HUNTON & WILLIAMS
B B & T BUILDING P. O. BOX 109
RALEIGH, NORTH CAROLINA 27602
TELEPHONE 919-828-9371

707 EAST MAIN STREET P. O. BOX 1535
RICHMOND, VIRGINIA 23212
TELEPHONE 804-788-8200
TWX 710-956-0081

299 PARK AVENUE
NEW YORK, NEW YORK 10171
TELEPHONE 212-980-8200
TELEX 754708

FIRST VIRGINIA BANK TOWER
P. O. BOX 3889
NORFOLK, VIRGINIA 23514
TELEPHONE 804-625-5501
TELEX 755628

2000 PENNSYLVANIA AVENUE, N. W.
P. O. BOX 19230
WASHINGTON, D. C. 20036
TELEPHONE 202-955-1500

333 SOUTH GRAND AVENUE
LOS ANGELES, CALIFORNIA 90071
TELEPHONE 213-617-3052
TELEX 754709

FIRST TENNESSEE BANK BUILDING
P. O. BOX 951
KNOXVILLE, TENNESSEE 37901
TELEPHONE 615-637-4311

DOCKETED USNRC
'84 AUG -8 A10:29
OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

August 1, 1984

File No. 24566.3

In the Matter of
LONG ISLAND LIGHTING COMPANY
(Shoreham Nuclear Power Station, Unit 1)
Docket No. 50-322-1 (OL)

Hon. Lawrence Brenner, Esq.
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Hon. Dr. Peter A. Morris
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Hon. Dr. George A. Ferguson
Administrative Judge
School of Engineering
Howard University
2300 - 56 Street, N.W.
Washington, D.C. 20059

Dear Administrative Judges:

In accordance with the Board's Order of July 25, 1984 dismissing the crankshaft oil passage plug issue, enclosed for filing is the Affidavit of Clinton Mathews attesting to the accuracy of the information contained in his letter of July 12, 1984 to Craig Seaman of LILCO. I am sending the original Affidavit to Judge Brenner with copies to all other parties.

Very truly yours,

David Dreifus

David Dreifus

300/918
Enclosure

cc: Alan Roy Dynner, Esq. (w/encl) (By Federal Express)
Richard J. Goddard, Esq. (w/encl) (By Federal Express)
Fabian G. Palamino, Esq. (w/encl) (By Federal Express)
Entire Service List (w/o encl)

8408090223 840806
PDR ADOCK 05000322
Q PDR

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
LONG ISLAND LIGHTING COMPANY	)	Docket No. 50-322-OL
	)	
(Shoreham Nuclear Power Station, Unit 1)	)	
	)	

DOCKETED USNRC
'84 AUG -8
OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

AFFIDAVIT OF CLINTON S. MATHEWS

STATE OF CALIFORNIA)
) ss.:
COUNTY OF ALAMEDA)

CLINTON S. MATHEWS, being duly sworn, deposes and says:

1. I am Vice President and General Manager of the Engine and Compressor Division of Transamerica Delaval Inc. ("TDI").

2. On July 12, 1984, I wrote to Craig Seaman of The Long Island Lighting Company comparing the design of the crankshaft oil hole plugs used in the TDI engines at Rafha, Saudi Arabia and those used at Shoreham. The information contained in that letter and its attachments (copies of which are annexed as Exhibit A) is accurate.

Clinton S. Mathews

Sworn to before me this
30th day of July, 1984

B J Dowd
Notary Public

OFFICIAL SEAL
B J DOWD
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My comm. expires JUL 5, 1985

Transamerica
Delaval

Engine and Compressor Division
550 85th Avenue
P.O. Box 2161
Oakland, California 94621
(415) 577-7400

July 12, 1984

Mr. Craig Seaman
Long Island Lighting Company
Shoreham Nuclear Power Station
P.O. Box 618
North Country Road
Wading River, New York 11792

Subject: Crankshaft Oil Hole Plug
P/N R-3149

Dear Craig:

In response to your inquiry regarding the design of the oil hole plugs used in the crankshaft at Rafha Electricity Corp., enclosed are drawing R-3149, the drawing release and change notice form showing the original release, and the change notices for change A (3/10/80) and change B (6/23/82) which describe the oil hole plug and its changes over the years. As set forth below, the oil hole plugs in place at Shoreham use significantly thicker steel than used at Rafha, and TDI has no knowledge of any failures of the Shoreham design plug which is in use in more than 300 "R" series engine crankshafts.

