

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9808050159 DOC. DATE: 98/07/27 NOTARIZED: NO DOCKET #
FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co. 05000335
50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
AUTH. NAME AUTHOR AFFILIATION
STALL, J.A. Florida Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION
Records Management Branch (Document Control Desk)

SUBJECT: Forwards complete replacement response to GL 97-04,
"Assurance of Sufficient NPSH for ECC & Containment Heat
Removal Pumps," as clarification to request 2 of GL.

DISTRIBUTION CODE: A076D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9
TITLE: GL 97-04 Assurance of Sufficient Net Positive Suction Head For Emerg

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTR ENCL
	PD2-3 PD	1 1	GLEAVES, W	1 1
INTERNAL:	FILE CENTER 01 NRR/DSSA/SRXB	1 1 1 1	NRR/DSSA/SCSB NRR/PD3-2	1 1 2 2
EXTERNAL:	NOAC	1 1	NRC PDR	1 1

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS
OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL
DESK (DCD) ON EXTENSION 415-2083

TOTAL NUMBER OF COPIES REQUIRED: LTR 9 ENCL 9

C
A
T
E
G
O
R
Y
1
D
O
C
U
M
E
N
T



July 27, 1998

L-98-195
10 CFR 50.4
10 CFR 50.54(f)

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Request for Additional Information
Response - Generic Letter 97-04

By letter dated June 19, 1998, NRC requested Florida Power and Light Company (FPL) to supplement the response to Generic Letter (GL) 97 04, *Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal Pumps*, for St. Lucie Units 1 and 2. Attachment 1 is the response to the request for information (RAI).

During the review of the initial GL response, the UFSAR, and the supporting calculations for this RAI response, FPL identified the need to clarify the initial response 2 of FPL letter L-98-33 dated February 1, 1998. Attachment 2 provides a complete replacement response to NRC GL 97-04 request 2.

Please contact us if there are any additional questions.

Very truly yours,

J. A. Stall
Vice President
St. Lucie Plant

JAS/GRM 640024

Attachments

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

9808050159 980727
PDR ADOCK 05000335
P PDR

//
A076



100-100000-100000

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
L-98-195 Attachment 1 Page 1

NRC Request 1:

What is the maximum sump temperature assumed in the net positive suction head (NPSH) analyses?

FPL Response 1:

The sump temperature assumed in the St. Lucie Unit 1 ECCS NPSH calculations is 210 °F¹. This is consistent with statements in the UFSAR (Table 6.2-9A).

For St. Lucie Unit 2, 240 °F was assumed for the HPSI pump calculation². This is consistent with statements in the UFSAR (Table 6.3-18). For the containment spray pump calculation³, 212 °F was assumed. While this is currently inconsistent with UFSAR Table 6.2-42 (240 °F), a review of the calculation concludes that the temperature difference does not adversely impact the results as the initial conditions in the containment are assumed at saturation. The UFSAR and plant documentation will be clarified for consistency.

NRC Request 2.a:

Were the inputs and assumptions used to generate the values in the Updated Final Safety Analysis Report (UFSAR) different than the inputs and assumptions used in the calculation/analysis? If not, explain the differences.

FPL Response 2.a:

For St. Lucie Unit 1, the original and current calculations^{1,4} for ECCS pump NPSH use the same methodology and generally the same inputs. A table of the differences between the original calculation which supported the UFSAR values and the current calculation follows. The current calculation values will be incorporated into the next UFSAR update. The next Unit 1 UFSAR update will be six months after the next Unit 1 refueling outage (SL1-16) currently scheduled for Fall 1999.

¹ Calculation PSL-1FSM-98-001, LPSI, Containment Spray Pumps NPSH from the Containment Sump St. Lucie Unit 1, Rev. 0.

² Calculation NSSS-012, NPSH for SIS Pumps, Rev 2.

³ Calculation NSSS-006, Containment Spray Systems, Rev 2.

⁴ Calculation PSL-1EJM-73-010, NPSH Calculation for ECC Pumps, Rev 0.

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
L-98-195 Attachment 1 Page 2

Parameter	UFSAR	Current Analysis Value	Basis
Containment Spray Pump Flow	3575 gpm	3425 gpm	Based on UFSAR Runout Flow
High Pressure Safety Injection Pump Flow	1280 gpm (2 pumps)	640 gpm (1 pump)	1C HPSI Pump Removed from Service
Sump Screen Pressure Loss	1.39 ft (assumed)	0.95 to 3.0 ft.-based on flow	Improved Methodology
Containment Water Level	24 ft	23.49 ft	Actual Configuration
Containment Spray Pump Nozzle Elevation	-8.25 ft	-8' - 1 1/2"	Actual Configuration
Low Pressure Safety Injection Pump Nozzle Elevation	-7.00 ft	-6' - 11"	Actual Configuration
High Pressure Safety Injection Pump Nozzle Elevation	-8.20 ft	-8' - 3 5/16"	Actual Configuration

For St. Lucie Unit 2, the original NPSH analysis for ECCS and CS pumps was based on a plant configuration of two HPSI pumps and two CS pumps on two recirculation trains. The data presented in the Unit 2 UFSAR is consistent with the NPSH calculations performed. Other than the correction of minor discrepancies⁵, there has been no change in the NPSH analyses for the Unit 2 ECCS and CS pumps. The UFSAR and plant documentation will be clarified for consistency.

