Attachment 9



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| 27.3 | IE02 | Question:<br>Should a reactor scram due to high reactor water level, where the feedwater pumps tripped due to the high reactor water level, count as a scram with a loss of normal heat removal<br>Background Information:<br>On April 6, 2001 LaSalle Unit 2 (BWR), during maintenance on a motor driven feedwater pump regulating valve, experienced a reactor automatic reactor scram on high reactor water level. During the recovery, both turbine driven reactor feedwater pumps (TDRFPs) tripped due to high reactor water level. The motor driven reactor feedwater pump was not available due to the maintenance being performed. The reactor operators choose to restore reactor water level through the use of the Reactor Core Isolation Cooling (RCIC) System, due to the fine flow control capability of this system, rather than restore the TDRFPs. Feedwater could have been restored by resetting a TDRFP as soon as the control board high reactor water level alarm cleared. Procedure LGA-001 "RPV Control" (Reactor Pressure Vessel control) requires the unit operator to "Control RPV water level between 11 in. and 59.5 in. using any of the systems listed below: Condensate/feedwater, RCIC, HPCS, LPCS, LPCI, RHR."<br><br>The following control room response actions, from standard operating procedure LOP-FW-04, "Startup of the TDRFP" are required to reset a TDRFP. No actions are required outside of the control room (and no diagnostic steps are required).<br><br>Verify the following:<br>TDRFP M/A XFER (Manual/Automatic Controller) station is reset to Minimum<br>No TDRFP trip signals are present<br>Depress TDRFP Turbine RESET pushbutton and observe the following<br>Turbine RESET light Illuminates<br>TDRFP High Pressure and Low Pressure Stop Valves OPEN<br>PUSH M/A increase pushbutton on the Manual/Automatic Controller station<br>Should this be considered a scram with the loss of normal heat removal?<br><br>Proposed Answer:<br>The ROP working group is currently working to prepare a response. | 1/25 Introduced<br>2/28 NRC to discuss with resident<br>4/25 Discussed<br>5/22 On hold<br>6/12 Discussed. Related FAQ 30.8<br>9/26 Discussed<br>10/31 Discussed | LaSalle |
| 28.3 | IE02 | Question:<br>This event was initiated because a feedwater summer card failed low. The failure caused the feedwater circuitry to sense a lower level than actual. This invalid low level signal caused the Reactor Recirculation pumps to shift to slow speed while also causing the feedwater system to feed the Reactor Pressure Vessel (RPV) until a high level scram (Reactor Vessel Water Level – High, Level 8) was initiated.<br><br>Within the first three minutes of the transient, the plant had gone from Level 8, which initiated the scram, to Level 2 (Reactor Vessel Water Level – Low Low, Level 2), initiating High Pressure Core Spray (HPCS) and Reactor Core Isolation Cooling (RCIC) injection, and again back to Level 8. The operators had observed the downshift of the Recirculation pumps nearly coincident with the scram, and it was not immediately apparent what had caused the trip due to | 3/21 Discussed<br>4/25 Discussed<br>5/22 Modified to reflect discussion of 4/25, On Hold<br>6/12 Discussed. Related FAQ 30.8 | Perry |

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| | | the rapid sequence of events.<br><br>As designed, when the reactor water level reached Level 8, the operating turbine driven feed pumps tripped. The pump control logic prohibits restart of the feed pumps (both the turbine driven pumps and motor driven feed pump (MFP)) until the Level 8 signal is reset. (On a trip of one or both turbine feed pumps, the MFP would automatically start, except when the trip is due to Level 8.) All three feedwater pumps (both turbine driven pumps and the MFP) were physically available to be started from the control room, once the Level 8 trip was reset. Procedures are in place for the operators to start the MFP or the turbine driven feedwater pumps in this situation.<br><br>Because the cause of the scram was not immediately apparent to the operators, there was initially some misunderstanding regarding the status of the MFP. (Because the card failure resulted in a sensed low level, the combination of the recirculation pump downshift, the reactor scram, and the initiation of HPCS and RCIC at Level 2 provided several indications to suspect low water level caused the scram.) As a result of the initial indications of a plant problem (the downshift of the recirculation pumps), some operators believed the MFP should have started on the trip of the turbine driven pumps. This was documented in several personnel statements and a narrative log entry. Contributing to this initial misunderstanding was a MFP control power available light bulb that did not illuminate until it was touched. In fact, the MFP had functioned as it was supposed to, and aside from the indication on the control panel, there were no impediments to restarting any of the feedwater pumps from the control room. No attempt was made to manually start the MFP prior to resetting the Level 8 feedwater trip signal.<br><br>Regardless of the issue with the MFP, however, both turbine driven feed pumps were available once the high reactor water level cleared, and could have been started from the control room without diagnosis or repair. Procedures are in place to accomplish this restart, and operators are trained in the evolution. Since RCIC was already in operation, operators elected to use it as the source of inventory, as provided for in the plant emergency instructions, until plant conditions stabilized. Should this event be counted as a Scram with a Loss of Normal Heat Removal? | | |
