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Perry Nuclear Power Plant
Docket No. 50-440
Response to Request for Additional Information Related to a License Amendment Requesting a Power Uprate (TAC No. MA6459)

Ladies and Gentlemen:

On September 9, 1999, the Perry Nuclear Power Plant (PNPP) staff submitted a license amendment request (PY-CEI/NRR-2420L) to the NRC requesting an increase of 5% in the present authorized rated thermal power level for the PNPP.

On February 7, 2000, a Request for Additional Information (RAI) was received containing questions from the NRC staff's Mechanical and Civil Engineering Branch regarding this license amendment request. The additional information requested is contained in Attachment 1.

If you have questions or require additional information, please contact Mr. Gregory A. Dunn, Manager - Regulatory Affairs, at (440) 280-5305.

Very truly yours,

John K. Wood

Attachment

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III
State of Ohio

A001

Perry Nuclear Power Plant Responses to an NRC Request For Additional Information (RAI) Forwarded by Mechanical and Civil Engineering Branch

The Perry Plant staff received a Request for Additional Information (RAI) from the NRC dated February 7, 2000. The RAI deals with questions associated with the Perry Plant license amendment request regarding a proposed increase of the present authorized rated thermal power level (power uprate) for the Perry Plant. The following are responses to requests from the NRC's Mechanical and Civil Engineering Branch.

NRC QUESTION

1. In Section 3.11 of NEDC-32907P, "Safety Analysis Report for Perry 5% Thermal Power Uprate," provide the calculated maximum stresses and fatigue usage factor, and code allowable limits for the most critical piping systems evaluated. Identify the supports (if any) and their piping systems that require modification to justify compliance to code requirements for the power uprate.

RESPONSE

The Perry Plant piping systems that are impacted by a 5% power uprate from the standpoint of piping stress analysis are shown in Table 1.

Table 1

Piping Systems Impacted by Power Uprate

System	Description
Main Steam A	Main Steam piping from the primary Containment penetration to the Moisture Separator Reheaters and to the steam inlet to the High Pressure Turbine.
Main Steam B	Main Steam piping from the primary Containment penetration to the Moisture Separator Reheaters and to the steam inlet to the High Pressure Turbine.
Main Steam C	Main Steam piping from the primary Containment penetration to the Moisture Separator Reheaters and to the steam inlet to the High Pressure Turbine.
Main Steam D	Main Steam piping from the primary Containment penetration to the Moisture Separator Reheaters and to the steam inlet to the High Pressure Turbine.
Feedwater Piping Loop A & B	Feedwater Loop A & B piping from the Reactor Vessel nozzles to the Feedwater Pumps in the Turbine Building including short portions of Residual Heat Removal and Reactor Water Clean Up interface piping.

The maximum stress ratios for each of the piping systems impacted by power uprate are provided in Table 2 below. All stresses are less than the applicable ASME Code allowable stress.

Table 2

Maximum Stress Ratios for Piping Systems Affected by Power Uprate

System	Computer Node Location	Condition	Stress (lb/in^2)	Allowable (lb/in^2)	Ratio to Allowable
1N11G39 Main Steam A (Class 1)	10 Inboard Weld	Upset	10543	28725	0.37
1N11G39 Main Steam A (Class 1)	10 Inboard Weld	Emergency	12579	43088	0.29
1N11G39 Main Steam A (Class 1)	10 Inboard Weld	Faulted	12233	57540	0.21
1N11G39 Main Steam A (Class 2)	10	Upset	13022	21000	0.62
1N11G39 Main Steam A (Class 2)	24	Emergency	18006	31500	0.57
1N11G39 Main Steam A (Class 2)	24	Faulted	18492	42000	0.44
1N11G38 Main Steam B (Class 1)	10	Upset	10502	26550	0.40
1N11G38 Main Steam B (Class 1)	10	Emergency	12579	39825	0.32
1N11G38 Main Steam B (Class 1)	10	Faulted	12232	53100	0.23
1N11G38 Main Steam B (Class 2)	16	Upset	11535	21000	0.55
1N11G38 Main Steam B (Class 2)	22	Emergency	17930	31500	0.57
1N11G38 Main Steam B (Class 2)	22	Faulted	18320	42000	0.44

Table 2 (Continued)

