge non-condensible gases. _____

4.18.3.3 After venting the SDC system or after cooling the SDC system inlet, re-align HPSI flow for cold leg injection then establish SDC flow. _____

4.18.4 After Shutdown Cooling has been establish, the steam generators can be secured as follows:

4.18.4.1 Close the Steam Bypass Valves or atmospheric steam dump valves. _____

4.18.4.2 Allow the steam generator level to rise to ∿ 90% narrow range level, then close the auxiliary feedwater control valves and stop the auxiliary feedwater pumps. _____

4.19 Establish Safety Injection, Recirculation Mode long term cooling as follows:

4.19.1 Verify that total HPSI flow exceeds 415 gpm with approximately one half of the total being supplied via the cold legs and approximately one half the total being supplied via the hot legs. _____

4.19.2 If the RCS remains pressurized above 200 psia, ensure that at least one containment spray train is supplying via one shutdown cooling heat exchanger, at least 1750 gpm spray flow to provide Containment Emergency Sump Cooling. _____

4.19.3 After RCS pressure falls below 200 psia, slowly divert a portion of the containment spray flow into the LPSI header until LPSI flow reaches 200 gpm. _____

4.0 SUBSEQUENT OPERATOR ACTION (Continued) INITIALS

4.19.4 After RCS temperature falls below 300°F, the steam generator can be secured as follows:

4.19.4.1 Close the Steam Bypass Valves or atmospheric steam dump valves. _____

4.19.4.2 Allow the steam generator level to rise to ∿ 90% narrow range level, then close the auxiliary feedwater control valves and stop the auxiliary feedwater pumps. _____

4.19.5 After RCS temperature falls below 180°F, slowly divert containment spray flow into the LPSI header until LPSI flow reaches 415 gpm, then secure containment spray flow to the containment spray header. _____

4.19.6 Periodically monitor the performance of the Recirculation mode, Safety Injection System, to ensure that long term cooling does not become degraded. _____

5.0 ATTACHMENTS

5.1 Figure 1 - Accident Identification Small Breaks.

5.2 Figure 2 - Accident Indentification Large Breaks.

H. E. MORGAN
Superintendent
Units 2 and 3

APPROVED:

J. M. CURRAN
Plant Manager

VBF/sa

FIG 1

ACCIDENT IDENTIFICATION SMALL BREAK

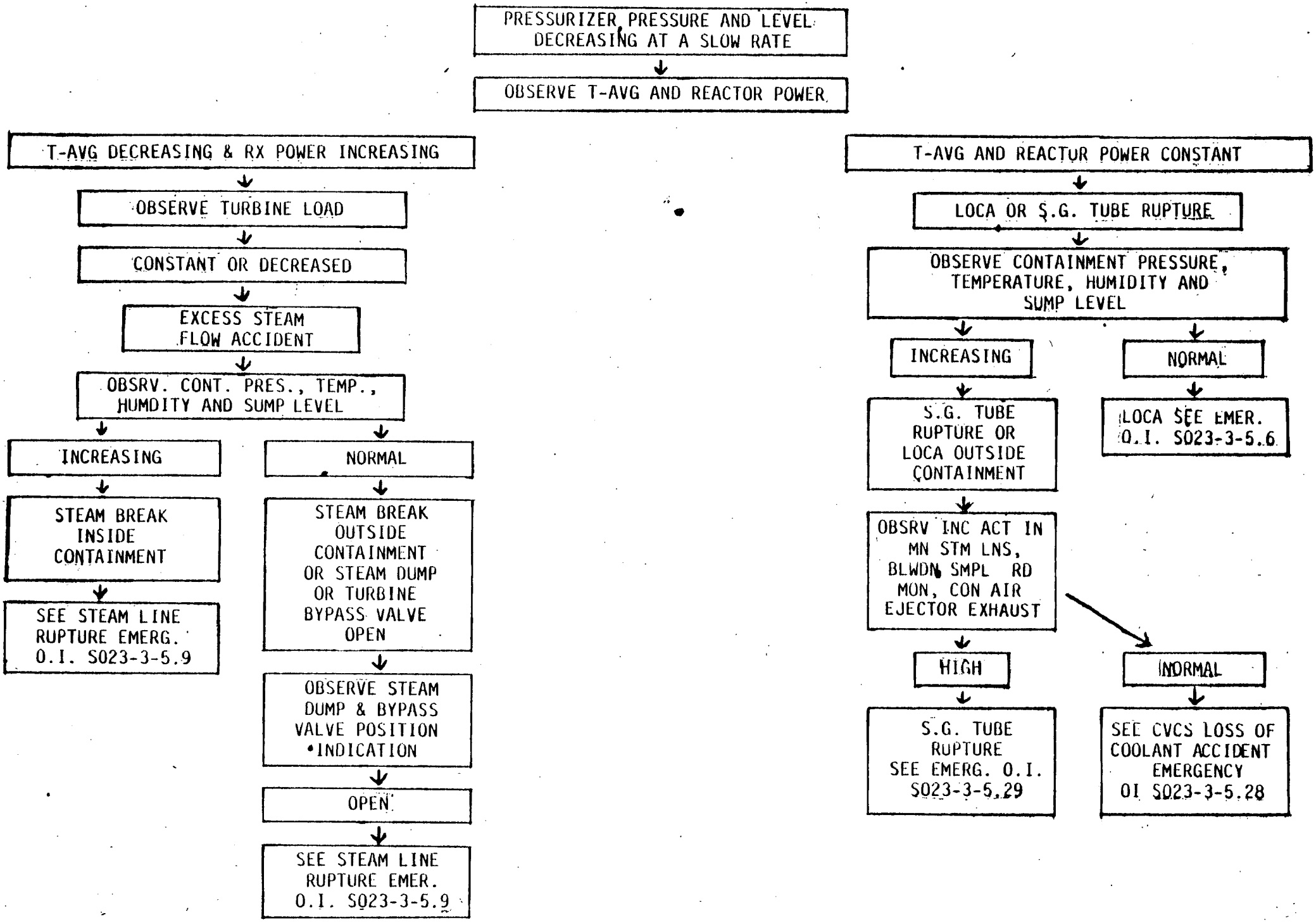

FIGURE 2

ACCIDENT IDENTIFICATION LARGE BREAK