⁵ FPL Safety Evaluation PSL-ENG SEMS-98-005, FSAR Discrepancies on ECCS Pump NPSH, Rev 0.

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
L-98-195 Attachment 1 Page 3

NRC Request 2.b:

Which set of values is considered to be the licensing basis, the UFSAR or the calculation/analysis?

FPL Response 2.b:

For St. Lucie Unit 1, calculations PSL-1EJM-73-010⁶ and PSL-1FSM-98-001⁷ document the analysis for the ECCS pump required and available NPSH during recirculation. FPL Safety Evaluation PSL-ENG-SEMS-98-009⁸ was issued to update the St. Lucie Unit 1 UFSAR to reflect the results of these calculations.

For St. Lucie Unit 2, calculation NSSS-006⁹ documents the analysis for the containment spray pump and calculation NSSS-012¹⁰ documents the analysis for the HPSI pump required and available NPSH during recirculation. FPL Safety Evaluation PSL-ENG-SEMS-98-005¹¹ was issued to update the St. Lucie Unit 2 UFSAR to reflect the results of these calculations.

As a result, the UFSARs will be updated to reflect the St. Lucie licensing basis as supported by the calculations identified above. The next Unit 2 UFSAR update will be six months after the next Unit 2 refueling outage (SL2-11) currently scheduled for Fall 1998. The next Unit 1 UFSAR update will be six months after the next Unit 1 refueling outage (SL1-16) currently scheduled for Fall 1999.

⁶ Calculation PSL-1EJM-73-010, NPSH Calculation for ECC Pumps, Rev 0.

⁷ Calculation PSL-1FSM-98-001, LPSI, Containment Spray Pumps NPSH from the Containment Sump St. Lucie Unit 1, Rev 0.

⁸ Safety Evaluation PSL-ENG-SEMS-98-009, ECCS Pump NPSH FSAR Discrepancies, Rev 0.

⁹ Calculation NSSS-006, Containment Spray Systems, Rev 2.

¹⁰ Calculation NSSS-012, NPSH for SIS Pumps, Rev 2.

¹¹ Safety Evaluation PSL-ENG-SEMS-98-005, FSAR Discrepancies on ECCS Pump NPSH, Rev 0.

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
L-98-195 Attachment 1 Page 4

NRC Request 2.c:

If the calculation is considered to be the licensing basis, has the UFSAR been updated to reflect this fact?

FPL Response 2.c:

FPL Safety Evaluation PSL-ENG-SEMS-98-009¹² was issued to update the St. Lucie Unit 1 UFSAR as a result of the initial review and revised calculations in response to GL 97-04.

FPL Safety Evaluation PSL-ENG-SEMS-98-005¹³ was issued to update the St. Lucie Unit 2 UFSAR also as a result of that review and a previously issued plant Condition Report, CR 96-2764.

As a result, the UFSARs will be updated to reflect the St. Lucie licensing basis as supported by the calculations identified above. The next Unit 2 UFSAR update will be six months after the next Unit 2 refueling outage (SL2-11) currently scheduled for Fall 1998. The next Unit 1 UFSAR update will be six months after the next Unit 1 refueling outage (SL1-16) currently scheduled for Fall 1999.

NRC Request 2.d:

Provide an explanation as to why the NPSHr calculated for the Unit 1 low-pressure safety injection decreased in comparison to the NPSHr given in the UFSAR (14 ft vs 20 ft) while the flowrate increased significantly (3500 gpm vs 250 gpm). Provide similar explanations for the Unit 2 Containment Spray and high-pressure safety injection pump NPSHr.

¹² Safety Evaluation PSL-ENG-SEMS-98-009, ECCS Pump NPSH FSAR Discrepancies, Rev 0

¹³ Safety Evaluation PSL-ENG SEMS-98-005, FSAR Discrepancies on ECCS Pump NPSH, Rev 0.

FPL Response 2.d:

The apparent discrepancy in the Unit 1 LPSI NPSHr values stems from conservative use of different flowrates within UFSAR Table 6.2-9A for developing NPSHr and NPSHa. NPSHa values were based on a 250 gpm LPSI flow. An NPSHr of 20 ft, based on a LPSI 4500 gpm flow, bounds the NPSHr at 250 gpm. The below update of the Table in the GL 97-04 Question 2 Response clarifies and corrects the information contained in UFSAR Table 6.2-9A.