| | | Response:<br>The ROP working group is currently working to prepare a response. | | |
| 30.8 | IE02 | Question:<br>Many plant designs trip the main feedwater pumps on high reactor water level (BWRs), and high steam generator water level or certain other automatic trips (PWRs). Under what conditions would a trip of the main feedwater pumps be considered/not considered a scram with loss of normal heat removal? | 5/22 Introduced<br>6/12 Discussed<br>9/26 Discussed.<br>10/31 Discussed | Generic |
| | | Response:<br>The ROP working group is currently working to prepare a response. | | |
| 32.3a | IE02 | Question:<br>An unplanned scram occurred October 7, 2001, during startup following an extended forced outage. The unit was in Mode 1 at approximately 8% reactor power with a main feed pump and low-flow feedwater preheating in service. The operators were preparing to roll the main turbine when a reactor tripped occurred. The cause of the trip was a loss of voltage to the control rod drive mechanisms and was not related to the heat removal path. Main feedwater isolated on the | 1/23 Revised. Split into two FAQs<br>3/20 Discussed<br>5/1 Discussed<br>5/22 Tentative Approval<br>6/18 Discussion deferred to July<br>7/24 Discussed | DC Cook |

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| | | trip, as designed, with the steam generators being supplied by the auxiliary feedwater (AFW) pumps. At 5 minutes after the trip, the reactor coolant system (RCS) temperature was 540 degrees and trending down. The operators verified that the steam dumps, steam generator power operated relief valves, start-up steam supplies and blowdown were isolated. Additionally, AFW flow was isolated to all Steam Generators as allowed by the trip response procedure. At 9 minutes after the trip, with RCS temperature still trending down, the main steam isolation valves (MSIV) were closed in accordance with the reactor trip response procedure curtailing the cooldown.<br>The RCS cooldown was attributed to steam that was still being supplied to low-flow feedwater preheating and #4 steam generator AFW flow control valve not automatically moving to its flow retention position as expected with high AFW flow. The low-flow feedwater preheating is a known steam load during low power operations and the AFW flow control issue was identified by the control room balance of plant operator. The trip response procedure directs the operators to check for and take actions to control AFW flow and eliminate the feedwater heater steam supply.<br>When this trip occurred the unit was just starting up following a 40 day forced outage. The reactor was at approximately 8% power and there was very little decay heat present following the trip. With very little decay heat available, the primary contribution to RCS heating is from Reactor Coolant Pumps (RCPs). Evaluation of these heat loads, when compared to the cooling provided by AFW, shows that there is approximately 3.5 times as much cooling flow provided than is required to remove decay heat under these conditions plus pump heat. This resulted in rapid cooling of the RCS and ultimately required closure of the MSIVs. Other conditions such as low flow feedwater preheating and the additional AFW flow due to the AFW flow control valve failing to move to its flow retention setting contributed to this cooldown, but were not the primary cause. Even without these contributors to the cooldown, closure of MSIVs would have been required due to the low decay heat present following the trip.<br>It should also be noted that the conditions that are identified as contributing to the cooldown are not conditions which prevent the secondary plant from being available for use as a cooldown path. The AFW flow control valve not going to the flow retention setting increases the AFW flow to the S/G, and in turn causes an increase in cooldown. This condition is corrected by the trip response procedure since the procedure directs the operator to control AFW flow as a method to stabilize the RCS temperature. With low-flow feedwater preheating in service, main steam is aligned to feedwater heaters 5 and 6 and is remotely regulated from the control room. Low-flow feedwater preheating is used until turbine bleed steam is sufficient to provide the steam supply then the system is isolated. There are no automatic controls or responses associated with the regulating valves, so when a trip occurs, operators must close the regulating valves to secure the steam source. Until the steam regulating valves are closed, this is a steam load contributing to a cooldown. The low-flow preheating steam supplies are identified in the trip response procedure since they are a CNP specific design issue.<br>The actions taken to control RCS cooldown were in accordance with the plant procedure in response to the trip. The primary reason that the MSIVs were required to be closed was due to the low level of decay heat present following a 40 day forced outage. The closure of the MSIVs was to control the cooldown as directed by plant procedure and not to mitigate an off-normal condition or for the safety of personnel or equipment. With the low decay heat present following the 40 day forced outage, there would not have been a need to reopen the MSIVs | | |