The original design of the crankshaft oil hole plug was released in December, 1965 and called for the plug to be stamped from 16 gauge sheet steel which is approximately 1/16" in thickness. Over the years this plug was completely successful. However, our manufacturing people suggested changing to a lighter gauge material which would reduce the time required for installation. Please note that the plug installation consists of inserting the plug into its location and then mechanically deforming the plug by rolling it into a premachined groove in the crankshaft, thereby locking the plug in place. In March of 1980, the plug material was changed from 16 gauge sheet steel to 22 gauge sheet steel, for "ease of assembly" (change symbol A). Twenty-two (22) gauge sheet metal is approximately 1/32" in thickness, or approximately one-half the thickness of the previously-used 16 gauge material.

While almost all of the 22 gauge plugs worked perfectly, field experience and shop experience showed us that the crankshaft oil hole plugs made from the thinner 22 gauge material were more likely to be damaged during the installation process where they were set into the crankshaft hole with a plug punch. Such installation damage is believed to have resulted in failures at Rafha in Saudi Arabia. As a result of these failures, where the center of the 22 gauge plug partially sheared out, we returned to the original 16 gauge material design in June of 1982 (change symbol B), which design remains unchanged from that time to the present. In the 300 R4 and RV-4 series engines shipped in the last 20 years, this 16 gauge plug has been used approxiamtely 6000 times with no reported failures. Both the original Shoreham crankshafts and the replacement crankshafts use the heavier 16 gauge plugs.

We trust the foregoing satisfies your needs. If not, please let me hear from you.

Best regards,

C. S. Mathews
Vice President and General Manager

CSM/pn

cc: Mr. Clarence Ray, TDI Owners Group w/att.

NAME PLUG - CRANKSH[illegible] IL HOLE

MODEL R

REQUESTED BY ENG.

D'WG NO

CHANGE SYMBOL REL

DATE 2-28-66

DETAIL OF CHANGE OR RELEASE

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
PRODUCTION
DEPARTMENT
MAR 03 1966
AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

Code 29L01012

12-1-70

RELEASED FOR PRODUCTION X | FILE X | RECORD X | EXPERIMENTAL

OTHER PARTS AFFECTED

REMARKS:

EXTRA COPIES

NEW PATTERN

OF NOTICE TO PATTERN SHOP

DISPOSITION OF STOCK	FINISHED STOCK	ROUGH STOCK	IN PROGRESS	ON ORDER	ASSEMBLED NOT SHPPD.	PARTS REPAIR SERVICE	PER CHANGE
SCRAP							PER PARTS LIST
REWORK		No Stock					SEE REMARKS
USE W/C CHANGE							

CHANGED BY NHS CHECKED BJM APPROVED DCR PARTS LIST

FORM D-4000
DE LAVAL TURBINE INC., ENTERPRISE DIVISION

DRAWING [redacted] CHANGE NOTICE EFFECTIVE JOB

NAME PLUG-CRANKSHAFT OIL HOLE

MODEL ALL

REQUESTED BY D. PRATT

PART NO. R-3149

CHANGE SYMBOL A

DATE 3/10/80

DETAIL OF CHANGE OR RELEASE

MATERIAL WAS 16 GUAGE (.0595) STEEL SHEET STAMPING.

REASON: EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 o/h 2/27/80

RELEASED FOR PRODUCTION X | FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY
X MAJOR MANDATORY	SCRAP			
	REWORK	SEE NOTE	USE AS IS	USE AS IS
	☐ NEW RELEASE			
☐ MAJOR OPTIONAL	PER INV. CONT.			
☐ MINOR				

OTHER PARTS AFFECTED

*PER MICROFISCHE DATED

PATTERN CHANGE NO

NEW PATTERN NO

CHANGE CODE (A) B C D

CHANGED BY E. BRANDT CHECKED F. JACOB APPROVED R PRATT 3/28

Form E 241 1/77

DRAWING ~~RELEASE~~ **NOTICE** EFFECTIVE JOB _____
~~PURCH. SPEC.~~ CHANGE

NAME PLUG, CRANKSHAFT OIL HOLE

MODEL _____

REQUESTED BY D. RIPPEE CHG. REQUEST OF 6-14-82

PART NO. R-3149

CHANGE SYMBOL B

DATE 6/23/82

DETAIL OF CHANGE OR RELEASE

.0299 ARF 7/6/84

MATERIAL WAS 22 GA. (~~.0229~~) COLD ROLLED STL.

