



EDG 101

8412140431 840910
PDR ADOCK 05000322
G PDR

INTEROFFICE CORRESPONDENCE

TO: DISTRIBUTION

LOCATION
SNPS-1

SUBJECT / REFERENCE / J.O. NO.

FROM: R. MURRAY

LOCATION
QEC11600.37 Component No. 03-341A
TRANSMITTAL OF SAT I.R.'s

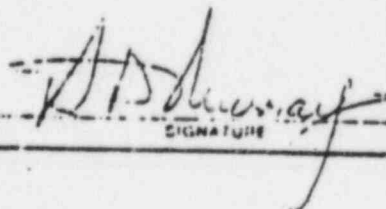
Att-3

MESSAGE: —

ATTACHED PLEASE FIND one SATISFACTORY INSPECTION REPORTS
GENERATED BY THE QUALITY REVALIDATION INSPECTION GROUP AND REVIEWED BY
THE QUALITY ENGINEERING GROUP. THEY ARE FORWARDED TO YOU FOR YOUR
INFORMATION IN ACCORDANCE WITH EDG QR/DR PROGRAM MEMO R. NAJUCH

3-26-84

DATE



SIGNATURE

564

TELEPHONE

REPLY:

DIST. R. NAJUCH (IOC ONLY)
G. ROGERS DRG W/ ATTACHMENTS
J. E. KELLY LILCO FQA (NDE RELATED IR'S ONLY) W/ATTACHMENTS.

DATE

A 046110

SIGNATURE

TELEPHONE

FORWARD WHITE AND PINK COPIES.

RETAIN PINK COPY FOR FILE.

INTEROFFICE CORRESPONDENCE

TO:

Ken Morrow

LOCATION

SUBJECT / REFERENCE / J.O. NO.

FaAA Report # 840321-2

FROM:

Don Johnson

LOCATION

FaAA

FT of DG 101 Pistons #5,7, & 8

MESSAGE: ---

Attached is FaAA Report # 840321-2, Eddy Current Examination of DG 101
Pistons # 5, 7, & 8.

No relevant indications were observed.

3/21/84
DATE


SIGNATURE

582

TELEPHONE

REPLY:

DATE

SIGNATURE

TELEPHONE

[illegible]

EDDY CURRENT CALIBRATION REPORT

Job No. 03340A Date 2-21-84 Report No. 830221-2
 Material Description NOD44V I RUN
 Code or Specification NDE 11.5 REV. 1 Full On N/A Full Off N/A
 Reference Standard PAO-C-1 Instrument 111217 S/N R123867

Instrument
 Freq. 2MHz Gain 20 Volts/div 0.5 Phase 210
 Test Probe FaAA ECP 100P S/N 100P
 Reference Probe FaAA ECP 100P S/N 100P-1

CALIBRATION
4 units @ -1.5 L/O
4 units @ -0.75 L/O
3.5 units @ +0.2 L/O
2.6 units @ 1.25 L/O

STRIP CHART RECORDER

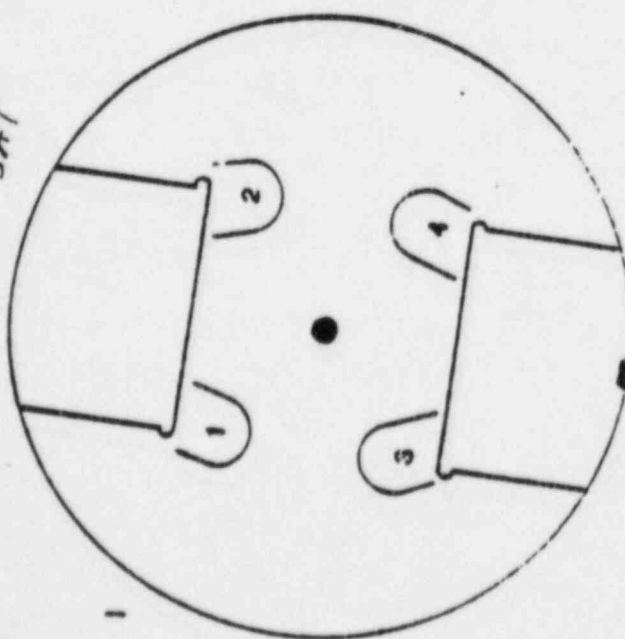
Type N/A S/N N/A
 Channel 1
 Sen N/A
 Position @ Null Point N/A
 Chart Speed N/A mm/sec
 Channel 2
 Sen N/A
 Position @ Null Point 2 1/4