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| | | prior to recommencing the startup.<br>Should the reactor trip described above be counted in the Unplanned Scrams with Loss of Normal Heat Removal Performance Indicator? | | |
| | | Response:<br>Yes. The licensee's reactor trip response procedure has an "action/expected response" that reactor coolant system temperature following a trip would be stable at or trending to the no-load Tavg value. If that expected response is not obtained, operators are directed to stop dumping steam and verify that steam generator blowdown is isolated. If cooldown continues, operators are directed to control total feedwater flow. If cooldown continues, operators are directed to close all steam generator stop valves (MSIVs) and other steam valves.<br>During the unit trip described, the #4 steam generator auxiliary feedwater flow control valve did not reposition to the flow retention setting as expected (an off normal condition). In addition, although control room operators manually closed the low-flow feedwater preheat control valves that were in service, leakage past these valves (a pre-existing degraded condition identified in the Operator Workaround database) also contributed to the cooldown. Operator logs attributed the reactor system cooldown to the #4 AFW flow control valve failure as well as to steam being supplied to low-flow feedwater preheating. As stated above, the trip response procedure directs operators to control feedwater flow in order to control the cooldown. Operator inability to control the cooldown through control of feedwater flow as directed is considered an off normal condition. Since the cooldown continued due to an off normal condition, operators closed the MSIVs, and therefore this trip is considered a scram with loss of normal heat removal. | | |
| 34.6 | IE02 | Question:<br>Should the following event be counted as a scram with loss of normal heat removal?<br>STP Unit Two was manually tripped on Dec. 15, 2002 as required by the off normal procedure for high vibration of the main turbine. Approximately 17 minutes after the Unit was manually tripped main condenser vacuum was broken at the discretion of the Shift Supervisor to assist in slowing the turbine. Plant conditions were stabilized using Auxiliary Feedwater and Steam Generator Power Operated Relief Valves. Main Feedwater remained available via the electric motor driven Startup Feedwater pump. Main steam headers remained available to provide cooling via the steam dump valves. At any time vacuum could have been reestablished without diagnoses or repair using established operating procedures until after completion of the scram response procedures.<br>Scrams with a Loss of Normal Heat Removal performance indicator is defined as *"The number of unplanned scrams while critical, both manual and automatic, during the previous 12 quarters that were either caused by or involved a loss of the normal heat removal path prior to establishing reactor conditions that allow use of the plant's normal long term heat removal systems."* This indicator states that a loss of normal heat removal has occurred whenever any of the following conditions occur: loss of main feedwater, loss of main condenser vacuum, closure of the main steam isolation valves or loss of turbine bypass capability. The determining factor for this indicator is whether or not the normal heat removal path is available, not whether the operators choose to use that path or some other path.<br>The STP plant is designed to isolate main feedwater after a trip by closing the main feedwater control valves. The auxiliary feedwater pumps are then designed to start on low steam generator levels. This is expected following normal operation above low power levels and in turn provides the normal heat removal. | 3/20 Introduced<br>3/20 Discussed<br>6/18 Discussed; Question to be revised to reflect discussion<br>7/24 Discussed | STP |

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| | | This design functioned as expected on December 15, 2002 when the reactor was manually tripped due to high turbine vibration. Normal plant operating procedures 0POP03-ZG-0006 (Plant Shutdown from 100% to Hot Standby) and 0POP03-ZG-0001 (Plant Heatup) state if Auxiliary Feedwater is being used to feed the steam generators than the preferred method of steaming is through the steam generator power operated relief valves. This can be found in steps 7.4 and 7.5 of 0POP03-ZG-0001 and steps 6.6.5 and 6.6.10 of 0POP03-ZG-0006. The note prior to 6.6.10 states "*the preferred method for controlling SG steaming rates while feeding with AFW is with the SG PORVs*".