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OAK RIDGE NATIONAL LABORATORY OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS. INC. FOR THE U.S. DEPARTMENT OF ENERGY

POST OFFICE BOX 2009 OAK RIDGE, TENNESSEE 37831

September 13, 1991

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Mr. W. R. Jones **Reactor Operations Analysis Branch** Division of Safety Programs Office for Analysis and Evaluation of Operational Data, MS-9112 U. S. Nuclear Regulatory Commission Washington, DC 20555

Dear Mr. Jones:

Preliminary ASP Analysis of Recent Nine Mile Point 2 Event

Enclosed are three copies of our preliminary Accident Sequence Precursor (ASP) analysis on the August 13, 1991, event at Nine Mile Point Unit 2 involving the failure of five non-safety related uninterruptible power supplies. Please note that this analysis is based on preliminary data and descriptions regarding the event and is subject to revision. Obviously, the report from the Incident Investigation Team (IIT) was not available as input for the analysis.

Based on the analysis at this time, it does appear that this event will be selected as an ASP event for 1991. Please let me know if we can be of further assistance in this matter.

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Sincerely yours,

\$ J. Mug

G. T. Mays, Director Nuclear Operations Analysis Center

GTM:ap

- cc/enc: J. W. Cletcher
 - D. A. Copinger B. W. Dolan

 - J. E. Jones Jr.

 - J. W. Minarick
 - J. E. Rosenthal, NRC-AEOD
- C. E. Pugh cc:

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G. F. Thompson, NRC-AEOD

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ACCIDENT SEQUENCE PRECURSOR PROGRAM EVENT ANALYSIS

Preliminary

This analysis was based on information which is preliminary in nature and subject to revision

Event No.:	PNO-IIT-91-002A
Event Description:	Loss of five non-safety uninterruptible power supplies.
Date of Event:	August 13, 1991
Plant:	Nine Mile Point 2

Summary

• 1

A main transformer fault occurred, resulting in turbogenerator trip and reactor scram. At the same time, five uninterruptible power supplies deenergized, removing power from some nonsafetyrelated instrumentation and equipment. Equipment affected included rod position indicators, control room annunciators, lighting, and communications systems. One train of the low-pressure coolant injection system was unavailable, having previously been removed from service for maintenance.

Plant operators verified successful scram by alternate means and started the reactor core isolation cooling system for reactor vessel level control. Reactor pressure was reduced and a condensate booster pump was aligned to provide makeup. Approximately one-half hour after the scram, power was restored to the uninterruptible power supply buses from an alternate supply and the plant proceeded with a normal shutdown. Based on the preliminary information provided, the conditional probability of subsequent core damage associated with the event is estimated to be 1.4×10^{-5} . The relative significance of this event compared to other postulated events at Nine Mile Point 2 is shown below:



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Event Description

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Nine Mile Point 2 was operating at 100% power when one phase of the main transformer faulted. The main generator and turbine tripped, and the reactor scrammed. Simultaneously, five uninterruptible power supplies (UPS) tripped and did not transfer to their alternate power supplies. These failures were apparently caused by fault-induced perturbations in the UPS AC power supplies, in conjuction with degraded battery power supplies to logic cards controlling the units. The UPS units affected, all considered not to be safety-related, are listed below in Table 1:

Supply	Load Description			
2VBB-UPS1A	Radwaste Computer Nonsafety-related control room instrumentation & controls			
2VBB-UPS1B	Nonsafety-related radiation monitoring Nonsafety-related control room instrumentation & controls			
2VBB-UPS1C	Non-essential lighting			
2VBB-UPS1D	Non-essential lighting			
2VBB-UPS1G	Computer-related loads			

Table 1. Failed Uninterruptible Power Supplies

Specific loads affected included control room annunciators, balance-of-plant instrumentation, control room recorders, feedwater regulating valves, drywell coolers, the rod position indicating system, control rod drive (CRD) hydraulic system indicators, radio and paging communications systems, plant monitoring computers, and some lighting.

