

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8803300224      DOC.DATE: 88/03/23      NOTARIZED: NO      DOCKET # 05000389  
 FACIL:50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co.  
 AUTH.NAME                              AUTHOR AFFILIATION  
 CONWAY, W.F.                           Florida Power & Light Co.  
 RECIP.NAME                            RECIPIENT AFFILIATION  
     Document Control Branch (Document Control Desk)

SUBJECT: Forwards addl info re ASME code relief requests for various safety related pumps, per NRC 871214 request.

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 TITLE: OR Submittal: Inservice Inspection/Testing/Relief from ASME Code

NOTES:

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<b>INTERNAL:</b>	ACRS			10	10			AEOD/DOA		1	1
	AEOD/DSP/TPAB			1	1			ARM/DAF/LFMB		1	0
	NRR/DEST/MEB9H3			1	1			NRR/DEST/MTB 9H		1	1
	NRR/PMAS/ILRB12			1	1			OGC 15-B-18		1	0
	<u>REG FILE</u> 01			1	1			RES/DE/EIB		1	1
<b>EXTERNAL:</b>	EG&G ROCKHOLD, H			1	1			LPDR		1	1
	NL 007 HEMMING			1	1			NRC PDR		1	1
	NSIC			1	1						

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MARCH 23 1988

L-88-147  
10CFR50.55a

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

Re: St. Lucie Unit 2  
Docket No. 50-389  
Request for Additional Information - ASME Code  
Relief Requests for Various Safety-Related Pumps

Gentlemen:

Per letter L-88-48 dated January 28, 1988, Florida Power & Light Company (FPL) provided additional information requested in your December 14, 1987 letter, "Requests for Various Safety-Related Pumps", (TAC No. 64819).

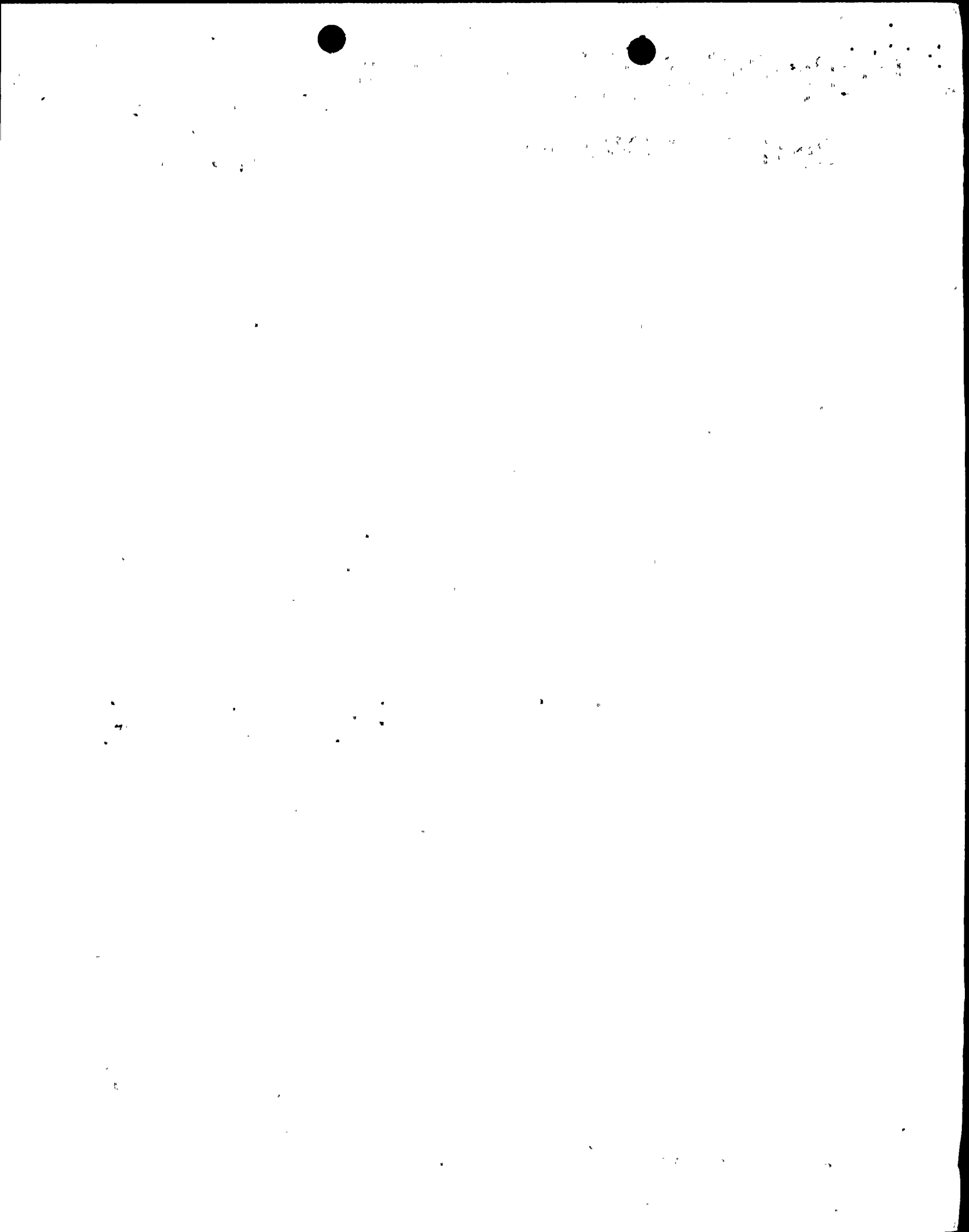
In conducting our research for the additional information on pump and motor data for the January 28, 1988 submittal, we determined that certain of that data was not readily available. The purpose of this letter is to provide that data which we have been able to obtain and to list the remaining data where procurement would involve considerable time and effort. Attachment 1 provides the information which FPL has obtained. Attachment 2 provides the data which we have not obtained and which would require considerable time and effort to procure.