<br>The normal heat removal path as defined in NEI 99-02 Revision 2 was in service and functioning properly for seventeen minutes after the manual reactor trip and would have continued to function had not the shift supervisor voluntarily broke condenser vacuum and closed the MSIV's. Interviews with the shift supervisor showed that the decision to break vacuum was two part. 1) Based on experience and reports from the field it was known that vacuum would need to be broken to support the maintenance state required for the main turbine and at a minimum to support timely inspection. 2)This would assist in slowing the turbine. The decision to break vacuum was not based solely on mitigating an off-normal condition or for the safety of personnel or equipment. Because Auxiliary Feedwater system had actuated and was in service as expected, the decision was made to use Auxiliary Feedwater and steam through the SG PORVs. As stated earlier, this is the preferred method of heat removal if the decision to use Auxiliary Feedwater is employed as supported by the normal operating procedures while the plant is in Mode 3. Main feedwater remained available via the electric motor driven Startup Feedwater pump and the main steam headers remained available to provide cooling via the steam dump valves if required. Discussion with the shift supervisor showed he was confident that at any time vacuum could have been readily recovered from the control room without the need for diagnoses or repair using established operating procedures if the need arose. An outside action would be required in drawing vacuum in that a Condenser Air Removal pump would require starting locally in the TGB. This is a simplistic, proceduralized and commonly performed evolution. Personnel are fully confident this would have been performed without incident if required.<br>Closing the MSIVs and breaking vacuum as quickly as possible is not uncommon at STP. For a normal planned shutdown MSIVs are closed and vacuum broken within four to six hours typically to support required maintenance in the secondary. If maintenance in the secondary is known to be critical path than vacuum has been broken as early as three hours and fifteen minutes following opening of the main generator breaker. The only reason that vacuum is not broken sooner is because in most cases it is needed to support chemistry testing.<br><br>By limiting the flow path as described in NEI 99-02 for normal heat removal there is undue burden being placed on the utility. Only recognizing this one specific flow path reduces operational flexibility and penalizes utilities for imparting conservative decision making. Conditions are established immediately following a reactor trip (100% to Mode 3) that can be sustained indefinitely using Auxiliary Feedwater and steaming through the steam generator PORVs. This fact is again supported in the stations Plant Shutdown from 100% to Hotstandby and Plant Heatup normal operating procedures. The cause of a trip, the intended forced outage work scope, or outage duration varies and inevitably will factor into which method of normal long term heat removal is best for the station to employ shortly following a trip. | | |

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| | | Response:<br>The ROP working group is currently working to prepare a response.<br>Licensee Proposed Response:<br>NO. Since vacuum was secured at the discretion of the Shift Supervisor and could have been restored using existing normally performed operating procedures, the function meets the intention of being available but not used. | | |
| 35.5 | IE02 | Question:<br>This question seeks clarification of the description of events that are not to be counted as a Scram with Loss of Normal Heat Removal (Scram w/LONHR), specifically page 16, lines 36-37, of NEI 99-02.<br>At GGNS, an automatic scram occurred due to a turbine trip from a load reject along with a simultaneous loss of offsite power to the Power Conversion System (PCS) with a total loss of power to PCS after the turbine/generator output breaker opened. Power to two of three Emergency Safety Feature (ESF) transformers were lost. All three of the emergency diesel generator divisions started and aligned to the three busses previously fed from the two lost transformers. The third ESF transformer is powered by an independent 115 Kv line and was not lost during the event.<br>The NRC Senior Resident agrees this was not a design basis loss of offsite power event to the Emergency Core Cooling System (ECCS). However, the NRC Senior Resident interprets the referenced exemption is not applicable in this case.<br>The NEI 99-02 guidance noted above exempts the "loss of offsite power" but does not explicitly address a situation where a partial loss of offsite power occurred that resulted in a complete loss of offsite power to the power conversion system.<br><br>**<u>Event Description:</u>**<br>GGNS automatically scrammed at 0948 CDST on 4/24/2003 due to a turbine trip from a load reject. Breakers opened in both the local switchyard and in remote switchyards that removed all paths of generation onto the grid and offsite power to the power conversion system. At the time of the scram, there was a severe thunderstorm in the vicinity. High winds caused a closure of an open disconnect into a grounded breaker under on-going maintenance. This lockout condition led to protective relaying actuating to isolate the fault, and caused the load reject.