Following a scram, operators normally refer to the rod position indicating system (RPIS) to verify that the control rods have all inserted properly. With the RPIS unavailable, the operators verified the scram by observing:

- 1. Scram pilot lights deenergized (Indicating scram circuits deenergized, which allows scram valves to operate).
- 2. Scram discharge volume full (Indicating that control rods have inserted, displacing water from the CRD over-piston area to the scram discharge volume).
- 3. Flux on source range monitor scale and decreasing.

Subsequent to the loss of load and reactor scram, two safety relief valves operated to relieve steam

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from the reactor to the suppression pool. In addition, turbine steam bypass valves opened to relieve to the main condenser.

The reactor core isolation cooling (RCIC) system was placed in service to provide vessel makeup. Its automatic control system experienced flow oscillations and operators placed RCIC in manual control to assure stable flow to the reactor. Residual heat removal (RHR) pump "A" was then placed in service in suppression pool cooling mode. Reactor pressure was rapidly reduced and a condensate booster pump was aligned to supply condensate to the the reactor.

Approximately one-half hour after the scram, the deenergized UPS buses were repowered from the standby "maintenance" bus and a normal plant cooldown ensued. Residual heat removal pump "B" was subsequently placed in service for decay heat removal.

Event-Related Plant Information

The Nine Mile Point 2 Final Safety Analysis Report indicates that ten UPS power supplies are utilized at the plant. UPS power supplies 2VBB-UPS1A, 1B, 1C, 1D, and 1G are all 75-kVA, 120/208-V, 3-phase, nonsafety-related units. Loads supplied by these units are indicated in table 1, above. Nonsafety-related supply 2VBB-UPS1H, a 5-kVA, single-phase, 120V unit, supplies the gaseous effluent radiation monitor in the plant stack. Reactor Protection System (RPS) supplies 2VBB-UPS3A and 3B are 10 kVA, 120-V, single-phase units. These units feed all RPS logic trip channel loads and MSIV control solenoids and are considered nonsafety-related as their loads "fail safe" (deenergize to operate).

Two UPS supplies are considered to be safety-related: 2VBA*UPS2A and 2B. These units are 25kVA, 120-V, single phase systems which supply ECCS instrumentation and control loads.

ASP Modeling Assumptions and Approach

The ASP models describe sequences in which successes of combinations of the following systems will prevent severe core damage:

- systems required for reactor shutdown (CRD scram function)
- power conversion systems (for decay heat removal)
- feedwater (for reactor vessel makeup)
- safety/relief valves
- emergency power
- high pressure core spray
- low pressure core spray
- reactor core isolation cooling
- control rod drive hydraulic system

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- low pressure coolant injection / residual heat removal system
- RHR service water system

With the exception of the feedwater system, portions of the control rod drive hydraulic system, and the power conversion system, all systems listed are supplied and controlled from safety-related power sources. Loss of the nonsafety UPS supplies should not have affected their availability.

Since the precise impacts of the UPS failures on nonsafety-related equipment were difficult to determine based on available information, the event was conservatively modeled as a scram with the control rod drive hydraulic system, the feedwater system, the power conversion system, and one train of LPCI all unavailable.

Preliminary information indicates that one train of the low-pressure coolant injection (LPCI) was unavailable. As RHR/LPCI pumps "A" and "B" were utilized during the event, it was inferred that "C" pump was unavailable. The "A" and "B" trains of RHR have heat exchangers which are cooled by service water.

System nonrecovery probabilities (given that an initial failure has occurred) are incorporated into the ASP models. These probabilities were examined in light of the additional stress which may have been experienced by the plant operations staff during the event. The values, in the range of 1.0 for actions which could not reasonably be performed in the time available to 0.04 for actions which are simple and which can be performed in the control room, were judged to be still appropriate based on the preliminary information available concerning the event.

Operators were forced to rely on backup sources of information to verify scram and rod insertion. The reduction in information available to operators may have increased the probability of human errors, such as inappropriate initiation of ATWS mitigation. These concerns were not addressed in the preliminary analysis.

Analysis Results

The conditional probability of core damage is estimated to be 1.4×10^{-5} . The dominant sequence involved failure of the power conversion and feedwater systems, and failure of residual heat removal/suppression pool cooling.

The potential impact of inappropriate ATWS mitigation actions may be explored in the final version of this analysis, when additional information is available.