Also, Attachment 3 provides corrections to page 5 of 19, "PSL-2 Safety Related Pump Information Report Form 'Pumps'", of the FPL January 28, 1988 submittal. The corrections are denoted by a vertical bar on the right hand side of the page.

At this time, Florida Power & Light proposes to discontinue efforts to obtain the information listed on Attachment 2 based on cost and time required to procure. However, we are interested in discussing the requirements and/or needs for this data with the Staff.

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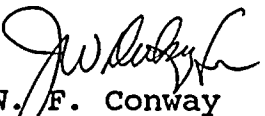
8803300224 880323  
PDR ADOCK 05000389  
P DCD



U.S.N.R.C.  
L-88-147  
Page 2

Should you have further questions or concerns, please contact us.

Very truly yours,

  
W. F. Conway  
Acting Group Vice President  
Nuclear Energy

WFC/MSD:cm

cc:

Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant  
Mr. Lyle Jerrett, Florida Dept. of Health and Rehabilitative  
Services

ATTACHMENT 1

Page 1 - Pump Data

Page 2 - Motor Data

Figures 1 thru 5

PUMP DATA

Specific Speed and Suction Specific Speed

Specific Speed ( $N_s$ ) is defined as

$$N_s = N\sqrt{Q} / H^{3/4}$$

where N - Impeller speed in RPM

Q - Flow rate in GPM

H - Total head in feet per stage

Suction Specific Speed (S) is defined as

$$S = N\sqrt{Q} / H_{sv}^{3/4}$$

where  $H_{sv}$  - Net Positive Suction Head in feet

	HPSI	LPSI	Cont Spray	Aux Feed 2A & 2B	2C	BAMU	DG Fuel Oil Transfer
Specific Speed	769	1,225	941	939	1,040	709	327
Suction Specific Speed	11,759	13,693	13,129	10,237	11,191	8,055	8,750

Power Intensity Factor

The Power Intensity Factor ( $I$ ) is defined as

$$I = \frac{\text{BHP/Stage}}{\text{Impeller diameter}^3}$$

	HPSI	LPSI	Cont Spray	Aux Feed 2A & 2B	2C	BAMU	DG Fuel Oil Transfer
	0.046	N/F	N/F	N/F	N/F	0.059	0.0036