<br>During the event, Division 1, 2 and 3 Diesel Generators (DGs) started and energized their respective safety busses. All safety systems functioned as designed and responded properly. During this transient, no deviations were noted in any safety functions.<br>Offsite power was automatically restored to the East 500 KV bus, once the main turbine output breaker opened and the fault was cleared. The West 500 KV bus, which was undergoing maintenance at the time of the event, remained deenergized.<br>While all three DGs started and supplied their buses, this did <u>not</u> constitute a design bases Loss Of Offsite Power (LOOP) and an emergency declaration of an unusual event because one of the three sources of off site power (a 115KV line to Engineered Safety Feature (ESF) Transformer 12 (ESF12) remained energized and was available throughout the event. Any of the three ECCS buses could have been transferred to this source of power at any time during the event.<br>Based on the above considerations, it is concluded that this event would be best modeled as a T2, or Loss of PCS (Power Conversion System), initiator. A T2 initiator results in the loss of | 7/24 Introduced<br><u>9/25 Tentative Approval; response to be rewritten to clarify reason.</u> | Grand Gulf |

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| | | the power conversion systems (feedwater, condenser, and condensate) and the modeling of this event does allow for recovery of the power conversion systems.<br><br>Under the current Revision 2 of NEI 99-02, does this Scram count as a Scram with Loss of Heat Removal? | | |
| | | Response:<br>No. The clarifying notes for this performance indicator exempt scrams resulting in loss of all main feedwater flow, condenser vacuum, or turbine bypass capability caused by loss of offsite power. There is no distinction made or implied regarding a complete or partial loss of offsite power. In this case, while the loss of offsite power was not a complete loss, the loss did affect the feedwater, condensate and condenser systems.~~The basis for the exemption is that a loss of power to the feedwater, MSIVs, or condenser equipment is expected to result in the loss of equipment and is not a reflection of equipment maintenance practices, testing or operation.~~ | | |
| 35.6 | MS01-MS04 | Question:<br>At Waterford-3, the essential chiller is a continuously operating support system for the High Pressure Injection, Heat Removal, Residual Heat Removal ~~Mitigating Systems~~, and Emergency AC Power mitigating systems. The function of the Chilled Water System is to provide room cooling to support operation of these systems and other~~of~~ key plant equipment. As such, chiller unavailability should cascade upon the mitigating systems, resulting in mitigating system unavailability. The Plant has established through documented engineering analysis that the functional capability of those mitigating systems is not affected by an interruption of the essential chiller function for a two hour period. The two hour period is not dependent on any operator actions; the time period is based upon the most limiting design temperature for components in the systems in a design basis condition. The mitigating systems are inoperable from a loss of chiller function as soon as chiller function is lost. However, the study establishes that the mitigating systems are available, at least for the first two hours of chiller unavailability. The practice at the plant is that for a loss of chiller function of less than two hours, no unavailability is counted for the mitigating systems. For a loss of chiller function of more than two hours, the counted unavailability time for the mitigating systems is the total chiller unavailability time minus two hours. Is the use of an engineering evaluation to exclude the initial two hour period of unavailable hours as described above consistent with the guidance presented in NEI 99-02, specifically, page 36 lines 14-22?<br>~~Loss of chiller function, as it cascades onto the mitigating safety systems, is not included in the unavailability documented analysis for those systems unless the loss of function exceeds two hours. That is, unavailability is taken for any portion of time after two hours until the chiller function is restored. Is this approach consistent with the guidance presented in NEI 99-02, specifically page 36, lines 14-22?~~ | 8/21 Introduced<br>9/25 Discussed. | Waterford 3 |
| | | Proposed answer:<br>Yes. The use of a documented engineering analysis which evaluates functionality of the mitigating ~~supported~~ systems as affected by cascading support system is consistent with NEI 99-02. The exclusion of the two hour period as described is appropriate.~~is consistent with NEI 99-02. The use of a study is acceptable in determining that the mitigating system function identified in NEI 99-02 will be available to perform its intended function.~~ | | |