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INTERNAL CORRESPONDENCE

FROM M.J. Colomb

M.J. McCormick.

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DISTRICT Nine Mile Point DATE , 'September 6, 1991 FILE CODE SUBJECT RCIC OSCILLATIONS

V NIAGARA M MOHAWK

This is an assessment of the RCIC flow oscillation problem based on review of surveillance data and interviews with the supervisors, operators and engineers involved.

On June 27, 1991, a surveillance was performed on the RCIC system (N2-OSP-ICS-Q002). During the performance of the test, fluctuations were seen in the RCIC system flow with the controller in auto, after the initial "cold start", during set up to record IST data. The magnitude of the flow change (oscillation) was approximately 30 gpm. When flow to the Condensate Storage Tank was changed by adjusting Test. Return Valve (ISC*FV108), the oscillation magnitude reduced to less than 20 gpm (i.e., magnitude was affected by FV108 position). The Control Room (Station Shift Supervisor) assessment was that RCIC operability was not affected (i.e., RCIC could perform its intended function). Eric Townsend (Operations Supervisor) was aware of the problem (he observed at least a portion of the test) and had no operability concerns. A Work Request was written by a GE engineer to "tune" the controller.

During the event of August 13, 1991, RCIC oscillations of a much greater magnitude (100 gpm) were observed. The controller was placed in manual and parameters stabilized.

In order to better assess the control function of the RCIC system in the future, the following changes are being made to the surveillance test:

In addition to the present requirement to make flow set point changes, pump discharge pressure changes will be made by adjustment of ICS*FV108 (i.e., assess operation at 1100 psig, 1000 psig, 800 psig, 600 psig, 400 psig and 200 psig).

Criteria will be added to assess stability.

In addition, during Startup from the present outage, RCIC will be run at three different reactor pressures (150 psig, 500 psig, 1000 psig).

Additional actions:

- 1) J.A. Fitzpatrick will be notified of the problem (BWR-4 with RCIC and HPCI)."
- 2) An event description is being prepared for Nuclear Network.
- 3) A letter is being issued to SSSs/ASSSs to emphasize the importance of documenting any surveillance anomalies in the tests and SSS log, and elevating issues wher appropriate.

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To: J. Conway From: J.Ting Date: Sept.2, 1991 Subject: RCIC flow and speed hunting problem status report

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Brief Description:

WR No. 189944 and 184909 identified RCIC turbine speed and flow hunting problems during the RCIC quarterly surveillance.

Discussions:

Discussions have been made with following personnel: Thad Sitnik, Dan Hadley, John Alberts (I/C Dept.) and Albert Hwu (GE), Dave Flood (System Engineering). Listed below were what we have done:

1.	As found flow control <u>EGM Settings on</u>	loop EGM settings taker <u>Per N2-IMP-ICS-010</u>	n: <u>As Found</u>
	Amps Gain Pot	7	7
	Hi ⁻ trim (volts)	4	4
	Lo trim (volts)	6.5	6.5
	Stability pot	7	7
	Speed setpoint	5 '	NA
	Idle (volts)	892	-1.96 at RGSC
			TP 1 and 2
	P601 Flow controller G	Gain .33	.30
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2. flow transmitter 2ICS*FT101 has been vented with its own line pressure, crud and air bubble were found.

- 3. Flow controller 2ICS*FC101 has been bench checked and was found OK.
- 4. Flow indicator 2ICS*FI101 has been checked and was found OK.
- 5. EGM CONTROL BOX static data was taken per N2-IMP-ICS-010 without any adjustment or setting change. After thoroughly review and revealed that:
- 1). The procedure requires further changes. 2). The as found Null Voltage readings indicated that the EGM control loop was out of calibration and Hi/Low trim needs to be adjusted.

Preliminary Conclusion:

Air in flow sensing line.

