

Item: 2715731 - CRDR

Problem Identification

WMCRFORM

Item No : 2715731 Unit : 1 Classification : SPEC EVAL Status : RECLASSIFY

Type/Sub : CRDR Source Type/Item : Report Date : 6/14/2004

Title : (U-1) SHORTLY AFTER PLACING AFN-P01 IN SERVICE, AN AREA OPERATOR REPORTED A WATERHAMMER CONDITION ON THE FEEDWATER LINES ON THE 120' OF THE TURBINE BUILDING.

Identified By : GAFFNEY*TIMOTHY J Due Date : 06/30/2004 Eval Due Date : 6/30/2004

Resp Group : 9734 SYS ENG MECHANICAL B Resp Org : SYS ENG MECHANICAL BOP Assigned To :

Discovery Date/Time : 06/15/2004 15:00 Need Date : Control Rm Review : N

Source Doc / Type : Legacy Item / Type : Attachments : Y

Description : Shortly after placing AFN-P01 in service, an Area Operator reported a waterhammer condition on the feedwater lines on the 120 Ft of the Turbine Building. The waterhammer lasted approximately 5 minutes. Systems Engineering (Jones) was notified of the condition and walked down the affected piping. Engineering found no visible signs of damage from the waterhammer. This CRDR is being initiated to document the condition for Engineering's evaluation.

Initiators Suggested Disposition

Added On	Added By	Comment Text
6/15/2004	GAFFNEY*TIMOTHY J	Engineering to evaluate the cause of the condition and recommend corrective action to prevent recurrence.

Requirement(s) Violated

Added On	Added By	Comment Text
6/15/2004	GAFFNEY*TIMOTHY J	None.

Recommend Closure: NO

Leaders Review			
Added By	Added On	Type	Comment Text
GAFFNEY*TIMOTHY J	6/15/2004	LDRS CAUSE	Placing AFN-P01 in service appears to be the cause of the waterhammer.
GAFFNEY*TIMOTHY J	6/15/2004	LDRS SUG DISPOSITION	Agree with suggested disposition. Recommend classification of ADVERSE and assignment to Systems Engineering for evaluation. Recommend initial cause code of SPP.
GAFFNEY*TIMOTHY J	6/15/2004	LDRS TRANSPORTABILITY	Potentially transportable.

Design Components								
ID	Name	Q	ASME	EQ	T.S.	Bldg	Room	Elev
1MAFNP01**PUMPXX	AUXILIARY FEED WATER PUMP	QA G	N	N	?	?	?	103

Unit/Systems	
System	Name
1-AF-SYS	AUXILIARY FEEDWATER

Action Taken		
Date/Time	Action Taken By	Action Taken Summary
6/15/2004 15:14	GAFFNEY*TIMOTHY J	Notified the UDL, Site Manager, Engineering, and NRC Resident of the condition.
6/18/2004 8:39	MIYAHARA*HELMUT R	Performed engineering post-water hammer walkdown identified rotated clamp pipe support 01-AF-025-H-004
6/18/2004 8:41	MIYAHARA*HELMUT R	Performed piping system stress analysis for identified rotated clamp. Determined to be acceptable when considering all system design loadings.
6/18/2004 8:43	MIYAHARA*HELMUT R	Initiated CM to re-work clamp position to drawing 01-AF-025-H-004. Recommend work to be performed UIR12.

CRC/NRA Requested Action

Added On	Added By	Comment Text
6/16/2004	DUTTON*EDWIN C	<p>Criteria 12 (Van Dop)</p> <p>Determine if the condition constitutes a Maintenance Rule Functional Failure. -Include determination basis</p> <p>If the condition is a Maintenance Rule Functional Failure, Evaluate the Significance per the following:</p> <ol style="list-style-type: none"> 1. Is the MRFF a repeat Functional Failure? 2. Does the failure cause a MRule SSC performance criteria or goal to be exceeded? 3. Is the MRFF an indicator of a clearly Declining Trend? <p>Reference procedure 70DP-OMR01 for specific requirements and complete SWMS CRDR 0003 Form.</p> <p>Criteria 9 to 2 (Brutcher) Determine impact of water hammer.</p>