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| 35.7 | EP03 | Question:<br>Can the licensee modify the ANS testing methodology when calculating the site value for this indicator?<br>Response:<br>Yes. Page 95 line 19-23 of NEI 99-02 will be modified as follows:<br>*The testing of the public alert and notification system shall meet the requirements of the licensee's FEMA approved Alert and Notification System (ANS) design report and supporting FEMA approval letter. Changes to the activation and/or testing methodology shall be noted in the licensee's quarterly PI report in the comment section.* Changes in the methodology may be made once a 50.54(q) analysis has been completed and a letter has been sent to FEMA requesting the change. Siren systems may be designed with equipment redundancy, *multiple signals* or feedback capability. It may be possible for sirens to be activated from multiple control stations *or signals*. If the use of redundant control stations *or multiple signals* is in approved procedures and is part of the actual system activation process, then activation from either control station *or any signal* should be considered a success.<br>Note: If prior to this FAQ response, a plant changed their testing methodology without prior FEMA approval, it is not necessary to recalculate their past PI data from the time of the change, so long as they subsequently obtain FEMA approval. However, those plants still need to update the affected PI data report by noting the change in the comment section. | 8/21 Introduced<br>9/25 Tentative Approval. The response will be modified to state that the methodology may be changed once a 50.54 (q) has been completed and a letter sent to FEMA requesting the change. | Generic |
| 35.8 | MS03 | Question:<br>NEI 99-02 states that Planned Unavailable Hours include testing, unless the "function can be promptly restored … by an operator in the control room". The guideline further states that "restoration actions must be contained in a written procedure, must be uncomplicated (a single action or a few simple actions), and must not require diagnosis or repair". "The intent … is to allow licensees to take credit for restoration actions that are virtually certain to be successful (i.e., probability nearly equal to 1) during accident conditions".<br>In the following scenario, a pump with an auto start feature is placed in "pull-to-lock" for performance of a calibration procedure on a recirculation valve flow transmitter. The pump would only be required to operate during an event requiring use of the Emergency Operating Procedures and instructions to verify pump operability are contained within the EOPs.<br>EOP instructions vary depending on the situation. For example, if a Reactor Trip and Safety Injection occurred, step 9 of E-0 (Reactor Trip or Safety Injection) directs the operator to "Verify Automatic Actions by performing Attachment 1-K (Verification of Automatic Actions) when time permits". Step 2 of Attachment 1-K verifies the status of the pump. This attachment would be performed for all situations, except when a Safety Injection is not required. If a Safety Injection were not required, restoration of the pump would be performed in step 6 of ES-0.1 (Reactor Trip Response). In each case, the specific EOP steps which verify automatic actions are performed after completion of the EOP Immediate Actions. This may take 1 to 2 minutes. The NRC Resident inspectors questioned whether performance of this restoration action (1 to 2 minutes into an event response -period of elevated intensity and probability of human error), meets the intent of NEI 99-02 regarding "virtually certain of success".<br>The licensee believes that in this situation the NEI guidance can be applied since the function can be promptly restored by an operator in the control room and that additional specific written instructions to verify pump operability would not be appropriate since the action would be performed in accordance with the EOPs in a pre-determined sequence. In addition, the station | 9/25 Introduced | Beaver Valley |

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| | | conduct of operations procedure, which governs operator performance at all times, specifies: "anytime valid plant conditions indicate a need for...Safety System actuation, and the actuation fails to automatically occur, the operator is required to manually initiate the protective action"<br>In this specific case, the control room operator was pre-briefed on the manual pump restoration task during the pre-evolution (transmitter calibration) briefing. Restoration of the pump is a single action (i.e. remove the pump from pull-to-lock).<br>In this example, can the manual operator action be credited in place of the automatic pump start function for continued pump availability? | | |
| | | Response: | | |