Recommended Actions:

1. Review procedure N2-IMP-ICS-010 and implement required changes. (Hi/Low Trim adjustment requires further discussion and confirmation with GE San Jose). Action required date: Sept. 3, 1991

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- 2. Perform N2-IMP-ICS-010 and take static base line data on Sept.3, 1991 night shift.
- 3. Perform troubleshooting (if required) during performance of N2-OSP-ICS-R002 at reactor pressure 150 psig (perform tune-up procedure N2-IMP-ICS-010 if required).
- 3A. Taking oil sample for water content during RCIC $\frac{150}{\text{test}}$ run. (NZ-CSP-17V) $WR \neq 184910$
- 4. At reactor rated pressure, perform RCIC tune-up per N2-IMP-ICS-010 and pump & valve operability verification per N2-OSP-ICS-Q002.
- 5. Generate a new procedure for periodic (18 month) system checkout and calibration per GE SIL No. 351 Rev.2 Category 2. (This is for tracking and because N2-IMP-ICS-010 is a once every 5 year procedure).

Required date: As soon as applicable.







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	Amps Gai	n Pot		7	7
	Hi trim	(volts)		4	4
	Lo trim	(volts)		6.5	. 6.5
	Stabilit	y pot		7	7
	Speed se	tpoint		5	NA
	Idle (vo	lts)		892	-1.96 at RGSC
	•	•			TP 1 and 2
	P601 Flo	w control	ler Gain	.33	.30
	11 11	<u>†1</u>	Dial	.20 measured	d .20 measured
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- 3. Perform troubleshooting (if required) during performance of N2-OSP-ICS-R002 at reactor pressure 150 psig (perform tune-up procedure N2-IMP-ICS-010 if required).
- 3A. Taking oil sample for water content during RCIC test run.
- 4. At reactor rated pressure, perform RCIC tune-up per N2-IMP-ICS-010 and pump & valve operability verification per N2-OSP-ICS-Q002.
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Required date: As soon as applicable.

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Preliminary Conclusion:

Air in flow sensing line.

Recommended Actions:

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- 3. Perform troubleshooting (if required) during performance of N2-OSP-ICS-R002 at reactor pressure 150 psig (perform tune-up procedure N2-IMP-ICS-010 if required).
- 3A. Taking oil sample for water content during RCIC $\frac{150}{\text{test}}$ run. (NZ-CSP-17V) WR = 184910

4. At reactor rated pressure, perform RCIC tune-up per N2-IMP-ICS-010 and pump & valve operability verification per N2-OSP-ICS-Q002.

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- 25) Missed required Tech Spec Surveillance
 - DER 2-91-Q-709 & letter from Gary Whitaker
 - Tech Spec 3/4.6.4, Suppression Chamber/Drywell Vacuum Breaker, require that... operability shall be demonstrated within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves, by cycling each vacuum breaker through at least one complete cycle of full travel". The actuation of two valves wasn't discovered until safety/relief approximately four hours after they actually lifted so this Tech. spec. was not met within the required time limit.
- 26) Missed required Tech Spec Action (RPS Inop due to EOP Jumpers)
 - DER 2-91-Q-74B & Section from J. Helker's report "Assessment of Operator Response"
 - Defeating of RPS interlocks is authorized by the EOPs for this particular scenario in order to provide the ability to reset the scram and perform multiple scrams. This Tech Spec action request specifies placing at leat one RPS trip system in a tripped condition within one hour. Using N2-EOP-6 Attachment 14 operators had defeated all RPS interlocks (except for manual) as directed by the EOPs for a period of approximately one and one half hours. The basis for the procedures and safety evaluations recognize the potential for this condition, thus, the action taken by the operators and direction by two procedures was appropriate.
- 27) DIV II H_2/O_2 Sample Pump Trip (2CMS*P2B)
 - WR 190966 & 196053
 - WR 190966 (910824) is closed. Work Item Description: During Plant Transient on 910813 Div. II Pump (2CMS-P2B) tripped for no obvious reason. Div. I CMS and all other Div. II CMS SOVs were found in their normal positions. Determine cause of pump trip and correct if required. Cause of failures: None found, possibly spurious.
 - Following completion of the WR I&C traced the wires through the electric1 downings and determined that pump *P2B was wired to the correct power panel.
 - Subsequently NMP2 Operations tripped pump *P2B by opening its power panel breaker.
 - WR 196053 (910829) is still open. Work Item Description: check the breaker for pump *P2B.
- 28) RCIC Flow Oscillations
 - WR 184909 and 189944
 - WR 184909 (910814) is still open. Work Item Description: After several minutes of operation during the RCIC Quarterly Surveillance the RCIC Flow Controller in auto began to hunt at approximately plus or minus 50 GPM about its set point of 600 GPM.

