

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 710-956-0061

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
FAX NO. 24566.3

DOCKETED
USNHC

'84 AGO -8

APR 29

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

August 1, 1984

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
PDR

Manufactures
Delaval



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

July 17, 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.



Mr. Craig Seamn
Long Island Lighting Company
July 12, 1984

Page 2

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 approximately 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 IL HOLE D'WG NO. _____
 MODEL R CHANGE SYMBOL REL
 REQUESTED BY ENG. DATE 2-28-66

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
 PRODUCTION
 DEPARTMENT
 MAR 03 1966

Code: 29L01012

AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

12-1-70

RELEASED FOR PRODUCTION FILE RECORD EXPERIMENTAL

OTHER PARTS AFFECTED _____ REMARKS: _____

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

CHANGED BY NHS CHECKED BJM APPROVED DCR PARTS LIST _____

FORM 2-400 DE LAVAL TURBINE INC., ENTERPRISE DIVISION

DRAWING 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

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

REASON: EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 014 2/27/80

DETAIL OF CHANGE OR RELEASE

RELEASED FOR PRODUCTION FILE

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP					NO
	REWORK	SEE NOTE	USE AS IS	USE AS IS		NO
	<input type="checkbox"/> NEW RELEASE					
<input type="checkbox"/> MAJOR OPTIONAL	PER INV. CONT.					*PER MICROFISCHE DATED
<input type="checkbox"/> MINOR						(A) B C D

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

DRAWING PURCH. SPEC NAME PLUG, CRANKSHAFT OIL HOLE **RELEASE CHANGE** **NOTICE** EFFECTIVE JOB _____

PART NO.	R-3149
CHANGE SYMBOL	B
DATE	6/23/82

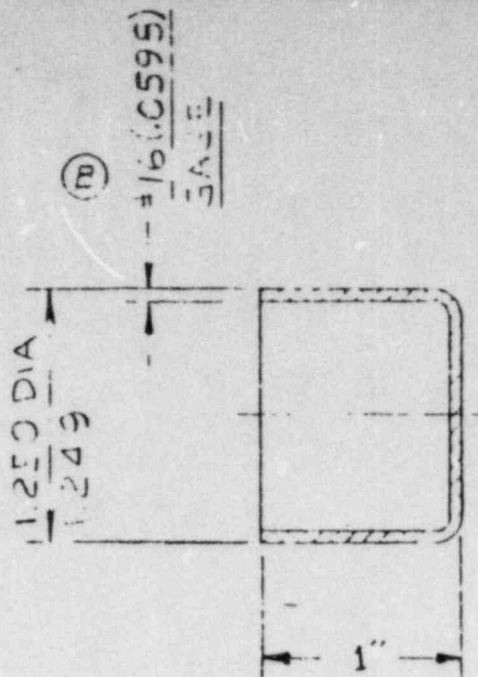
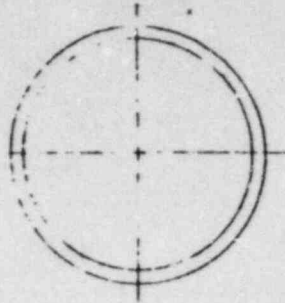
MODEL _____ REQUESTED BY D. RIPPEE CHG. REQUEST OF 6-14-82

DETAIL OF CHANGE OR RELEASE

.0259 OKF 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 <input checked="" type="checkbox"/>		FILE <input type="checkbox"/>					
TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE	
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP	X	X	X		NO	
	REWORK					NEW PATTERN	NO
	<input type="checkbox"/> NEW RELEASE					*PER MICROFISCHE DATED	CHANGE CODE (A) B C D
<input type="checkbox"/> MAJOR OPTIONAL	PER INV. CONT.						
<input type="checkbox"/> MINOR							

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING *OK*



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. 1" 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

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBMITTED SOLELY TO RETURN FROM
REPAIR AND IS ON THE EXPRESS CONDITION THAT THE INFORMATION CONTAINED HEREIN WILL
NOT BE USED DIRECTLY IN ANY WAY DETRIMENTAL TO THE INTERESTS OF THE
CORPORATION.

NOTES

ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA.

PLUG,
CRANKSHAFT OIL HOLE

DRAWN 12-1-65 NMS

R-3149

CHECKED EJM

APPROVED

PARTS DRAWING NO.