| 36.1 | IE02 | Question:<br>With the unit in RUN mode at 100% power, the control room received indication that a Reactor Pressure Vessel relief valve was open. After taking the steps directed by procedure to attempt to reseat the valve without success, operators scrammed the reactor in response to increasing suppression pool temperature. Following the scram, and in response to procedural direction to limit the reactor cooldown rate to less than 100 degrees per hour, the operators closed the Main Steam Isolation Valves (MSIVs). The operators are trained that closure of the MSIV's to limit cool down rate is expected in order to minimize steam loss through normal downstream balance-of-plant loads (steam jet air ejectors, offgas preheaters, gland seal steam).<br>At the time that the MSIVs were closed, the reactor was at approximately 500 psig. One half hour later, condenser vacuum was too low to open the turbine bypass valves and reactor pressure was approximately 325 psig. Approximately eight hours after the RPV relief valve opened, the RPV relief valve closed with reactor pressure at approximately 50 psig. This information is provided to illustrate the time frame during which the reactor was pressurized and condenser vacuum was low.<br>Although the MSIVs were not reopened during this event, they could have been opened at any time. Procedural guidance is provided for reopening the MSIVs. Had the MSIVs been reopened within approximately 30 minutes of their closure, condenser vacuum was sufficient to allow opening of the turbine bypass valves. If it had been desired to reopen the MSIVs later than that, the condenser would have been brought back on line by following the normal startup procedure for the condenser.<br>As part of the normal startup procedure for the condenser, the control room operator draws vacuum in the condenser by dispatching an operator to the mechanical vacuum pump. The operator starts the mechanical vacuum pump by opening a couple of manual valves and operating a local switch. All other actions, including opening the MSIVs and the turbine bypass valves, are taken by the control room operator in the control room. It normally takes between 45 minutes and one hour to establish vacuum using the mechanical vacuum pump.<br>The reactor feed pumps and feedwater system remained in operation or available for operation throughout the event. The condenser remained intact and available and the MSIVs were available to be opened from the control room throughout the event. The normal heat removal path was always and readily available (i.e., use of the normal heat removal path required only a decision to use it and the following of normal station procedures) during this event.<br>Does this scram constitute a scram with a loss of normal heat removal? | 9/25 Introduced and discussed | Quad Cities |

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| | | Response:<br>No. The normal heat removal path was not lost even though the MSIVs were manually closed to control cooldown rate. There was no leak downstream of the MSIVs, and reopening the MSIVs would not have introduced further complications to the event. The normal heat removal path was purposefully and temporarily isolated to address the cooldown rate, only. Reopening the normal heat removal path was always available at the discretion of the control room operator and would not have involved any diagnosis or repair.<br>Further supporting information:<br>The clarifying notes for this indicator state: "*Loss of normal heat removal path* means the loss of the normal heat removal path as defined above. The determining factor for this indicator is whether or not the normal heat removal path is *available*, not whether the operators choose to use that path or some other path." In this case, the operator did not choose to use the path through the MSIVs, even though the normal heat removal path was available.<br>The clarifying notes for this indicator also state: "*Operator actions or design features to control the reactor cooldown rate or water level*, such as closing the main feedwater valves or closing all MSIVs, are not reported in this indicator as long as the normal heat removal path can be readily recovered from the control room without the need for diagnosis or repair." In this case, the closing of the MSIVs was performed solely to control reactor cooldown rate. It was not performed to isolate a steam leak. There was no diagnosis or repair involved in this event. The MSIVs could have been reopened following normal plant procedures | | |
| 36.2 | IE02 | Question:<br>Should an "Unplanned Scram with a Loss of Normal Heat Removal" be reported for the Peach Bottom Unit 2 (July 22, 2003) reactor scram followed by a high area temperature Group I isolation?<br>Description of Event:<br>At approximately 1345 on 07/22/03, a Main Generator 386B and 386F relay trip resulted in a load reject signal to the main turbine and the main turbine control valves went closed. The Unit 2 reactor received an automatic Reactor Protection System (RPS) scram signal as a result of the main turbine control valves closing. Following the scram signal, all control rods fully inserted and, as expected, Primary Containment Isolation System (PCIS) Group II and III isolations occurred due to low Reactor Pressure Vessel (RPV) level. The Group III isolation includes automatic shutdown of Reactor Building Ventilation. RPV level control was re-established with the Reactor Feed System and the scram signal was reset at approximately 1355 hours.<br>At approximately 1356 hours, the crew received a High Area Temperature alarm for the Main Steam Line area. The elevated temperature was a result of the previously described trip of the Reactor Building ventilation system. At approximately 1358, a PCIS Group I isolation signal occurred due to Steam Tunnel High Temperature resulting in the automatic closure of all Main Steam Isolation Valves (MSIV).Following the MSIV closure, the crew transitioned RPV pressure and level control to the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems. Following the reset of the PCIS Group II and III isolations at approximately 1408, Reactor Building ventilation was restored.<br>At approximately 1525, the PCIS Group I isolation was reset and the MSIVs were opened. Normal cooldown of the reactor was commenced and both reactor recirculation pumps were restarted. Even though the Group I isolation could have been reset following the Group II/III reset at 1408, the crew decided to pursue other priorities before reopening the MSIVs including: | 9/25 Introduced and discussed | Peach Bottom |