St. Lucie Unit 1

PUMP	FLOW		NPSHa		NPSHr	
	FSAR ¹	Calc/ Anal	FSAR ¹	Calc/ Anal	FSAR ¹	Calc/ Anal
LPSI Pump	250 gpm	3500 gpm	30.7 ft @ 250 gpm	21.67 ft @3500 gpm	20.0 ft @4500 gpm <10 ft @250 gpm	14 ft @3500 gpm

¹ Unit 1 FSAR Table 6.2-9A

The apparent discrepancy in the Unit 2 CS NPSHr values also stems from conservative use of different flowrates for developing NPSHr and NPSHa. NPSHa values were based on a 3560 gpm CS flow per FSAR Section 6.2.2.3.1. An NPSHr of 21.0 ft, based on a >4000 gpm CS flow, bounds the NPSHr at 3600 gpm. The following update of the table in the GL 97-04 Question 2 Response clarifies and corrects the information.

A GL 97-04 Request 2 Response error accounts for the discrepancy in the Unit 2 HPSI NPSHr values. This error stems from use of two different flowrates within the UFSAR for reporting NPSHr values. The NPSHr of 19.9 ft is reported in UFSAR Table 6.3-23; this data, based on 640 gpm, reflects the similarities between individual Unit 1 and Unit 2 HPSI pumps. The NPSHr of 23.5 ft at 685 gpm is reflected in both UFSAR Table 6.3-1 and the current analysis. The following update of the table in the GL 97-04 Request 2 Response clarifies and corrects this information.



11

St. Lucie Unit 2

PUMP	FLOW		NPSHa		NPSHr	
	FSAR	Calc/ Anal	FSAR	Calc/ Anal	FSAR	Calc/ Anal
CS Pump	3560 ² gpm	3600 gpm	25.35 ³ ft	23.43 ft	21.0 ³ ft @>4000 gpm	18 ft
HPSI Pump	685 ⁴ gpm	685 gpm	23.5 ft	24.57 ft	23.5 ⁵ ft	23.5 ft

² Unit 2 FSAR Section 6.2.2.3.1

³ Unit 2 FSAR Table 6.2-42

⁴ Unit 2 FSAR Table 6.3-1

⁵ Unit 2 FSAR Section 6.3.2.2.3.

The UFSAR and plant documentation will be clarified for consistency. The next Unit 2 UFSAR update will be six months after the next Unit 2 refueling outage (SL2-11) currently scheduled for Fall 1998.

St. Lucie Units 1 and 2
 Docket Nos. 50-335 and 50-389
 L-98-195 Attachment 2 Page 1

NRC Request 2:

Identify the required NPSH and the available NPSH.

FPL Response 2:

Unit 1:

PUMP	FLOW		NPSHa		NPSHr	
	UFSAR ¹	Calc/ Anal	UFSAR ¹	Calc/ Anal	UFSAR ¹	Calc/ Anal
CS Pump	3425 gpm	3425 gpm	28.73 ft	25.26 ft	10.0 ft	10 ft
LPSI Pump	250 gpm	3500 gpm	30.7 ft @250 gpm	21.67 ft @3500 gpm	20.0 ft @4500 gpm <10 ft @250 gpm	14 ft @3500 gpm
HPSI Pump	640 gpm	640 gpm	24.0 ft	22.1 ft	20.0 ft	20 ft
CS Pump (with HPSI Piggybacked)	N/A	4165 gpm	N/A	24.47 ft	N/A	12 ft
LPSI Pump	N/A	3500 gpm	N/A	21.49 ft	N/A	14 ft
HPSI Pump Piggybacked	N/A	740² gpm	N/A	N/A	N/A	N/A

¹ Unit 1 UFSAR Table 6.2-9A

² Conservative bounding value used in calculation. HPSI flow is limited to 640 gpm by 1-EOP-03. Correction identified during the response to NRC RAI dated June 19, 1998.

Corrected values shown bold and shaded.

Note: Although the NPSHa and NPSHr values determined by calculation/analysis differ from those in the UFSAR, the results still indicate that NPSHa > NPSHr. Therefore, there is adequate NPSH available to accommodate the ECCS and CS pumps during recirculation from the sump and no unreviewed safety question exists.

St. Lucie Units 1 and 2
 Docket Nos. 50-335 and 50-389
 L-98-195 Attachment 2 Page 2

Unit 2:

PUMP	FLOW		NPSHa		NPSHr	
	UFSAR	Calc/ Anal	UFSAR	Calc/ Anal	UFSAR	Calc/ Anal
CS Pump	3560 ² gpm	3600 gpm	25.35 ³ ft	23.43 ft	21.0³ ft @>4000 gpm	18 ft
LPSI Pump	0 gpm	0 gpm	N/A	N/A	N/A	N/A
HPSI Pump	685 ⁴ gpm	685 gpm	23.5 ft	24.57 ft	23.5⁵ ft	23.5 ft

² Unit 2 UFSAR Section 6.2.2.3.1

³ Unit 2 UFSAR Table 6.2-42

⁴ Unit 2 UFSAR Table 6.3-1

⁵ Unit 2 UFSAR Section 6.3.2.2.3

Corrected values shown bolded and shaded!

Note: Although the NPSHa and NPSHr values determined by calculation/analysis differ from those in the UFSAR, the results still indicate that NPSHa > NPSHr. Therefore, there is adequate NPSH available to accommodate the ECCS and CS pumps during recirculation from the sump and no unreviewed safety question exists.