REASON: TO LESSEN CHANCE OF DAMAGE TO PLUG AT INSTALLATION

REMARKS: NEXT PART MADE MUST BE PER THIS REVISION

MISC. 82-135

RELEASED FOR PRODUCTION ☒ FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY
☒ MAJOR MANDATORY	SCRAP	X	X	X
	REWORK			
	☐ NEW RELEASE			
☐ MAJOR OPTIONAL	PER INV. CONT.			
☐ MINOR				

OTHER PARTS AFFECTED

*PER MICROFISCHE DATED

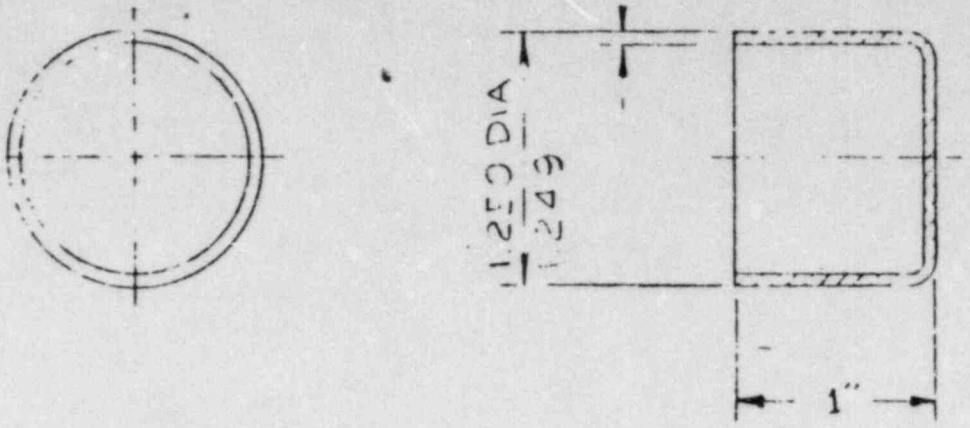
PATTERN CHANGE NO

NEW PATTERN NO

CHANGE CODE (A) B C D

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING

Form E 241 1/77



6. FACE ..... TO BE PARALLEL TO FACE ..... WITHIN .....
T.I.R. AND AT RIGHT ANGLES TO FACE ..... WITHIN ..... T.I.R.
IN ..... INCH LENGTH.
5. ..... DIAMETERS MARKED ★ ARE TO BE CONCENTRIC TO EACH OTHER
WITHIN ..... T.I.R. AND AT RIGHT ANGLES TO FACES MARKED ★★
WITHIN ..... T.I.R.
4. √ SURFACE FINISH SYMBOL WITH NUMBER INDICATING MU IN RMS.
3. ALL MACHINING DIMENSIONS ± .010 UNLESS OTHERWISE SPECIFIED
2. REMOVE ALL BURRS AND SHARP CORNERS
1. DO NOT SCALE DRAWING

NOTES

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBMITTED SUBJECT TO RETURN UPON REQUEST AND, UPON THE EXPRESS CONDITION THAT THE INFORMATION CONTAINED SHALL NOT BE USED DIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE CO-PARTICIPANTS.

MATERIAL AND HARDNESS

16 GAGE COLD ROLLED DRAWING QUALITY SHEET STAMPING

(3)

B 6-15-82 MATL WAS 22GA (.029") STL SHT

A 2-2[illegible] STL SHT

PART NO. ~	SCALE: FULL
MOD.	PARTS LIST 31C

ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA.

PLUG, CRANKSHAFT OIL HOLE

DRAWN 12-1-65 NNHS	R-3149
CHECKED EJM	
APPROVED	PART DWG NO.