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Need Control Loop Setting Verification per attached and troubleshoot as necessary.

- WR 189944(910627) is still open. Work Item Description: RCIC Turbine Speed Exhibits hunting during surveillance test; perform applicable procedure steps (N2-IMP-ICS-0001) to tune up the RCIC Control System.
- 29) Drywell Temp indicator discrepancy CMS*TRX130
 - WR189947
 - WR 189947 (910819) is still open. Work Item Description: Pen showing elevation 307 temperature on the Drywell temperature recorder did not move during temperature transient in the Drywell.
- 30) Fire panels affected by transient
 - Letter from A. Andersen dated August 15, 1991.
 - 18 of 20 fire panels at Unit 2 maintained normal power supply. Two fire panels transferred to internal battery backup. There was no interruptions or decreases of fire protection/detection/suppression at the local fire panels.
- 31) Group 9 Isolation
 - System Engineering Evaluation.
 - Upon loss of UPS1A, automatic isolation of Group 9 valves was lost. Also, loss of UPS1B resulted in loss of 2GTS-RE105, causing the radiation monitor trip contacts to close. This closed contact feeds a second time delay relay in the isolation logic. When power was restored to UPS1A, the Group 9 isolation logic was restored, causing the relay fed from the radiation monitor to time out, which resulted in the Group 9 isolation.
- 32) WCS isolation
 - Operations Evaluation of Operating Procedure.
 - Root Cause under investigation by Operations Department.
- 33) Verification that EOP Actions Restored to Normal
 - Attachment 14 (Alternate Control Rod Insertions) to N2-EOP-6 which installed the RPS Jumpers has a hand written double verification of their removal.
 - The ADS inhibit switch is a Control Room front panel switch on panel P601 which has been verified to be back in its normal (unhibited) position.
 - A Procedure Change Evaluation (PCE) request will be written suggesting that all EOP-6 attachments have double verification steps after all restoration steps.

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INTERNAL CORRESPONDENCE

N V NIAGARA N M MOHAWK 07-640-91



DISTRICT Nine Mile Point DATE September 6, 1991 FILE CODE SUBJECT RCIC OSCILLATIONS

TO M.J. McCormick

This is an assessment of the RCIC flow oscillation problem based on review of surveillance data and interviews with the supervisors, operators and engineers involved.

On June 27, 1991, a surveillance was performed on the RCIC system (N2-OSP-ICS-Q002). During the performance of the test, fluctuations were seen in the RCIC system flow with the controller in auto, after the initial "cold start", during set up to record IST data. The magnitude of the flow change (oscillation) was approximately 30 gpm. When flow to the Condensate Storage Tank was changed by adjusting Test. Return Valve (ISC*FV108), the oscillation magnitude reduced to less than 20 gpm (i.e., magnitude was affected by FV108 position). The Control Room (Station Shift Supervisor) assessment was that RCIC operability was not affected (i.e., RCIC could perform its intended function). Eric Townsend (Operations Supervisor) was aware of the problem (he observed at least a portion of the test) and had no operability concerns. A Work Request was written by a GE engineer to "tune" the controller.

During the event of August 13, 1991, RCIC oscillations of a much greater magnitude (100 gpm) were observed. The controller was placed in manual and parameters stabilized.

In order to better assess the control function of the RCIC system in the future, the following changes are being made to the surveillance test:

- 1) In addition to the present requirement to make flow set point changes, pump discharge pressure changes will be made by adjustment of ICS*FV108 (i.e., assess operation at 1100 psig, 1000 psig, 800 psig, 600 psig, 400 psig and 200 psig).
- 2) Criteria will be added to assess stability.

In addition, during Startup from the present outage, RCIC will be run at three different reactor pressures (150 psig, 500 psig, 1000 psig).

Additional actions:

- 1) J.A. Fitzpatrick will be notified of the problem (BWR-4 with RCIC and HPCI).
- 2) An event description is being prepared for Nuclear Network.
- 3) A letter is being issued to SSSs/ASSSs to emphasize the importance of documenting any surveillance anomalies in the tests and SSS log, and elevating issues when appropriate.

