MACSY

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8301110523 DOC.DATE: 03/01/07 NOTARIZED: NO DOCKET #
FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Clarifies typographical error in 820929 ltr re peak clad temp for recirculation line suction break w/25 s diesel generator start for large recirculation suction break,peak clad temp remains well below 2,200 F limit.

DISTRIBUTION CODE: A015S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 3
TITLE: OR Submittal: Onsite Emergency Power System

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
	NRR LB2 BC	01	7	7				
INTERNAL:	NRR/DL/ORAB	12	1	1	NRR/DSI/ICSB	09	1	1
	NRR/DSI/PSB	14	1	1	REG FILE	04	1	1
	RGN1		1	1	RM/DDAMI/MIB	18	1	1
EXTERNAL:	ACRS	16	6	6	INPO,J.STARNES		1	1
	LPDR	03	2	2	NRC PDR	02	1	1
	NSIC	05	1	1	NTIS		1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 25 ENCL 25

[illegible]

[illegible]

[illegible]

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215 / 770-5381

JAN 07 1983

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
DIESEL GENERATOR START TIME
ER 100450 FILE 841-8
PLA-1472 Docket No. 50-387

Dear Mr. Schwencer:

The purpose of this letter is to clarify our letter, PLA-1321 dated September 21, 1982. The September 29, 1982 letter contains a typographical error on the peak clad temperature for a recirculation line suction break with a 25 second diesel generator start. This letter contains the clarification and supersedes PLA-1321.

Introduction

Pennsylvania Power & Light Co. was requested to determine the effects on the LOCA analysis in the FSAR Section 6.3 of a change in the diesel generator start time from 10 seconds to 25 seconds. This work resulted from a desire to change Technical Specification 4.8.1.1.2.d(12) which currently requires two diesel generator starts to at least 600 rpm in less than or equal to 10 seconds and the remaining 3 starts to be less than or equal to 19 seconds with an initial accumulator pressure less than or equal to 240 psig and the air compressors secured. The proposed change requires one start in less than or equal to 10 seconds and four starts in less than equal to 25 seconds with the same initial accumulator pressure and compressor line-up. The Technical Specification change was requested since there is no clear basis for the time requirement of more than one diesel generator start. The diesel generator accumulators were not designed to the requirements of Technical Specification 4.8.1.1.2.d(12), and therefore, were not able to meet this specification during surveillance testing. This letter addresses the effects of a 25 second diesel generator start on the limiting and non-limiting LOCA analyses in the FSAR.

A045

Large Break LOCA

The limiting large break LOCA is a recirculation discharge line break with the failure of the LPCI injection valve. This accident will provide no LPCI flow to the vessel since the LPCI injection valve that allows flow to the intact recirculation loop is assumed to fail to open and the LPCI flow to the broken recirculation loop is assumed to flow out the break. Therefore, core spray flow is the only low pressure injection system used in the analysis.

The sequence of events for the limiting large break LOCA is shown in FSAR Table 6.3-1. At zero seconds the break occurs, offsite power is lost, and the high drywell pressure signal is reached. This initiates a diesel generator start and the core spray start logic. There is a 12 second delay prior to the 4 KV bus being energized on diesel power to allow the diesel to reach rated speed. At 22.5 seconds the core spray pumps will begin to start. At 27 seconds the pumps reach full speed. However, not until 63 seconds is the reactor pressure low enough to open the core spray injection valve to allow flow to the reactor vessel.

The 10 second diesel start requirement in the Technical Specifications is based on the 12 second delay prior to the 4 KV bus energization. Therefore, if the diesel generator start requirement is changed to 25 seconds, the sequence of events for the limiting transient is adjusted as follows. At time zero the break occurs, off-site power is lost, and the high drywell pressure signal is reached. At 27 seconds the 4 KV bus is energized on diesel power. At 37.5 seconds the core spray pumps begin to start. At 42 seconds the pumps reach full speed. At 63 seconds the core spray injection valves open and allow flow to the reactor vessel.

By comparing the two scenarios, it is apparent that the reactor is not affected by the increased diesel generator delay since the core spray pumps are at full speed in both cases when the injection valves open. Therefore, increasing the diesel generator start to 25 seconds does not impact the margin to thermal limits (2200°F peak clad temperature limit) as calculated for the large recirculation discharge break in Section 6.3 of the FSAR.

General Electric (GE) was also requested to analyze the effects of the delayed diesel start. GE neglected the time sequencing of the core spray pump start and the injection valve opening. They simply extrapolated the clad temperature versus time plot to show a reflood time that is 15 seconds later. The use of this conservative method results in a peak clad temperature for the limiting discharge side break of 1959°F. This is still well below the maximum allowable peak clad temperature of 2200°F.

Section 6.3 of the FSAR also provides curves for a large recirculation suction break. The calculations show that the recirculation suction break is less severe than the discharge break. In the intact loop the LPCI injection valve is assumed to fail. In the broken loop the LPCI flow enters the recirculation discharge piping and a portion of it flows through the pump and out the break. The recirculation pump provides a resistance to the flow out the break which allows for some flow to the reactor vessel when the vessel to containment differential pressure is small. However, as described above, the 25 second diesel generator start will affect both the LPCI pump start time and the core spray pump start time. This delay will delay the accident mitigation provided by the core spray flow and minimized LPCI flow. From the figures provided in the FSAR, it is obvious that the decrease in reactor pressure is more rapid for the suction line break than for the discharge line break. This causes the injection valves to begin to open before the pumps reach rated speed. Hence, a delay in starting the pumps will delay the core reflood time and fuel heat-up calculation. The analysis in Section 6.3 of the FSAR results in a peak clad temperature of 1688°F for the recirculation suction break. However, General Electric has determined that the peak clad-temperature for a recirculation line suction break with a 25 second diesel generator start is 1793°F which is still well below the maximum allowable peak clad temperature of 2200°F. PP&L considers this to be a conservative estimate of the peak clad temperature. Even with this increase of peak clad temperature a recirculation line suction break does not become the limiting break in the LOCA analysis.

Intermediate and Small Breaks

Intermediate and small break LOCAs will have slower depressurization rates than the large break LOCA. A slower depressurization results in core spray and LPCI injection later in the accident and the effects of delaying the injection is not as severe as in the large break LOCA. Since the intermediate and small breaks analyzed in Section 6.3 are less limiting than the large break and since the effects on the intermediate and small breaks are less severe than the effects on the large break LOCA, the margin to thermal limits (2200°F peak clad temperature limit) are not reduced by increasing the diesel generator start to 25 seconds for the intermediate and small break cases.

Conclusion

PP&L has determined that the large recirculation discharge break peak clad temperature is not affected by a 15 second delay to the diesel generator start time. For a large recirculation suction break the peak clad temperature is affected but remains well below the 2200°F limit.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

cc: R. L. Perch - NRC