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

DOCKETED
USNRC

'84 AGO -8 A10 :30

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In the Matter of	
LONG ISLAND LIGHTING COMPANY	Docket No. 50-322-OL
(Shoreham Nuclear Power Station, Unit 1)	

AFFIDAVIT OF CLINTON S. MATHEWS

STATE OF CALIFORNIA)
) ss.:
COUNTY OF ALAMEDA)

CLINTON S. MATHEWS, being duly sworn, deposes and says:

1. I am Vice President and General Manager of the Engine and Compressor Division of Transamerica Delaval Inc. ("TDI").

2. On July 12, 1984, I wrote to Craig Seaman of The Long Island Lighting Company comparing the design of the crankshaft oil hole plugs used in the TDI engines at Rafha, Saudi Arabia and those used at Shoreham. The information contained in that letter and its attachments (copies of which are annexed as Exhibit A) is accurate.

Clinton S. Mathews

Sworn to before me this
30th day of July, 1984

B J Dowd
Notary Public

OFFICIAL SEAL
B J DOWD
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My comm. expires JUL 5, 1985

Transamerica Delaval

Transamerica Delaval Inc.
Engine and Compressc
550 85th Avenue
P.O. Box 2161
Oakland, California 94621
(415) 577-7400

on

EXHIBIT A

July 12, 1984

Mr. Craig Seaman
Long Island Lighting Company
Shoreham Nuclear Power Station
P.O. Box 618
North Country Road
Wading River, New York 11792

Subject: Crankshaft Oil Hole Plug
P/N R-3149

Dear Craig:

In response to your inquiry regarding the design of the oil hole plugs used in the crankshaft at Rafha Electricity Corp., enclosed are drawing R-3149, the drawing release and change notice form showing the original release, and the change notices for change A (3/10/80) and change B (6/23/82) which describe the oil hole plug and its changes over the years. As set forth below, the oil hole plugs in place at Shoreham use significantly thicker steel than used at Rafha, and TDI has no knowledge of any failures of the Shoreham design plug which is in use in more than 300 "R" series engine crankshafts.

The original design of the crankshaft oil hole plug was released in December, 1965 and called for the plug to be stamped from 16 gauge sheet steel which is approximately 1/16" in thickness. Over the years this plug was completely successful. However, our manufacturing people suggested changing to a lighter gauge material which would reduce the time required for installation. Please note that the plug installation consists of inserting the plug into its location and then mechanically deforming the plug by rolling it into a premachined groove in the crankshaft, thereby locking the plug in place. In March of 1980, the plug material was changed from 16 gauge sheet steel to 22 gauge sheet steel, for "ease of assembly" (change symbol A). Twenty-two (22) gauge sheet metal is approximately 1/32" in thickness, or approximately one-half the thickness of the previously-used 16 gauge material.

Transamerica
Delaval

While almost all of the 22 gauge plugs worked perfectly, field experience and shop experience showed us that the crankshaft oil hole plugs made from the thinner 22 gauge material were more likely to be damaged during the installation process where they were set into the crankshaft hole with a plug punch. Such installation damage is believed to have resulted in failures at Rafha in Saudi Arabia. As a result of these failures, where the center of the 22 gauge plug partially sheared out, we returned to the original 16 gauge material design in June of 1982 (change symbol B), which design remains unchanged from that time to the present. In the 300 R4 and RV-4 series engines shipped in the last 20 years, this 16 gauge plug has been used approxiamtely 6000 times with no reported failures. Both the original Shoreham crankshafts and the replacement crankshafts use the heavier 16 gauge plugs.

We trust the foregoing satisfies your needs. If not, please let me hear from you.

Best regards,

C S Mathews

C. S. Mathews
Vice President and General Manager

CSM/pn

cc: Mr. Clarence Ray, TDI Owners Group w/att.

DRAWING RELEASE NOTICE EFFECTIVE JOB

PARTS LIST CHANGE

NO R-3149

NAME PLUG - CRANKSH OIL HOLE

MODEL R

DWG NO

CHANGE SYMBOL REL

REQUESTED BY ENG.