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| | | stabilizing RPV level and pressure using HPCI and RCIC; maximizing torus cooling; evaluating RCIC controller oscillations; evaluating a failure of MO-2-02A-53A "A" Recirculation Pump Discharge Valve; and, minimizing CRD flow to facilitate restarting the Reactor Recirculation pumps.<br><br>**Problem Assessment:**<br>It is recognized that loss of Reactor Building ventilation results in rising temperatures in the Outboard MSIV Room. The rate of this temperature rise and the maximum temperature attained are exacerbated by summertime temperature conditions. When the high temperature isolation occurred, the crew immediately recognized and understood the cause to be the loss of Reactor Building ventilation. The crew then prioritized their activities and utilized existing General Plant (GP) and System Operating (SO) procedures to re-open the MSIVs.<br>Reopening of the MSIVs was:<br>• easily facilitated by restarting Reactor Building ventilation,<br>• completed from the control room using normal operating procedures<br>• without the need of diagnosis or repair<br>Therefore, the MSIV closure does not meet the definition of "Loss of normal heat removal path" provided in NEI 99-02, Rev. 2, page 15, line 37, and it is appropriate not to include this event in the associated performance indicator – Unplanned Scrams with Loss of Normal Heat Removal.<br>Discussion of specific aspects of the event:<br>Was the recognition of the condition from the Control Room?<br>▪ Yes. Rising temperature in the Outboard MSIV Room is indicated by annunciator in the main control room. Local radiation levels are also available in the control room. During the July 22, 2003 scram, control room operators also recognized that the increase in temperature was not due to a steam leak in the Outboard MSIV Room because the local radiation monitor did not indicate an increase in radiation levels. Initiation of the Group I isolation on a Steam Tunnel High Temperature is indicated by two annunciators in the control room.<br>Does it require diagnosis or was it an alarm?<br>▪ The event is annunciated in the control room as described previously.<br><br>Is it a design issue?<br>▪ Yes. The current Unit 2 design has the Group I isolation temperature elements closer to the Outboard MSIV Room ventilation exhaust as compared to Unit 3. As a result, the baseline temperatures, which input into the Group I isolation signal, are higher on Unit 2 than Unit 3.<br>Are actions virtually certain to be successful?<br>▪ The actions to reset a Group I isolation are straight forward and the procedural guidance is provided to operate the associated equipment. No diagnosis or troubleshooting is required.<br><br>Are operator actions proceduralized?<br>▪ The actions to reset the Group I isolation are delineated in General Plant procedure GP-8.A "PCIS Isolation-Group I." The actions to reopen the MSIVs are contained in System Operating procedures SO 1A.7.A-2 "Main Steam System Recovery Following a Group I Isolation" and Check Off List SO 1A.7.A-2 "Main Steam Lineup After a Group I Isolation." These procedures are performed from the control room. | | |

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| | | How does Training address operator actions?<br>▪ The actions necessary for responding to a Group I isolation and subsequent recovery of the Main Steam system are covered in licensed operator training.<br>Are stressful or chaotic conditions during or following an accident expected to be present?<br>• As was demonstrated in the event of July 22, 2003, sufficient time existed to stabilize RPV level and pressure control and methodically progress through the associated procedures to reopen the MSIVs without stressful or chaotic conditions<br>Response:<br>The Peach Bottom Unit 2 July 22, 2003 reactor scram followed by a high area temperature Group I isolation should not be included in the Performance Indicator - "Unplanned Scram with a Loss of Normal Heat Removal." This specific MSIV closure does not meet the definition of "Loss of normal heat removal path" provided in NEI 99-02, Rev. 2, page 15, line 37, in that the main steam system was "easily recovered from the control room without the need for diagnosis or repair. Therefore, it would not be appropriate to include this event in the associated performance indicator – Unplanned Scrams with Loss of Normal Heat Removal. | | |
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