Maximum Stress Ratios for Piping Systems Affected by Power Uprate

System	Computer Node Location	Condition	Stress (lb/in^2)	Allowable (lb/in^2)	Ratio to Allowable
1N11G40 & 41 Main Steam C & D (Class 1)	10	Upset	10543	26550	0.40
1N11G40 & 41 Main Steam C & D (Class 1)	0	Emergency	12523	39825	0.31
1N11G40 & 41 Main Steam C & D (Class 1)	10	Faulted	12089	53100	0.23
1N11G40 & 41 Main Steam C & D (Class 2)	10	Upset	13022	21000	0.62
1N11G40 & 41 Main Steam C & D (Class 2)	24	Emergency	18006	31500	0.57
1N11G40 & 41 Main Steam C & D (Class 2)	24	Faulted	18492	42000	0.44
1N11G01 Main Steam A, B, C & D (B31.1)	Max	Sustained	7428	15000	0.50
1N11G01 Main Steam A, B, C & D (B31.1)	Max	Occasional	13084	18000	0.73
1N11G01 Main Steam A, B, C & D (B31.1)	Max	Sustained + Thermal	32182	37500	0.86
23A6987 Feedwater Loops A&B (Class 1) Inside Containment	110	Upset	18676	31860	0.59
23A6987 Feedwater Loops A&B (Class 1) Inside Containment	110	Emergency	22138	39825	0.56
23A6987 Feedwater Loops A&B (Class 1) Inside Containment	110	Faulted	35083	53100	0.67

Table 2 (Continued)

Maximum Stress Ratios for Piping Systems Affected by Power Uprate

System	Computer Node Location	Condition	Stress (lb/in^2)	Allowable (lb/in^2)	Ratio to Allowable
1N27G06C Feedwater Loops A&B (Class 1) Outside Containment	159	Upset	9154	53100	0.17
1N27G06C Feedwater Loops A&B (Class 1) Outside Containment	159	Emergency	9382	53100	0.18
1N27G06C Feedwater Loops A&B (Class 1) Outside Containment	159	Faulted	7349	53100	0.14
1N27G06A Feedwater Loops A&B (Class 2) Outside Containment	238	Upset	17194	18000	0.96
1N27G06A Feedwater Loops A&B (Class 2) Outside Containment	238	Emergency	22572	27000	0.84
1N27G06A Feedwater Loops A&B (Class 2) Outside Containment	238	Faulted	27550	36000	0.77
1N27G06A Feedwater Loops A&B (Class 2) Outside Containment	32	Eq. 10	16843	22500	0.75
1N27G04A Feedwater Loops A&B (B31.1) Outside Containment	199	Thermal	37479	37500	0.99

The maximum fatigue usage factors for each of the piping subsystems impacted by power uprate are provided in Table 3 below. All usage factors satisfy code requirements.

Table 3

Maximum Usage Factors for Piping Subsystems Evaluated for Power Uprate

Subsystem	Location	Maximum Usage Factor
Main Steam A, B, C & D	111	0.003
Feedwater Loop A &B Inside Containment	207	0.080
Feedwater Loop A &B Outside Containment	20	0.050

No new postulated pipe breaks or new weld inspection locations (In-Service Inspection) were identified due to power uprate.

The code of record, code allowable, and analytical techniques used in the power uprate evaluations are the same as those used in the original and existing design basis piping stress qualifications. Therefore, there are no modifications to supports and their piping systems necessary for the proposed power uprate.

NRC QUESTION

2. Discuss the functionality of safety-related mechanical components (including air-operated valves, safety relief valves, pumps and other safety-related valves not covered within GL 89-10) affected by the power uprate to ensure that the performance specifications and technical specification requirements (e.g., flow rate, close and open times) will be met for the proposed power uprate. Confirm all safety-related valves will be capable of performing their intended function(s) following the power uprate including such affected parameters as fluid flow, temperature, pressure and differential pressure, and ambient temperature conditions. Identify mechanical components for which functionality at the uprated power level could not be established in the absence of physical modifications, and provide these proposed modifications, if necessary.

RESPONSE

Summaries of the plant specific results of the underlying engineering evaluations for the Perry Plant are presented in NEDC-32907P, "Safety Analysis Report for Perry 5% Thermal Power Uprate" (SAR). The details of the plant specific evaluations are contained in the design record files of the organizations performing these evaluations and are available for NRC audit.

A summary of system capability to support the power uprate is contained in the various sections of the Perry Plant SAR. The supporting system evaluations include the capability of all Nuclear Steam Supply Systems (NSSS) and Balance of Plant (BOP) systems to meet their performance specifications under uprated conditions. These evaluations include the supporting components, including safety-related valves and other mechanical components, such as pumps and heat exchangers.

These evaluations also confirm that all safety-related valves will perform their intended function(s) following the power uprate, including affected parameters such as fluid flow, temperature, pressure and differential pressure, and ambient temperature conditions.

As documented in GE Licensing Topical Reports, NEDC-31897P-A, "Generic Guidelines For General Electric Boiling Water Reactor Power Uprate," commonly called "LTR 1," and NEDC-31984P, "Generic Evaluations of General Electric Boiling Water Reactor Power Uprate," commonly called "LTR 2," the NRC reviewed and approved the scope and content of Boiling Water Reactor (BWR) power uprate evaluation results on the generic issues. Subsequently, numerous BWRs have submitted and received NRC approval of plant-specific safety evaluation summaries like the Perry Plant SAR.

There are no mechanical components for which operability could not be confirmed at power uprate conditions. There are no plant modifications necessary for Perry Plant components to establish their functionality for the proposed power uprate.