Special Evaluation

Added On	Added By	Comment Text
6/17/2004	MIYAHARA*HELMUT R	<p>NSSS/pipe stress engineering performed a walk-down of the Aux Feedwater sytem Line AF-025-DCDA-6* and its pipe supports. Visual inspection identified 13-AF-025-H-004 Pipe Clamp rotated on the pipe. The pipe clamp supports a vertical strut.</p> <p>We have performed a computer analysis (SNUM HMS625, dated 06/17/04) simulating this identified condition of the rotated pipe clamp. Review of the analysis shows that all resulting pipe stresslevels and pipe support loadings meet ASME Code allowable values.</p> <p>Therefore this situation is acceptable for all design loadings and will perform as designed.</p> <p>This analysis/evaluation will be documented in Calculation 13-MC-AF-504 Volume 3.</p> <p>Engineering recommends the pipe clamp to be restored to the drawing during UIR12.</p> <p>Further recomends downgrade to ADVERSE and assign for evaluation of system operating condition to Mark Van Dop.</p>

Attached Forms

Description	Document ID	Rev.	Created By	Created Date	Attached Step
MRule PF Review.R000.pdf (Media Id: 1105683)	CRDR-0003	000	LANDSTROM*CARL E	06/29/2004	MRule Eval

Workflow History Details

----- From -----				
Person	Work Assignment	Action/Status	Date	Comment
VAN DOP*MARK W	9734 SYS ENG MECHANICAL B	MRULE EVAL	07/02/2004	<no comment provided>
LANDSTROM*CARL E	9734 SYS ENG MECHANICAL B	Returned	06/29/2004	Pot Sig Eval Complete. Not a MRule Functional Failure
MIYAHARA*HELMUT R	9711 DESIGN MECHANICAL NS	POT SIG	06/18/2004	Performed piping sytem.walk-down and stressss evaluation.
BUSTO*ROBERT E	9734 SYS ENG MECHANICAL B	Referred	06/16/2004	Perform MRFF Eval
MITCHELL*LORNA S	CRDR GROUP	CLASSIFY	06/16/2004	<no comment provided>
MITCHELL*LORNA S	CRDR GROUP	CLASSIFY	06/16/2004	<no comment provided>
MITCHELL*LORNA S	CRDR GROUP	CLASSIFY	06/16/2004	<no comment provided>
GAFFNEY*TIMOTHY J	8225 SHIFT TECH ADVISORS	LDR REVIEW	06/15/2004	<no comment provided>
GAFFNEY*TIMOTHY J	8225 SHIFT TECH ADVISORS	IDENTIFY	06/15/2004	<no comment provided>
GAFFNEY*TIMOTHY J		REPORT	06/14/2004	<no comment provided>

Maintenance Rule Functional Failure Review

Is this Condition a Maintenance Rule Functional Failure?

☒

No

☐

Yes

☐

Unknown

If yes:

Is this condition a repeat functional failure?

☐

No

☐

Yes

☐

Unknown

Does this failure cause a M-Rule SSC performance criteria to be exceeded?

☐

No

☐

Yes

☐

Unknown

Is this condition an indicator of a clearly declining trend?

☐

No

☐

Yes

☐

Unknown

Comments

The intended function of the N Train AF pump is to be the normal source of SG feedwater during startups and shutdowns. This function is successful if 500 gpm can be delivered to either SG within 20 minutes of initiation of a manual demand. In this event, the pump started and delivered the desired flow to support plant operation. Following the described water hammer, the piping was inspected. No damage was found which would make the system incapable of performing its function for an indefinite period of time. Therefore, this event is not a MRule Functional Failure.

System Engineering recommends that this CRDR be classified as REVIEW and assigned to System Engineering for followup review of the event.

General Guidance for MRFF Determinations

Definitions:

Maintenance Rule Functional Failure (MRFF) is the failure of an SSC within the scope of the Maintenance Rule that, if not corrected, could or did cause the affected system, train or component to be unable to accomplish or support its key safety function(s). Failures occurring during post maintenance testing are not considered MRFFs if they occur prior to returning the SSC to service and are caused by the maintenance for which the post maintenance testing is performed. An MRFF of low risk significant SSCs monitored at the plant level occurs only when plant level performance criteria is effected or an unplanned safety system actuation results (i.e., when the failure results in a plant trip, unplanned capacity loss or safety system actuation).

Support SSC: A system, subsystem, or component which provides support required by supported SSC(s) to perform their Maintenance Rule Key Safety Function(s). Essential Cooling Water (EW) is considered a support SSC for Essential Chilled Water (EC) and Shutdown Cooling (SDC).

Supported SSC: A system, subsystem, or component that depends upon one or more support SSCs to perform its Maintenance Rule Key Safety Function(s). The HPSI Pump is supported by the Essential Room Cooler, which is supplied by Essential Chilled Water (EC). Therefore the HPSI Pump is considered an SSC supported by EC.