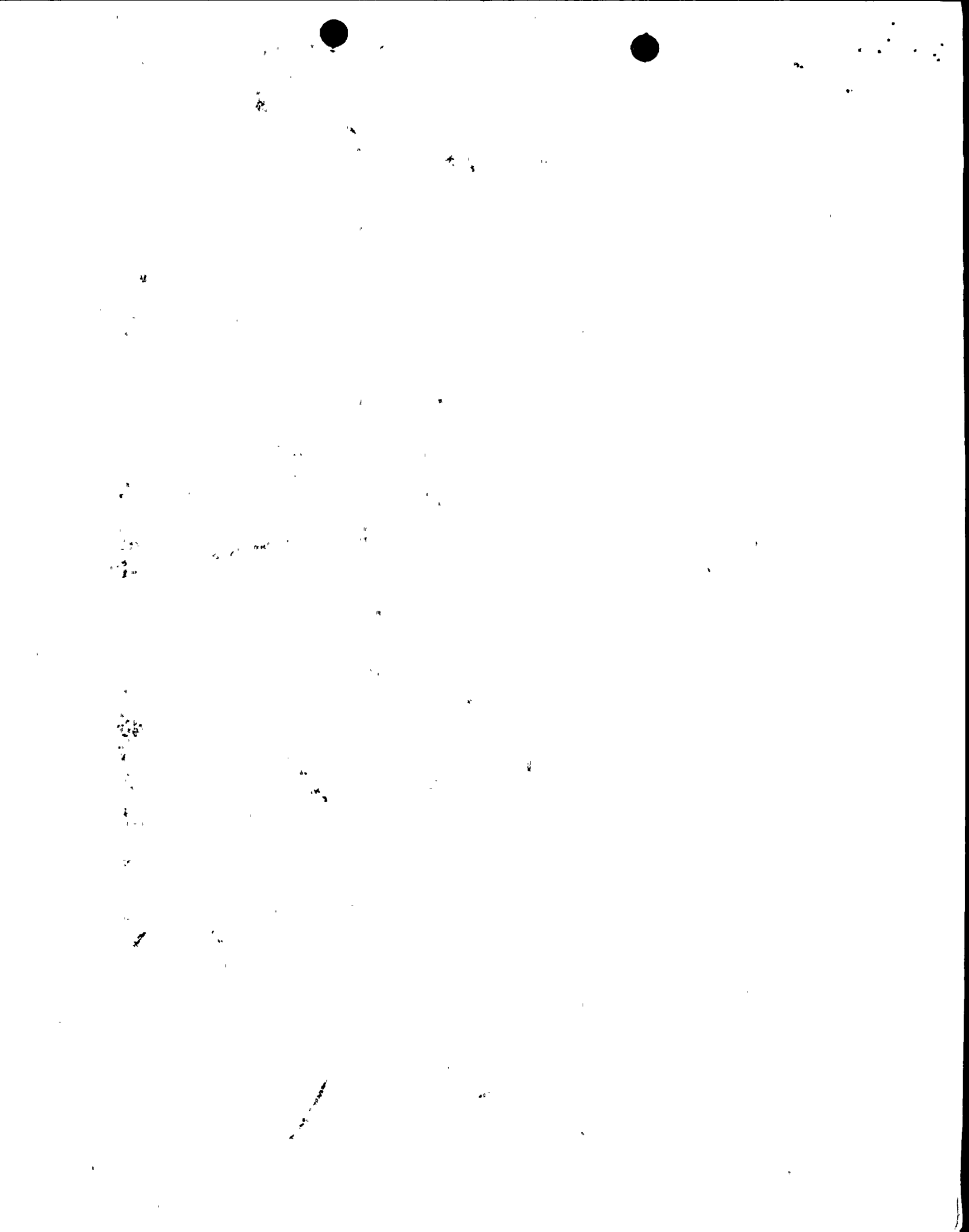
N/F - Not Found

MOTOR DATA

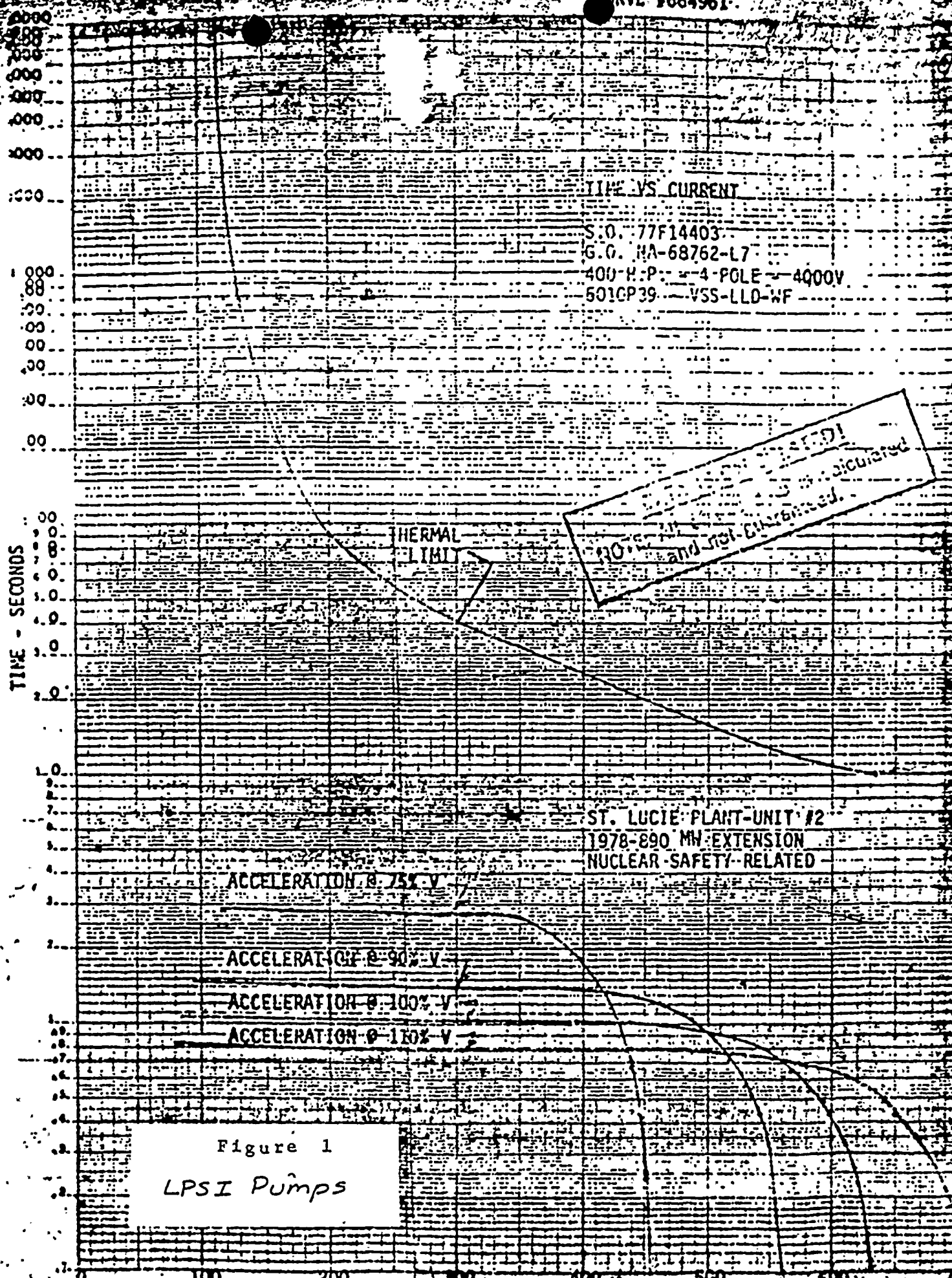
Data	Pump	Figure #	Source
Current vs Torque	LPSI (1)	1	DWG 2998-4542 Rev 0
	Aux Feed 2A & 2B(2) DG Fuel Oil Transfer	2	DWG 2998-2383 Rev 3
		N/F	
Efficiency vs Torque	HPSI	N/F	
	Cont Spray (3)	3	DWG 2998-4063 Rev 0
	Aux Feed 2A & 2B	N/F	
	BAMU (3)	5	I/M 2998-5514 Rev 3
	DG Fuel Oil Transfer (3)	4	I/M 2998-7445 Rev 1
Power Factor vs Torque	HPSI	N/F	
	Cont Spray (3)	3	DWG 2998-4063 Rev 0
	Aux Feed 2A & 2B	N/F	
	BAMU(3)	5	I/M 2998-5514 Rev 3
	DG Fuel Oil Transfer(3)	4	I/M 2998-7445 Rev 1
Torque	DG Fuel Oil Transfer (4)	24 ft-lb	I/M 2998-7445 Rev 1
Speed vs Torque	DG Fuel Oil Transfer	N/F	