DATE 2-28-66

DETAIL OF CHANGE OR RELEASE

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
PRODUCTION DEPARTMENT
MAR 03 1966
AM 7 8 9 10 11 12 1 2 3 4 5 PM

Code 29L01012

12-1-20

RELEASED FOR PRODUCTION X FILE X RECORD X EXPERIMENTAL

OTHER PARTS AFFECTED

REMARKS

EXTRA COPIES

NEW PATTERN

DISPOSITION OF STOCK	FINISHED STOCK	ROUGH STOCK	IN PROGRESS	ON ORDER	ASSEMBLED NOT SHPPD	PARTS REPAIR SERVICE	
SCRAP							PER CHANGE
REWORK		No STOCK					PER PARTS LIST
USE W/O CHANGE							SEE REMARKS

OF NOTICE TO PATTERN SHOP

CHANGED BY NHS CHECKED BJM APPROVED DCR PARTS LIST

FORM E-4221
DE LAVAL TURBINE INC., ENTERPRISE DIVISION

DRAWING [redacted] NOTICE EFFECTIVE JOB

[redacted] CHANGE

PART NO. R-3149

NAME PLUG-CRANKSHAFT OIL HOLE

MODEL ALL

CHANGE SYMBOL A

DATE 3/10/80

REQUESTED BY D. PRATT

DETAIL OF CHANGE OR RELEASE

MATERIAL WAS 16 GUAGE (.0595) STEEL SHEET STAMPING.

REASON: - EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 o/h 2-2-80

RELEASED FOR PRODUCTION X FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY
X MAJOR MANDATORY	SCRAP			
	REWORK	SEE NOTE	USE AS IS	USE AS IS
	☐ NEW RELEASE			
☐ MAJOR OPTIONAL	PER INV. CONT.			
☐ MINOR				

OTHER PARTS AFFECTED

*PER MICROFISCHE DATED

PATTERN CHANGE NO

NEW PATTERN NO

CHANGE CODE (A) B C D

CHANGED BY E. BRANDT CHECKED F. JACOB APPROVED R. PRATT RP

Form E 241 1/77

DRAWING ~~RELEASE~~ **NOTICE** EFFECTIVE JOB _____

~~PURCH. SPEC.~~ CHANGE

NAME PLUG, CRANKSHAFT OIL HOLE

MODEL _____

REQUESTED BY D. RIPPEE CHG. REQUEST OF 6-14-82

PART NO. R-3149

CHANGE SYMBOL B

DATE 6/23/82

DETAIL OF CHANGE OR RELEASE

.0299 eff 7/6/84

MATERIAL WAS 22 GA. (~~.0229~~) COLD ROLLED STL.

REASON: TO LESSEN CHANCE OF DAMAGE TO PLUG AT INSTALLATION

REMARKS: NEXT PART MADE MUST BE PER THIS REVISION

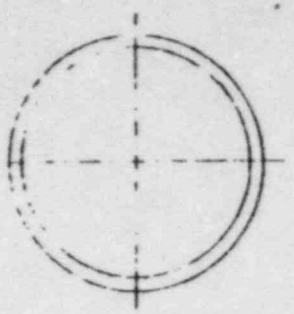
MISC. 82-135

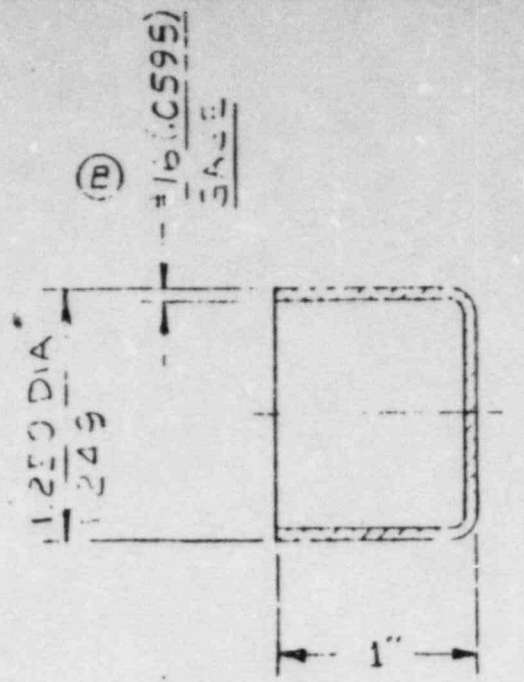
RELEASED FOR PRODUCTION ☒ FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE
☒ MAJOR MANDATORY	SCRAP	X	X	X		NO
	REWORK					NEW PATTERN NO
	☐ NEW RELEASE				*PER MICROFISCHE DATED	CHANGE CODE (A) B C D
☐ MAJOR OPTIONAL	PER INV. CONT.					
☐ MINOR						