General Rules for MRFF Determinations

I. General Rule for LRS SSCs Monitored at The Plant Level

1. For normally operating low risk significant key safety functions monitored at the plant level an MRFF occurs only when a component, train or system failure causes a plant trip, unplanned capacity loss or safety system actuation

II. General Rules for Post Maintenance Testing and Troubleshooting Activities

2. SSC failures detected during post maintenance retest prior to declaring the equipment available for service will not be counted as a maintenance rule functional failure unless the failure is unrelated to the maintenance performed.
3. Following an MRFF, all demands that are placed on the SSC as part of the troubleshooting and verification of corrective maintenance following the MRFF should be considered invalid (no demand and no failure) regardless of their success or failure. Normal accounting of SSC demands should resume upon the final retest of the SSC, which will be counted as a demand.

III. General Rules for Trips or Malfunctions of Equipment Bypassed in Emergency Mode

4. Spurious operation of a trip that would be bypassed while the SSC was performing its key safety function will not be counted as a MRFF providing the bypass feature is periodically verified functional.
5. A malfunction of equipment that prevents the successful completion of a test will not be counted as an MRFF provided that the equipment is not used by the SSC for the fulfillment of its key safety function.

IV. General Rules for Human Performance Errors by Operations, Maintenance and Others

6. Human performance errors (such as valve mispositioning events) can result in Maintenance Rule Functional Failures even when there is no damage to, malfunction of, or degraded condition of the effected SSC.
- An operator error made during support of a maintenance activity (i.e., corrective, preventative, predictive or testing) that unexpectedly caused an SSC to be incapable of accomplishing the key safety function(s) for which it was included in the Scope of the Maintenance Rule would typically be considered an MRFF.
 - Any error made during routine operations resulting in a latent failure of a Maintenance Rule SSC is typically considered an MRFF. A latent failure is a condition that is not detected and corrected prior to declaring the SSC available for service and that could (or does) cause a failure of the key safety function(s).
 - Minor equipment problems or operating errors will not be considered MRFFs provided the following criteria are satisfied: 1) the problem is detected and corrected during the evolution; 2) the problem is diagnosed and corrected without corrective maintenance (e.g., turn a switch or reset a breaker); and 3) these actions can be completed within the time limits assumed by the safety analysis and PRA.

V. General Rules for Support and Supported SSCs

7. Typically, a Maintenance Rule Functional Failure (MRFF) of a support SSC will not be counted as an MRFF of the supported SSC for Maintenance Rule reliability monitoring purposes even if the failure renders the supported SSC unable to perform its Maintenance Rule key safety function(s).

Note: see rule 8 for an exception applicable to outage situations. See rule 9 and the applicable Maintenance Rule System Performance Criteria/Scoping Basis information in the Maintenance Rule Performance Criteria Database for exceptions related to combining systems for monitoring purposes.

8. The risk ranking and monitoring criteria for support systems was established based on "at power" system functions, therefore some support systems for outage related key safety functions may not be independently monitored during outage periods. When this occurs, an SSC failure resulting in the loss of a key safety function that is high risk significant only during outage periods may need to be considered an MRFF of the supported system even when the failure occurs within the formal boundary of a support system.
9. Support components such as supply breakers, relays and other components (e.g., the turbine driven AF pump steam admission valves) designed to supply energy, an actuation signal or cooling for a single supported SSC (i.e., the support component supports only one SSC not multiple SSCs) are considered to be within the scope of the Maintenance Rule SSC they support unless otherwise documented in the applicable system basis documents. Therefore, any failures of these components resulting in the inability of the supported SSC to perform its Maintenance Rule Key

Safety Function(s) will be counted as an MRFF of the supported SSC, but will not be counted as an MRFF of the support system. See Rules 10 and 11 for additional guidance regarding MRFF determinations for these types of components.

10. When there are redundant support components designed to supply energy, an actuation signal or cooling for a single supported SSC the failure of either support SSC should be counted as an MRFF, unless a documented evaluation or special accounting rule justifies an alternate approach. This justification should consider whether either the PRA or the plant Safety Analysis Report take credit for the redundant support SSC.

VII General Rule for Redundant SSCs within a Redundant Train

11. Special accounting rules should be developed and documented to address failures of redundant components within a single train that are both capable of independently supporting a key safety function (e.g., two check valves in a single line). Unless the PRA or plant Safety Analysis specifically takes credit for such redundancy, the special accounting rule can stipulate that the failure of only one of the redundant components need not be counted as an MRFF.