## Notes:

- 1) Time vs current
- 2) Current vs torque values in this case is not graphed in relation to each other Current and torque however are graphed together vs speed.
- 3) Efficiency and power factor are graphed vs horsepower and not torque
- 4) Starting torque







TIME VS CURRENT  
 S.O. 77F14403  
 G.O. MA-68762-L7  
 400-H-P: 4-POLE 4000V  
 501CP39 VSS-LLD-WF

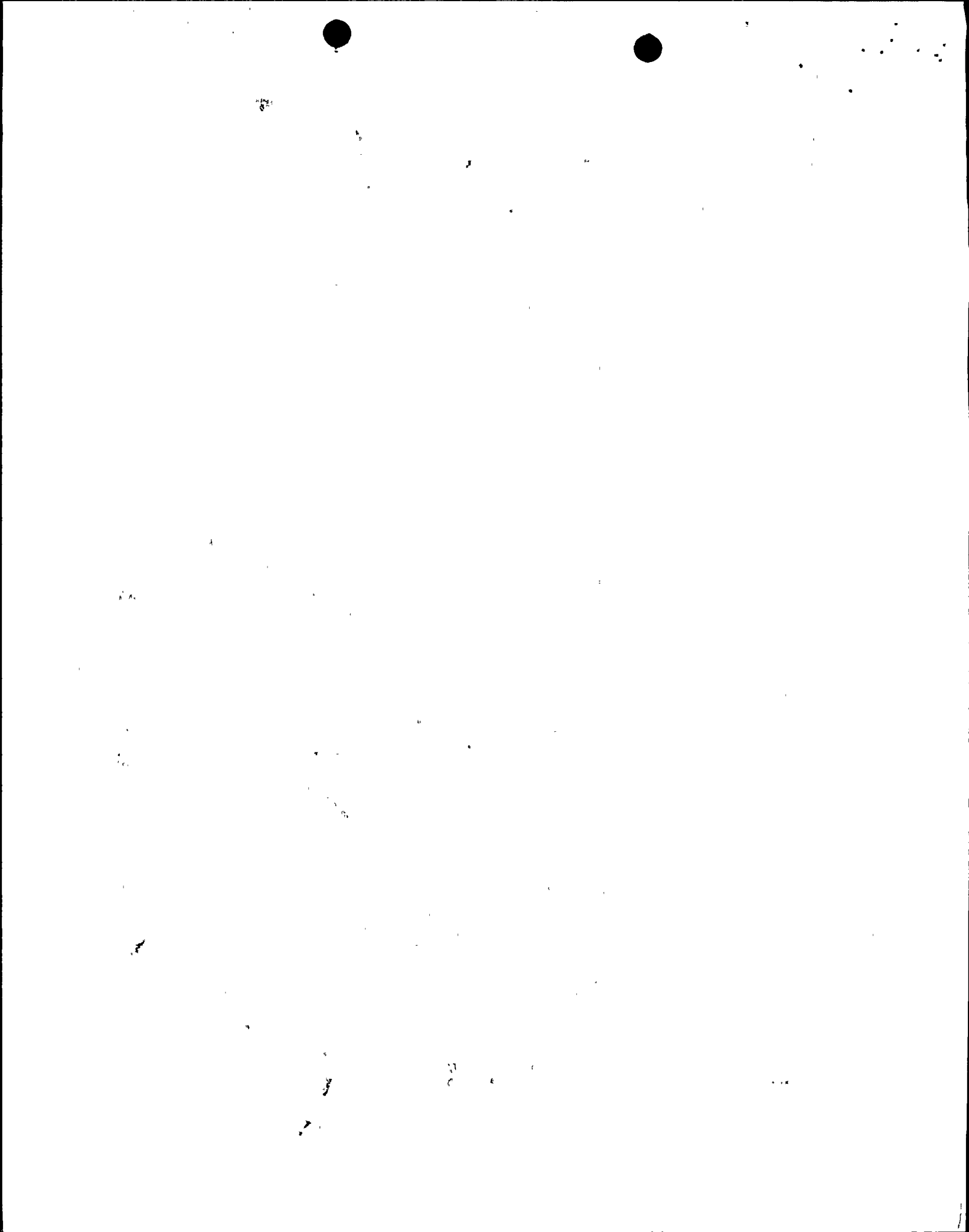
NO. 1 and 2 are secured and not guaranteed.