MATERIAL AND HARDNESS

16 GAGE CO. R. ED. DRAWING
QUALITY SHEET STAMPING

(B)

B 6-15-82 MATL WAS 226A
10299 JTL SH

A 2275 JTL SH

SCALE: FULL

PARTS LIST 31C

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").

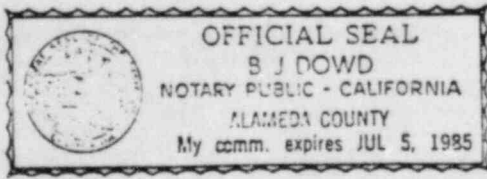
2. On July 12, 1984, I wrote to Craig Seaman of The Long Island Lighting Company comparing the design of the crankshaft oil hole plugs used in the TDI engines at Rafha, Saudi Arabia and those used at Shoreham. The information contained in that letter and its attachments (copies of which are annexed as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

Clinton S. Mathews

Clinton S. Mathews

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

B.J. Dowd
Notary Public



**Transamerica
Delaval**



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

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**



Mr. Craig Seamn
Long Island Lighting Company
July 12, 1984

Page 2

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 approximately 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,

A handwritten signature in cursive script, appearing to read 'C. S. Mathews'. The signature is written in dark ink and is positioned above the typed name.

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
 NAME PLUG - CRANKSH OIL HOLE
 REQUESTED BY ENG

NO R-3149
 D'W'G NO
 CHANGE SYMBOL REL
 DATE 2-28-66

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
 PRODUCTION
 DEPARTMENT
 MAR 03 1966

Code: 29401012

12-1-20

AM
 7.8.9.10.11.12.13.14.15.16

RELEASED FOR PRODUCTION <input checked="" type="checkbox"/>		FILE <input checked="" type="checkbox"/>		RECORD <input checked="" type="checkbox"/>		EXPERIMENT	
OTHER PARTS AFFECTED				REMARKS:			
DISPOSITION OF STOCK	FINISHED STOCK	ROUGH STOCK	IN PROGRESS	ON ORDER	ASSEMBLED NOT SHIPPED	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	

DRAWING [REDACTED] NOTICE EFFECTIVE JOB
 NAME PLUG-CRANKSHAFT OIL HOLE
 REQUESTED BY D. PRATT

PART NO. R-3149
 CHANGE SYMBOL A
 DATE 3/10/80

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

REASON: EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 o/w 2/2/80

DETAIL OF CHANGE OR RELEASE

RELEASED FOR PRODUCTION <input checked="" type="checkbox"/>		FILE <input type="checkbox"/>		OTHER PARTS AFFECTED		PATTERN CHANGE	
TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY			NO
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP						NEW PATTERN
	REWORK	SEE NOTE	USE AS IS	USE AS IS			NO
	<input type="checkbox"/> NEW RELEASE						CHANGE CODE
<input type="checkbox"/> MAJOR OPTIONAL	PER INV. CONT.						A B C D
<input type="checkbox"/> MINOR							
CHANGED BY E. BRANDT		CHECKED F. JACOB		APPROVED R. PRATT			

DRAWING ~~RELEASE~~ **NOTICE**
 PURCH. SPEC. CHANGE EFFECTIVE JOB _____
 NAME PLUG, CRANKSHAFT OIL HOLE
 MODEL _____
 REQUESTED BY D. RIPPE CHG. REQUEST OF 6-14-82

PART NO.	R-3149
CHANGE SYMBOL	B
DATE	6/23/82

DETAIL OF CHANGE OR RELEASE

10299 ALF 7/6/84

MATERIAL WAS 22 GA. (~~229~~) COLD ROLLED STL.

REASON: TO LESSEN CHANCE OF DAMAGE TO PLUG AT INSTALLATION

REMARKS: NEXT PART MADE MUST BE PER THIS REVISION

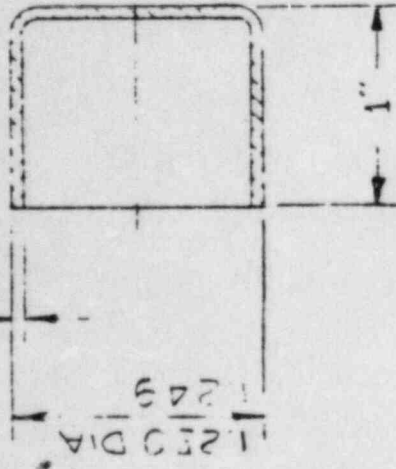
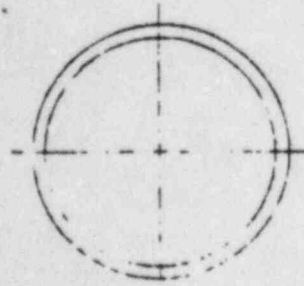
MISC. 82-135