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING

Form E 241 1/77





6. FACE ... TO BE PARALLEL TO FACE ... WITHIN ...
T.I.R. AND AT RIGHT ANGLES TO FACE ... WITHIN ... T.I.R.
IN ... INCH LENGTH.
5. ... DIAMETERS MARKED ★ ARE TO BE CONCENTRIC TO EACH OTHER
WITHIN ... T.I.R. AND AT RIGHT ANGLES TO FACES MARKED ★★
WITHIN ... T.I.R.
4. ✓ SURFACE FINISH SYMBOL WITH NUMBER INDICATING MU IN RMS.
3. ALL MACHINING DIMENSIONS ± .010 UNLESS OTHERWISE SPECIFIED
2. REMOVE ALL BURRS AND SHARP CORNERS
1. DO NOT SCALE DRAWING

NOTES

...DRAWING CONTAINS PROPRIETARY INFORMATION AND IS LOANED SUBJECT TO RETURN ON REQUEST AND UPON THE EXPRESS CONDITION THAT THE INFORMATION CONTAINED HEREIN WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE CORPORATION

ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA

PLUG, CRANKSHAFT OIL HOLE

DRAWN 12-1-65 N.H.S	R-3149
CHECKED E J M	
APPROVED	PART & DWG NO.

MATERIAL AND HARDNESS

16 GAGE CRS FLAT DRAWING
QUALITY SHEET STAMPING

(B)

B 6-5-82 MATL WAS .22GA (.029) STL SHT
A 2-2-...

SCALE: FULL

PARTS LIST 31C

MODEL

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of LONG ISLAND LIGHTING COMPANY (Shoreham Nuclear Power Station, Unit 1)	)	Docket No. 50-322-OL

'84

OFFICE DOCKE

AFFIDAVIT OF CLINTON S. MATHEWS

STATE OF CALIFORNIA)
) ss.:
COUNTY OF ALAMEDA)

CLINTON S. MATHEWS, being duly sworn, deposes and says:

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Clinton S. Mathews

Sworn to before me this
30th day of July, 1984

B J Dowd
Notary Public

OFFICIAL SEAL
B J DOWD
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My comm. expires JUL 5, 1985

Transamerica Delaval

Transamerica Delaval Inc.
Engine and Compressc
550 85th Avenue
P.O. Box 2161
Oakland, California 94621
(415) 577-7400

on

EXHIBIT A

July 12, 1984

Mr. Craig Seaman
Long Island Lighting Company
Shoreham Nuclear Power Station
P.O. Box 618
North Country Road
Wading River, New York 11792

Subject: Crankshaft Oil Hole Plug
P/N R-3149

Dear Craig:

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Transamerica
Delaval

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We trust the foregoing satisfies your needs. If not, please let me hear from you.

Best regards,

C. S. Mathews
Vice President and General Manager

CSM/pn

cc: Mr. Clarence Ray, TDI Owners Group w/att.

DRAWING RELEASE / PARTS LIST CHANGE **NOTICE** EFFECTIVE JOB _____ NO R-3149

NAME PLUG - CRANKSH OIL HOLE MODEL R

REQUESTED BY ENG.

D'W'G NO _____ CHANGE SYMBOL REL DATE 2-28-66

DETAIL OF CHANGE OR RELEASE

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
PRODUCTION DEPARTMENT
MAR 03 1966
AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

Code 29L01012

12-1-20

RELEASED FOR PRODUCTION X FILE X RECORD X EXPERIMENTAL

OTHER PARTS AFFECTED

REMARKS:

EXTRA COST

NEW PATTERN

OF NOTICE PATTERN CHANGE

DISPOSITION OF STOCK	FINISHED STOCK	ROUGH STOCK	IN PROGRESS	ON ORDER	ASSEMBLED NOT SHPPD.	PARTS REPAIR SERVICE	
SCRAP							PER CHANGE
REWORK		No Stock					PER PARTS LIST
USE W/C CHANGE							SEE REMARKS

CHANGED BY NHS CHECKED BJM APPROVED DCR PARTS LIST _____

FORM E-402C
DE LAVAL TURBINE INC., ENTERPRISE DIVISION

DRAWING [redacted] CHANGE **NOTICE** EFFECTIVE JOB _____

NAME PLUG-CRANKSHAFT OIL HOLE MODEL ALL

REQUESTED BY D. PRATT

PART NO. R-3149

CHANGE SYMBOL A DATE 3/10/80

DETAIL OF CHANGE OR RELEASE

MATERIAL WAS 16 GUAGE (.0595) STEEL SHEET STAMPING.