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Date: Sept.2, 1991 To: J. Conway From: J.Ting Subject: RCIC flow and speed hunting problem status report

Brief Description:

WR No. 189944 and 184909 identified RCIC turbine speed and flow hunting problems during the RCIC guarterly surveillance.

Discussions:

Discussions have been made with following personnel: Thad Sitnik, Dan Hadley, John Alberts (I/C Dept.) and Albert Hwu (GE), Dave Flood (System Engineering). Listed below were what we have done:

L.	As found flow control EGM Settings on	loop EGM <u>Per N2-</u>	settings taker IMP-ICS-010	n: <u>As</u> <u>Found</u>
	Amps Gain Pot	•	7	7
	Hi trim (volts)		4	4
	Lo trim (volts)		6.5	6.5
	Stability pot	1	7	7
	Speed setpoint		5	NA
	Idle (volts)		892	-1.96 at RGSC
				TP 1 and 2
	P601 Flow controller @	Gain	.33	.30
		Dial	.20 measured	.20 measured
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flow transmitter 2ICS*FT101 has been vented with its own line pressure, crud and air bubble were found.
Flow controller 2ICS*FC101 has been bench checked and

- was found OK.
- 4. Flow indicator 2ICS*FI101 has been checked and was found OK.
- 5. EGM CONTROL BOX static data was taken per N2-IMP-ICS-010 without any adjustment or setting change. After thoroughly review and revealed that:
- 1). The procedure requires further changes.
- 2). The as found Null Voltage readings indicated that the EGM control loop was out of calibration and Hi/Low trim needs to be adjusted.

Preliminary Conclusion:

Air in flow sensing line.

Recommended Actions:

1. Review procedure N2-IMP-ICS-010 and implement required changes. (Hi/Low Trim adjustment requires further discussion and confirmation with GE San Jose). Action required date: Sept. 3, 1991

. . To: J. Conway Date: Sept.2, 1991 From: J.Ting Subject: RCIC flow and speed hunting problem status report

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	" " Dial	20 measured	20 measured
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- 2. Perform N2-IMP-ICS-010 and take static base line data on Sept.3, 1991 night shift.
- 3. Perform troubleshooting (if required) during performance of N2-OSP-ICS-R002 at reactor pressure 150 psig (perform tune-up procedure N2-IMP-ICS-010 if required).
- 3A. Taking oil sample for water content during RCIC test run.
- 4. At reactor rated pressure, perform RCIC tune-up per N2-IMP-ICS-010 and pump & valve operability verification per N2-OSP-ICS-Q002.
- 5. Generate a new procedure for periodic (18 month) system checkout and calibration per GE SIL No. 351 Rev.2
 Category 2. (This is for tracking and because N2-IMP-ICS-010 is a once every 5 year procedure).

Required date: As soon as applicable.

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	Idle	(vol	ts)				892		-1.96	5 at	RGSC
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Required date: As soon as applicable.