ST. LUCIE PLANT-UNIT #2  
 1978-890 MW EXTENSION  
 NUCLEAR SAFETY RELATED

ACCELERATION @ 75% V  
 ACCELERATION @ 90% V  
 ACCELERATION @ 100% V  
 ACCELERATION @ 110% V

Figure 1  
 LPSI Pumps

SRM-212347



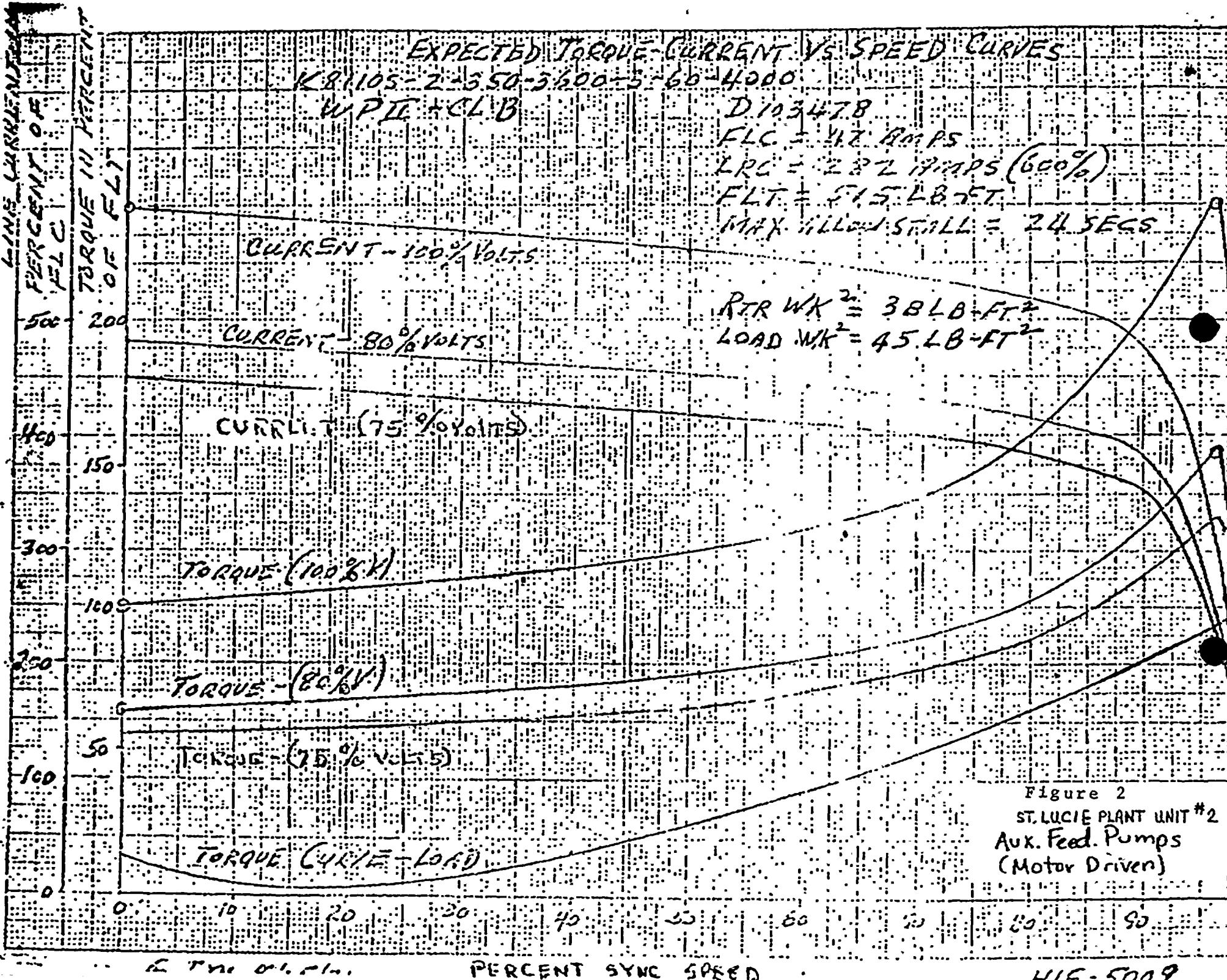
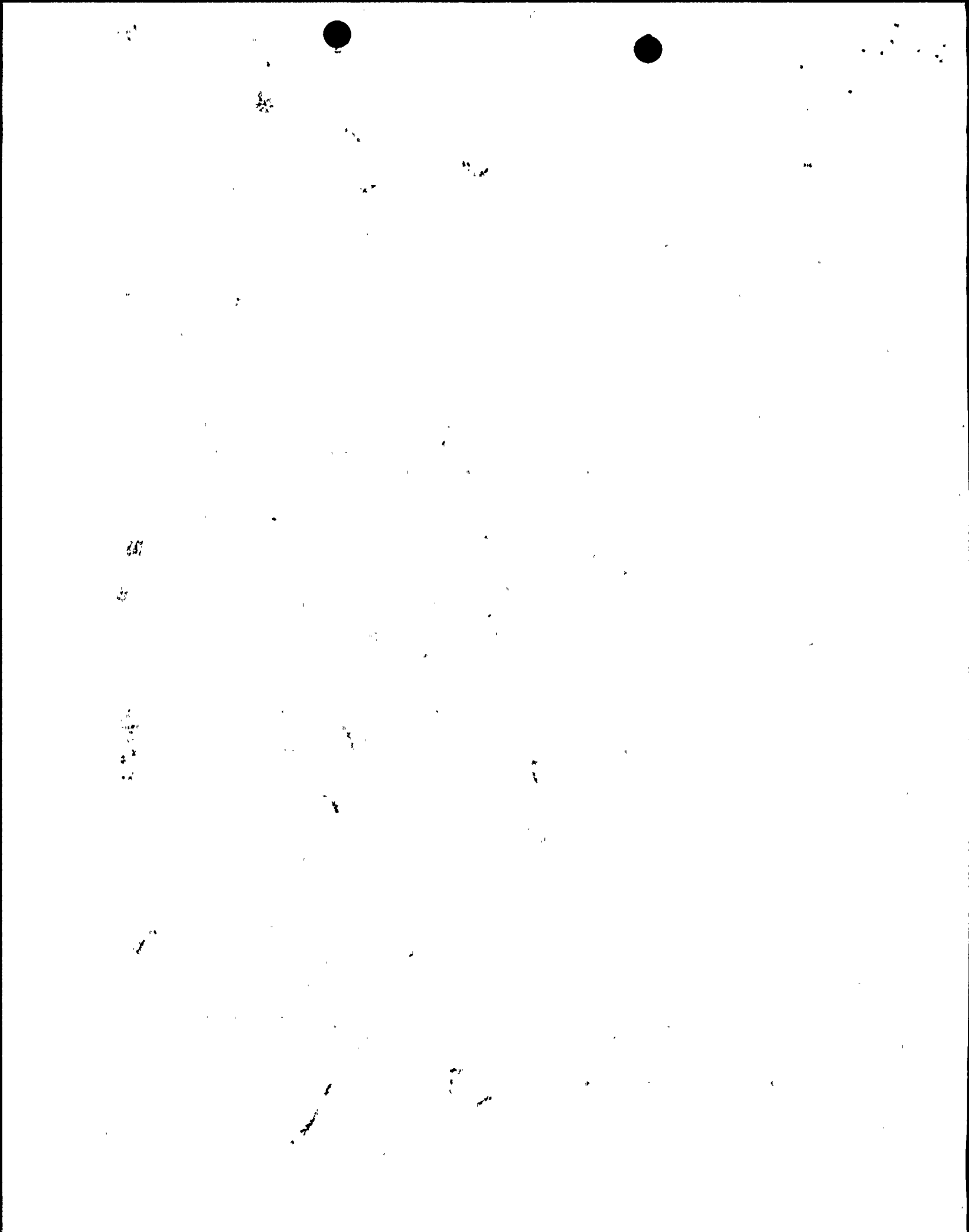


Figure 2  
 ST. LUCIE PLANT UNIT #2  
 Aux. Feed Pumps  
 (Motor Driven)

HIC-5009



ALLIS-CHALMERS MFG. CO.