RELEASED FOR PRODUCTION <input checked="" type="checkbox"/>		FILE <input type="checkbox"/>				
TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP	X	X	X		NO
	REWORK					NEW PATTERN
	<input type="checkbox"/> NEW RELEASE				*PER MICROFISCHE DATED	CHANGE CODE
<input type="checkbox"/> MAJOR OPTIONAL PER INV. CONT.				(A) B C D		
<input type="checkbox"/> MINOR						

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING *OK*

1/6 (CS95)

(E)



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

NOTES

ENTERPRISE DIVISION
DE LAVAL TURBINE INC.
OAKLAND, CALIFORNIA.

PLUG,
CRANKSHAFT OIL HOLE

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

R-3149

CHECKED H.J.M.

APPROVED

PARTS DIV. NO.

16 SHEET OF 16 DRAWINGS
CRANKSHAFT OIL HOLE PLUGS

MATERIAL AND HARDNESS

16 SHEET OF 16 DRAWINGS
CRANKSHAFT OIL HOLE PLUGS

(B)

B 6-5-92
A 2-27-92
MATERIAL WAS 2024-T3 ALUMINUM

SCALE: FULL

PARTS LIB 31C

PARTS DIV.

MO. 1

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))
)

84
OFFICE
DOCKET

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.

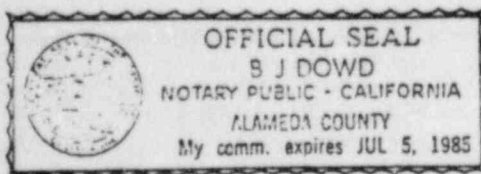
Clinton S. Mathews

Clinton S. Mathews

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

B. J. Dowd

Notary Public



**Transamerica
Delaval**



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

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

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**Transamerica
Delaval**



Mr. Craig Seamn
Long Island Lighting Company
July 12, 1984

Page 2

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

Best regards,

A handwritten signature in cursive script, appearing to read 'C. S. Mathews'. The signature is written in dark ink and is positioned above the printed name.

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
 REQUESTED BY ENG. DATE 2-28-66

DETAIL OF CHANGE OR RELEASE

NEW DRAWING RELEASED FOR PRODUCTION.

RECEIVED
 PRODUCTION DEPARTMENT
 MAR 03 1966

Code: 29L01012

12-1-70

AM 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM

RELEASED FOR PRODUCTION FILE RECORD EXPERIMENTAL

OTHER PARTS AFFECTED _____ REMARKS: _____

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

CHANGED BY NHS CHECKED *BJM* APPROVED DCR PARTS LIST _____

DE LAVAL TURBINE INC., ENTERPRISE DIVISION

DRAWING ~~_____~~ NOTICE EFFECTIVE JOB _____
 CHANGE
 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 GAUGE (.0595) STEEL SHEET STAMPING.

REASON: EASE OF ASSEMBLY

NOTE: EFFECTIVE ON NEXT MADE

113 o/w 2/2/80

RELEASED FOR PRODUCTION FILE

TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP					NO
	REWORK	SEE NOTE	USE AS IS	USE AS IS		NO
	<input type="checkbox"/> NEW RELEASE					CHANGE CODE
<input type="checkbox"/> MAJOR OPTIONAL	PER INV. CONT.					(A) B C D
<input type="checkbox"/> MINOR						

CHANGED BY E. BRANDT CHECKED F. JACOB APPROVED R. PRATT *128*

DRAWING RELEASE **NOTICE**
 PURCH SPEC CHANGE EFFECTIVE JOB _____
 NAME PLUG, CRANKSHAFT OIL HOLE
 MODEL _____
 REQUESTED BY D. RIPPPEF CHG. REQUEST OF 6-14-82