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- 25) Missed required Tech Spec Surveillance
 - DER 2-91-Q-709 & letter from Gary Whitaker
 - Tech Spec 3/4.6.4, Suppression Chamber/Drywell Vacuum Breaker, require that... operability shall be demonstrated within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves, by cycling each vacuum breaker through at least one complete cycle of full travel". The actuation of two wasn't valves discovered until safety/relief approximately four hours after they actually lifted so this Tech. spec. was not met within the required time limit.
- 26) Missed required Tech Spec Action (RPS Inop due to EOP Jumpers)
 - DER 2-91-Q-74B & Section from J. Helker's report "Assessment of Operator Response"
 - Defeating of RPS interlocks is authorized by the EOPs for this particular scenario in order to provide the ability to reset the scram and perform multiple scrams. This Tech Spec action request specifies placing at leat one RPS trip system in a tripped condition within one hour. Using N2-EOP-6 Attachment 14 operators had defeated all RPS interlocks (except for manual) as directed by the EOPs for a period of approximately one and one half hours. The basis for the procedures and safety evaluations recognize the potential for this condition, thus, the action taken by the operators and direction by two procedures was appropriate.
- 27) DIV II H₂/O₂ Sample Pump Trip (2CMS*P2B)
 - WR 190966 & 196053
 - WR 190966 (910824) is closed. Work Item Description: During Plant Transient on 910813 Div. II Pump (2CMS-P2B) tripped for no obvious reason. Div. I CMS and all other Div. II CMS SOVs were found in their normal positions. Determine cause of pump trip and correct if required. Cause of failures: None found, possibly spurious.
 - Following completion of the WR I&C traced the wires through the electricl downings and determined that pump *P2B was wired to the correct power panel.
 - Subsequently NMP2 Operations tripped pump *P2B by opening its power panel breaker.
 - WR 196053 (910829) is still open. Work Item Description: check the breaker for pump *P2B.
- 28) RCIC Flow Oscillations
 - WR 184909 and 189944
 - WR 184909 (910814) is still open. Work Item Description: After several minutes of operation during the RCIC Quarterly Surveillance the RCIC Flow Controller in auto began to hunt at approximately plus or minus 50 GPM about its set point of 600 GPM.

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Need Control Loop Setting Verification per attached and troubleshoot as necessary.

- WR 189944(910627) is still open. Work Item Description: RCIC Turbine Speed Exhibits hunting during surveillance test; perform applicable procedure steps (N2-IMP-ICS-@001) to tune up the RCIC Control System.
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 - Letter from A. Andersen dated August 15, 1991.
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 - Upon loss of UPS1A, automatic isolation of Group 9 valves was lost. Also, loss of UPS1B resulted in loss of 2GTS-RE105, causing the radiation monitor trip contacts to close. This closed contact feeds a second time delay relay in the isolation logic. When power was restored to UPS1A, the Group 9 isolation logic was restored, causing the relay fed from the radiation monitor to time out, which resulted in the Group 9 isolation.
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 - Attachment 14 (Alternate Control Rod Insertions) to N2-EOP-6 which installed the RPS Jumpers has a hand written double verification of their removal.
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- WR 189941(9:0027) IS STOLL OPEN. WORLD'TO H DESERVICE IN: 0 RCIC Turbing food the bits bucking out at a sub allance そのから、 またたい しょうわかい キーマッキャー しんしいくれいたいしょく (N2-IMP-TOS-0001) IN SAR AN THE BURE CONNER PROCESSION

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RCIC Controller 07-641-91 adultations

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Sequence of events 1. Operation performing ICS Q002 2. Operators Note flow oscillations on ICS flow controller 3. SSS informed, SSS recalle oscillation just outside the green bond. Heen band spane 20 gpm on controller. Estimation of flow oscillation magnetul ~ 30 gpm 4. Operation adjust FV 108 to attain required pump spin and flow rate. When FV 108 in throttled open, oscillation stop. 5. SSS concluder that orcillation due to FV108. See SSS note attached. 6. E. Tournend Asst Sups Ops observer ICS instruments and notes menute parameter changer. Concluder that they au due to system dynamics. 7. J.T. Havie, 6E advisory observes oullate Note: Operator is able to start and stop accillation by adjusting FU 108. 8. SSS and GE descur operability issue No operability concern because oscillat due to adjustment of FUIOB. SSS and GE discun need for loop calibration to correct unsmooth flow control. WR to be written

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- 9. Problem ariser during surveillance with inability to trip ICS trubine from control room.
 - 10. JT Hwe arriver in the control room, inform 555 that governon/controlles in oRay but EGM output needs adjustment. WR 189944 writter See attached 555 Note.
 - 11. Work request reacher Work control, Ron Murray. Ron remembers being hand delivere the WR by JT Hur. JT Hur does not remember this.
 - 12. Kon Murray remember JT Hwa dissussing the WK and if it was an operability issue. JT Hwa said no it was not. He also said that he descussed it with the S55.
 - 13. Ron Manay says he called the control room to discuss the UR as an operability concern. Ne does not remember who he york to but does remember being told about slight oscillation and only a need to fine tune. 14. With operability not an issue the WR was placed in the cycle to be worked during the next ICS outyr or prior to the next scheduled surveillance run - 9-11-91

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15. Since there was no ungency issue concerning operability, the request to work in less than 7 days was not pursued.