WARWOOD, OHIO

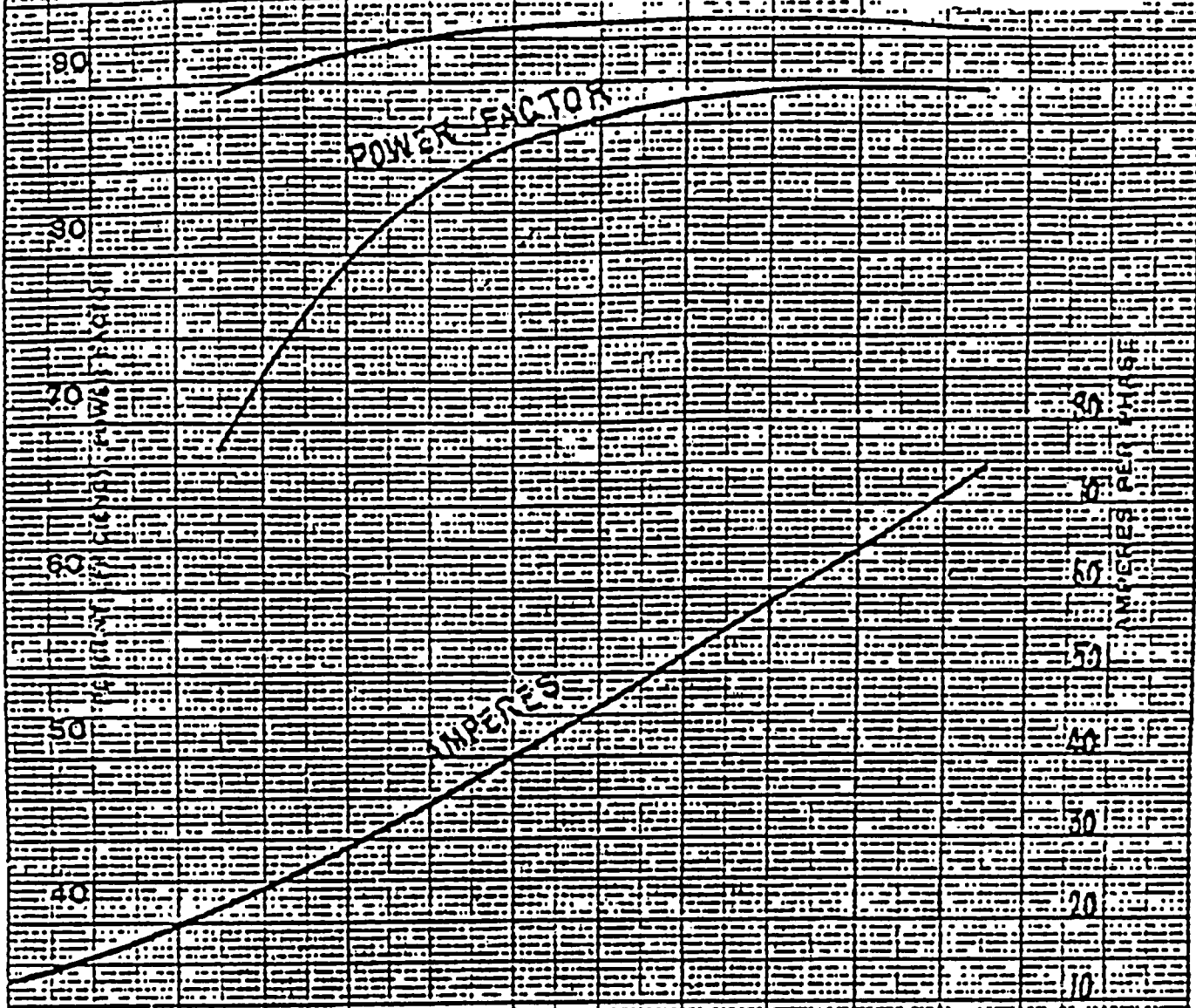
INDUCTION MOTOR CURVES

Containment  
Spray Pumps  
St. Lucie  
Unit 2

51811-V  
A-10815

EFFICIENCY

Figure 3



HORSE POWER OUTPUT

(IN PERCENT OF NAME-PLATE RATING)

NAME-PLATE RATING

HORSE-POWER 500

440V SPEED 1800

PHASES 3

CYCLES 60

VOLTS 4000

TYPE 51DVS

FRAME NO. 500

SERIAL NO.

10.2%

W.R.O.

A-10810-0-1-TS-LUE

FRAME SIZE

Figure 4  
DIESEL FUEL OIL TRANSFER PUMPS  
EFFICIENCY AND POWER FACTOR vs HORSEPOWER  
DATA FROM INSTRUCTION MANUAL 2998-7445 REV 1

Horsepower	3 (full load)	2.25 (3/4 load)
Efficiency	82	81
Power Factor	84.1	77.9

Figure 5

BORIC ACID MAKEUP PUMPS  
EFFICIENCY AND POWER FACTOR vs HORSEPOWER

DATA FROM INSTRUCTION MANUAL 2998-5514 REV 3

Horsepower	25 (full load)	18.75 (3/4 load)	12.5 (1/2 load)
Efficiency	85.6	86.7	83.7
Power Factor	86.9	83.1	77.5

ATTACHMENT 2

INFORMATION NOT AVAILABLE

Pump Data

Power Intensity Factor (specifically, impeller diameter)

- LPSI
- Containment Spray
- AFW (2A, 2B, and 2C)

Motor Data

Power Factor vs. Torque\*

- HPSI
- AFW (2A, 2B)

Speed vs. Torque\*

- D/G Fuel Oil Transfer

Current vs. Torque\*

- D/G Fuel Oil Transfer

Efficiency vs. Torque\*

- HPSI
- AFW (2A, 2B)

\* Either curves or values at various loads, i.e. 1/2, 3/4, or full load.