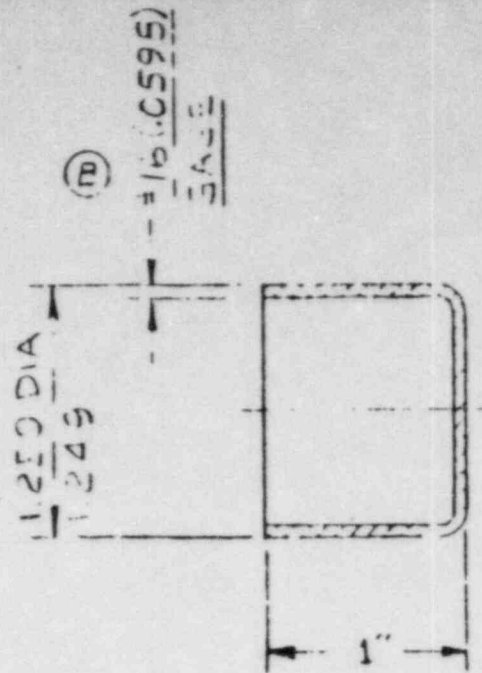
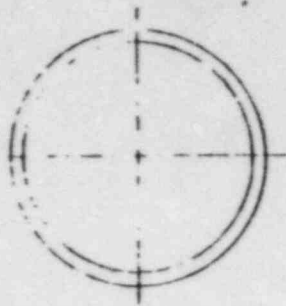
PART NO. R-3149
 CHANGE SYMBOL B
 DATE 6/23/82

DETAIL OF CHANGE OR RELEASE

10299 OK F 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 <input checked="" type="checkbox"/>		FILE <input type="checkbox"/>					
TYPE	DISPOSITION OF STOCK	WORK IN PROGRESS	ON HAND	ISSUE TO ASSEMBLY	OTHER PARTS AFFECTED	PATTERN CHANGE	
<input checked="" type="checkbox"/> MAJOR MANDATORY	SCRAP	X	X	X		NO	
	REWORK					NEW PATTERN	NO
	<input type="checkbox"/> NEW RELEASE					*PER MICROFISCHE DATED	CHANGE CODE (A) B C D
<input type="checkbox"/> MAJOR OPTIONAL	PER INV. CONT.						
<input type="checkbox"/> MINOR							

CHANGED BY BERGENDAHL CHECKED JACOB APPROVED KING *BL*



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

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBMITTED SOLELY TO RETURN FROM REPAIR AND IS ON THE EXPRESS CONDITION THAT THE INFORMATION CONTAINED HEREIN WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY ELEMENTAL TO THE INTEREST OF THE CORPORATION.

NOTES

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 CO. CR. PL. DRAWING
QUALITY SHEET STAMPING

(B)

B 6-15-32 MATL WAS 22GA
0299 JTL SMT

A 2275 STE. CASE

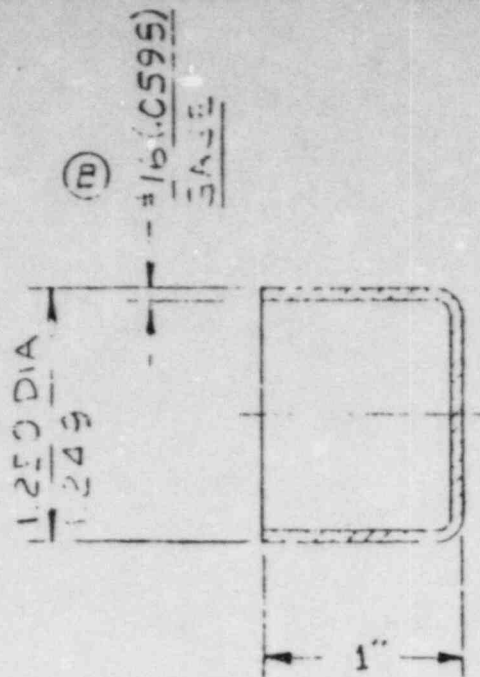
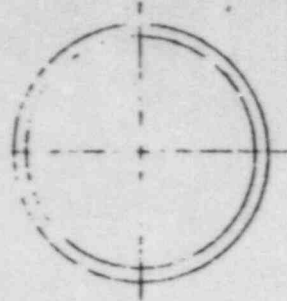
DATE

PART NO.

SCALE: FULL

PARTS LIST 31C

NO. 1



- 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

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBMITTED SOLELY TO RETURN FOR REVISION AND IS ON THE EXPRESS CONDITION THAT THE INFORMATION CONTAINED HEREIN WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTERESTS OF THE CORPORATION.

NOTES

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

PARTS Dwg. No.

MATERIAL AND HARDNESS
16 SAE 52100 STEEL DRAWING
QUALITY SHEET STAMPING

(B)

SCALE: FULL

PARTS LIST 31C

B 6-5-82 MAPL WAS 22GA
0299 JTL SHT

A 2275 JTL SHT

DATE

MO. 1