REASON: EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 o/h 2/2/80

RELEASED FOR PRODUCTION X FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY
X MAJOR MANDATORY	SCRAP			
	REWORK	SEE NOTE	USE AS IS	USE AS IS
	☐ NEW RELEASE			
☐ MAJOR OPTIONAL	PER INV. CONT.			
☐ MINOR				

OTHER PARTS AFFECTED

*PER MICROFISCHE DATED

PATTERN CHANGE NO

NEW PATTERN NO

CHANGE CODE (A) B C D

CHANGED BY E. BRANDT CHECKED F. JACOB APPROVED R. PRATT RP

Form E 241 1/77

DRAWING ~~RELEASE~~ **NOTICE** EFFECTIVE JOB _____
~~PURCH. SPEC~~ CHANGE

NAME PLUG, CRANKSHAFT OIL HOLE

MODEL _____

REQUESTED BY D. RIPPEE CHG. REQUEST OF 6-14-82

PART NO. R-3149

CHANGE SYMBOL B

DATE 6/23/82

DETAIL OF CHANGE OR RELEASE

.0299 aff 7/6/84

MATERIAL WAS 22 GA. (~~.0229~~) COLD ROLLED STL.

REASON: TO LESSEN CHANCE OF DAMAGE TO PLUG AT INSTALLATION

REMARKS: NEXT PART MADE MUST BE PER THIS REVISION

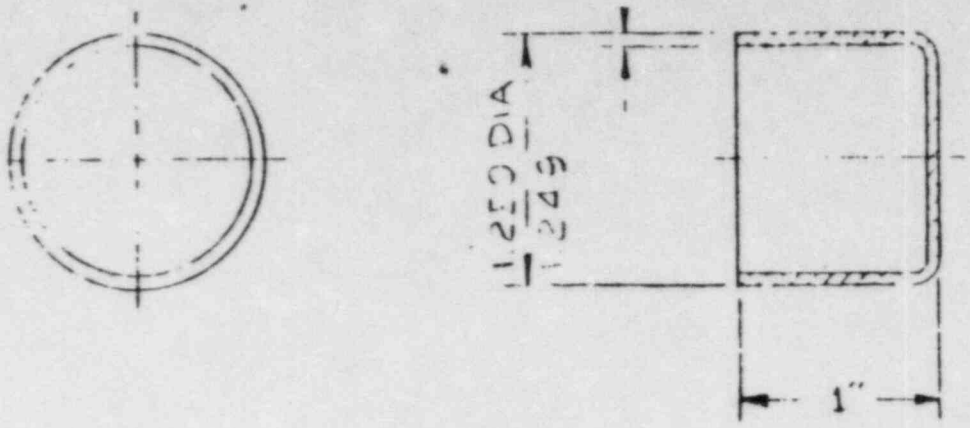
MISC. 82-135

RELEASED FOR PRODUCTION ☒ FILE ☐

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE
☒ MAJOR MANDATORY	SCRAP	X	X	X		NO
	REWORK					NEW PATTERN NO
	☐ NEW RELEASE				*PER MICROFISCHE DATED	CHANGE CODE (A) B C D
☐ MAJOR OPTIONAL	PER INV. CONT.					
☐ MINOR						

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING

Form E 241 1/77



6. FACE ... TO BE PARALLEL TO FACE ... WITHIN ...
T.I.R. AND AT RIGHT ANGLES TO FACE ... WITHIN ... T.I.R.
IN ... INCH LENGTH.
5. ... DIAMETERS MARKED ★ ARE TO BE CONCENTRIC TO EACH OTHER
WITHIN ... T.I.R. AND AT RIGHT ANGLES TO FACES MARKED ★★
WITHIN ... T.I.R.
4. √ SURFACE FINISH SYMBOL WITH NUMBER INDICATING MU IN RMS.
3. ALL MACHINING DIMENSIONS ± .010 UNLESS OTHERWISE SPECIFIED
2. REMOVE ALL BURRS AND SHARP CORNERS
1. DO NOT SCALE DRAWING

NOTES

...AWING ...TAIN PROPRIETARY INFORMATION AND IS SUBMITTED TO RETURN ...ON REQUEST ...ON THE EXPRESS CONDITION ...AT THE INFORMATION ...NOT BE USED DIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

MATERIAL AND HARDNESS

16 SAME AS DETAIL DRAWING

SAFETY WIRE DRILLING

(B)

B 6-5-82 MATL WAS .22 GA (.0295) STL SHT

A ... STL SHT

DATE ... CHG ...