ATTACHMENT 3

PSL-2 SAFETY RELATED PUMP  
 INFORMATION  
 REPORT FORM 'PUMPS'

	HPSI	LPSI	CONTAINMENT SPRAY	2A/B ALX FEED MOTOR DRIVEN	2C ALX. FEED TURBINE DRIVEN	BORIC ACID MAKE UP	DIESEL OIL TRANSFER
SECTION B PUMP DATA							
01 MFG	BINGHAM	INGERSOL	INGERSOL	INGERSOL	INGERSOL	GOULDS	GOULDS
02 SIZE	3X4X9	8X20	8X23	4X3	6X4	30L 1/2	1X2X10
03 NO. STAGES	7	1	1	10	7	1	1
04 CONFIGURATION	CENT.HORIZ	CENT.VERT	CENT.VERT.	CENT.HORIZ	CENT.HORIZ	CENT.HORIZ	CENT.HORIZ
05 INLINE/OPOSED	INLINE	NA	NA	INLINE	INLINE	NA	NA
06 SUCTION	SINGLE	SINGLE	SINGLE	SINGLE	SINGLE	SINGLE	SINGLE
07 DIS.CHAMBER	VOLUTE	DIFFUSER	DIFFUSER	DIFFUSER	DIFFUSER	VOLUTE	VOLUTE
08 DISCH SIZE	3"	8"	8"	3"	4"	1 1/2"	1"
09 SPEED	3560	1780	1780	3570	3750	3500	1750
10 FLOW	345 GPM	3100 GPM	2850 GPM	300 GPM	570 GPM	143 GPM	25 GPM
11 SUCT.PRESS	250# MAX	300# MAX	20# MAX	100#	100#	11#	5#
12 DISCH PRES	2500 FT.	350 FT.	470 FT.	1150 PSIG	1150 PSIG	231 FT.	35 PSIG
13 NPSHR	10.0 FT.	14.0 FT.	14.0 FT.	11.0 FT.	16.0 FT.	9.0 FT.	1.0 FT.
14 SPECIFIC SPEED							
15 SUCT. SPEC.SPD							
16 PWR INTEN.FACT							
17A HEAD VS FLOW	FIGURE 1	FIGURE 2	FIGURE 3	FIGURE 4	FIGURE 4A	FIGURE 5	FIGURE 6
17B EFFIC. VS FLOW	FIGURE 1	FIGURE 2	FIGURE 3	FIGURE 4	FIGURE 4A	FIGURE 5	FIGURE 6
17C BHP VS FLOW	FIGURE 1	FIGURE 2	FIGURE 3	FIGURE 4	FIGURE 4A	FIGURE 5	FIGURE 6
17D NPSHR VS FLOW	FIGURE 1	FIGURE 2	FIGURE 3	FIGURE 4	FIGURE 4A	FIGURE 5	FIGURE 6
18 MINIFLOW	30GPM/6.7%	100GPM/2.0%	150GPM/4.2%	50GPM/12.5%	70GPM/8.2%	10GPM/3.7%	NA

	HPSI	LPSI	CONTAINMENT SPRAY	2A/B ALX FEED MOTOR DRIVEN	2C ALX. FEED TURBINE DRIVEN	BORIC ACID MAKE UP	DIESEL OIL TRANSFER
SECTION C MOTOR DATA							
01 MFG	GE	WESTINGHOUSE	SIEMENS	GE	NA	RELIANCE	WESTINGHOUSE
02 PHASE/HERTZ	3/60	3/60	3/60	3/60	NA	3/60	3/60
03 SPEED	3575	1779	1780	3570	NA	3515	1710
04 TORQUE	587	1100	1475	515	NA	54***	
05 VOLTS	4000	4000	4000	4000	NA	460	460
06 AMPERES	54	50	64.3	47	NA	31	4
07 HORSEPOWER	400	400	500	350	NA	25	3
08 SERVICE FACTOR	1.15	1.15	1.15	1.15	NA	1.15	1.00
09 TYPE	INDUCTION	INDUCTION	INDUCTION	INDUCTION	ST TURBINE	INDUCTION	INDUCTION
10A SPEED VS TORQUE	FIGURE 11	FIGURE 7	FIGURE 9	FIGURE 12	NA	FIGURE 13	
10B CURRENT VS TORQUE	FIGURE 11*		FIGURE 10****		NA	FIGURE 13*	
10C EFFICIENCY VS TORQUE		FIGURE 8**	FIGURE 10**		NA		
10D PWR FACTOR VS TORQUE		FIGURE 8**	FIGURE 10**		NA		

\* Current vs torque values in these cases are not graphed in relation to each other. Current and torque, however, are graphed together vs speed.

\*\* Efficiency and power factor are graphed vs horsepower and not torque.

\*\*\* Zero speed torque value obtained from speed vs torque curve.

\*\*\*\* Current vs torque in this case is not graphed in relation to each other. Current vs horsepower, however, is graphed.