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ALTER TITTE CONTRACTOR 12 6/27/91 1 8:52 m reported Ite Fried problem with TIP Machine Index Flux pretiven RXENGINEERING TO RUN TIP'S'IN preps of RESP-4 · RAP9 Completed (TIP Bites CAMIDIATION) (9:25An) A KADIA WORKY ON LIBI Chillen fill /vent /stavet up [] 9:15 pm Signed to restore CEP-AOU RO to norman AFTER Meetiancal work 9:17Am PTV N2-RESP-4 LPRON CARLOLIATIONS

D Ils Not controlling SMOOTH FLOW NEED Itc to Due LOOP CAL WR to be written <u>NO</u> APPENNES to be Hydralic ops with Ics - FV108 Hurottling to MAINTANN 4250. RPM MO 600 GAM. Controllon MAS SKAROFD out AND BALL MANTO. • • • • . ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ . •

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K H. 6/27/91 17 Clemed TM 91-025 /032 ON Sup + P,F (2.75 15 WR ON VIOF (168700) (10:47 Am) [] 11:08 pm EBS- 4001 Completed DIVI I UN Weekey Schedule DIU I / IT ON MONTHly A LOG WOOT BK/ VOLTAge done due 1912 6/27/91 I REIL TURBINE THIP WON'T WORK ON PGOI E3L 91-390 Also Governon / controller is ORAN the Eon output (that througer ELECTION to Hydralu ching) 15 Neeping Adjustment. the Governac ULU will Follow EGM output (WR 189944) I Adjusted Rods to RATE For Line



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al, A don't remember much detail. alot of FOG.

I walked in the control room, & Remember Jerry Buns + Pat Brennan Telling me of some orcillations . A looked at the system + recall very minute farameter changes that appeared to be normal system dynamics. Jerry or Part told me of having to throttle open FV108. I don't remember which SRO was There . Newman. Willis . I think I mentioned that DEET was the start up sugineer. I think it was me who suggested getting albert thou to look at some GTARS traces. Nothing was to be gained by looking at The P603 meters . I don't remember of albert was in the control Room before & left or not. What I saw was RCIC in duto running as regid for The OSP walk down. bETAIS traces weren'T available then. I might have mentioned calling Dave Flood too, tim not sale.

I do not remember questioning operability.

I hope this helps but June 27th seems cour ago.

Eric

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ATTACHMENT 2 INDEX NO: 91-390 EGUIPMENT STATUS LOS SHEET *** PAGE 1 OF 2 *** DATE 6/27/9 COMPONENT (EP) NO: RETE TURBINE TRIP BUTTON INFO ONLY (YES or NOU BIF NO..:_35 3.0.4 APPLICABLE : (YES dr ND) :__ SYSTEM ... : ICS S/U or MODE RESTRAINT: (RES or NO):_ DIVISION: SPECIAL REPORT RED'D .: (YES or NO): DER WRITTEN TO TRACK ..: (YES or NO):_____ TC Muermuth REDUCTION ... ZCO Ξ DESCRIPTION: Mitnich TRIP TURBINE BUTTON ON PLOY WORLD INT FUNTION. APPLICABLE TECH SPECS: 3.7.4 MODES: 1,2,3 LOO ACTION: restore wir 14days with HPLS onerable on HSN WIT IZHOURS 6/27/91 1140 HPCS OPERALOLE MALE REDUNDANT COMPONENT(S) OPERABLE? (Y/N): OPPOSITE DIVISION COMPONENT(S) OPERABLE? (Y/N):___ **6** -RELATED ESL ENTRIES: ESL NUMBER AFFECTED COMP/SYS DATE CLEARED IS SYS/COMP OPERABLE? (INIT/DATE) (Y/1): 01/1/0/27/1/(Y/N): ______ <Y/N):__ <u>/ (Y/N): / (Y/N):</u> ACTIONS REQUIRED TO RESTORE OPERABILITY: Clean we's ESL ENTRY ORIGINATED BY: Janua ** PAGE 1 OF 2 **** N2-ODI-5.13 -7 May 1991

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