PATTERN ~ SCALE FULL

MODEL ... PARTS LIST 31C

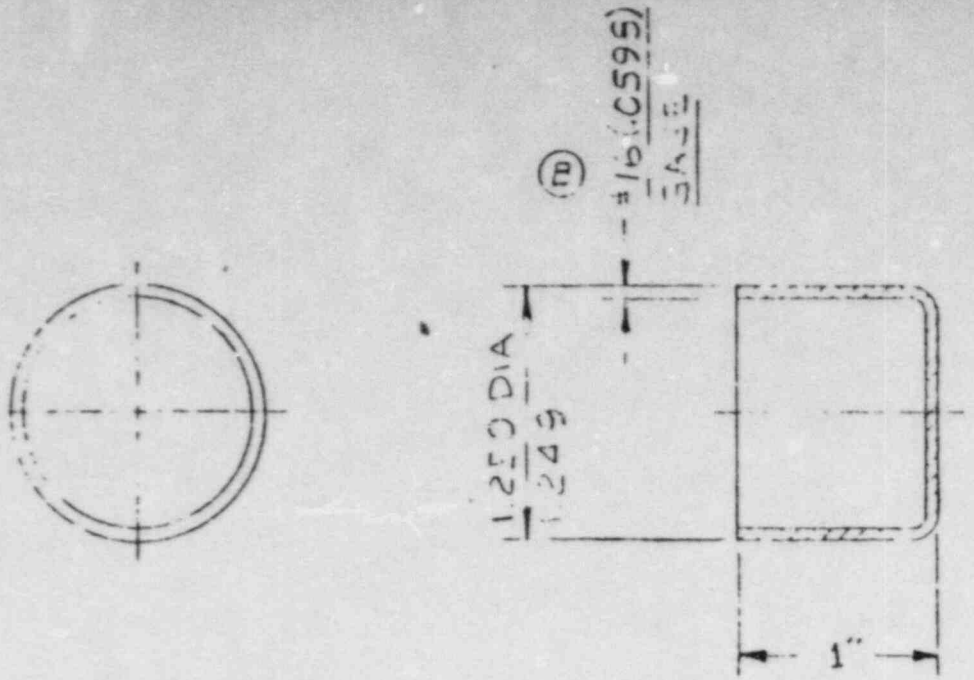
ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA.

PLUG, CRANKSHAFT OIL HOLE

DRAWN 12-1-65 N.H.S. R-3149

CHECKED E J M

APPROVED ... PART & DWG NO.



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WITHIN ... T.I.R.
4. √ SURFACE FINISH SYMBOL WITH NUMBER INDICATING MU IN RMS.
3. ALL MACHINING DIMENSIONS ± .010 UNLESS OTHERWISE SPECIFIED
2. REMOVE ALL BURRS AND SHARP CORNERS
1. DO NOT SCALE DRAWING

NOTES

...DRAWING ...CONTAIN PROPRIETARY INFORMATION AND IS LOANED SUBJECT TO AGREEMENT THAT NEITHER ...N, NOR ...ON THE EXPRESS CONDITION ...AT THE INFORMATION CONTAINED HEREIN WILL NOT BE ...SED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE ...PORATION.

MATERIAL AND HARDNESS

16 GAGE CR ... PLATE DRAWING

QUALITY SHEET STAMPING

(5)

B 6-5-92 MATL WAS .22GA (.0299) STL SHT

A ... STL SHT

... DATE ... TR

CHK ... E

PATT ... ~

NO. ...

SCALE: FULL

PARTS LIST 31C

ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA.

PLUG, CRANKSHAFT OIL HOLE

DRAWN 12-1-65 N.H.S

CHECKED E J M

APPROVED

R-3149

PART DWG. NO.