Calibration Check

Time	Phase	Gain
<u>12:21 PDI</u>	<u>210</u>	<u>30</u>
<u>12:27</u>	<u>210</u>	<u>30</u>
<u>12:35</u>	<u>210</u>	<u>30</u>
<u>12:41 EOT</u>	<u>210</u>	<u>30</u>
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain

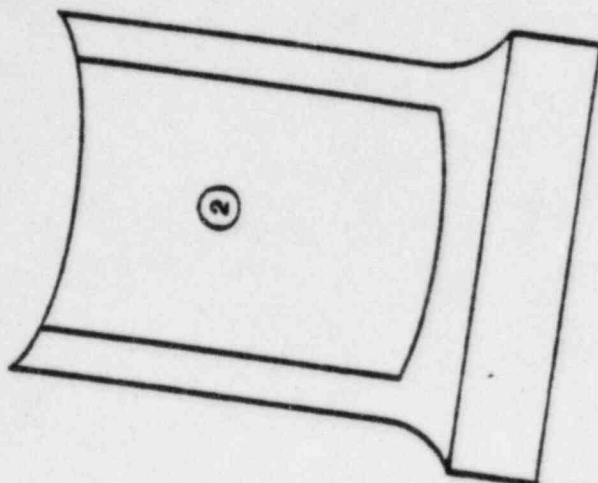
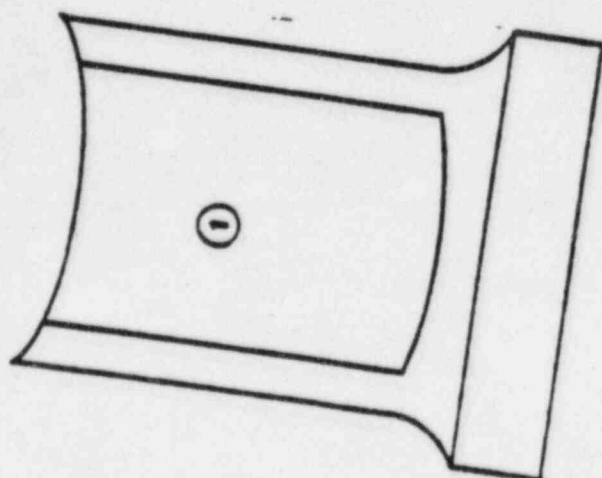
Examiner [Signature] Level II Examiner Level
 R&D-KR-3

Diesel engine # 56101
 Piston # 8
 Condition SAT

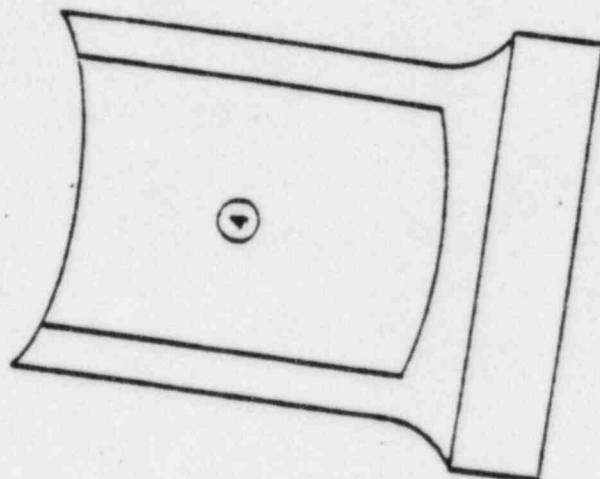
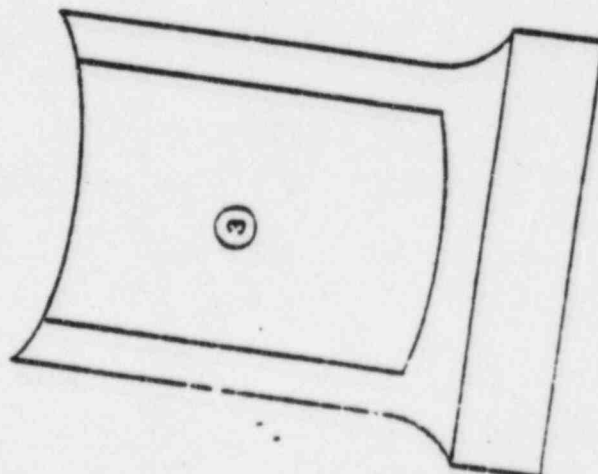


Notch side

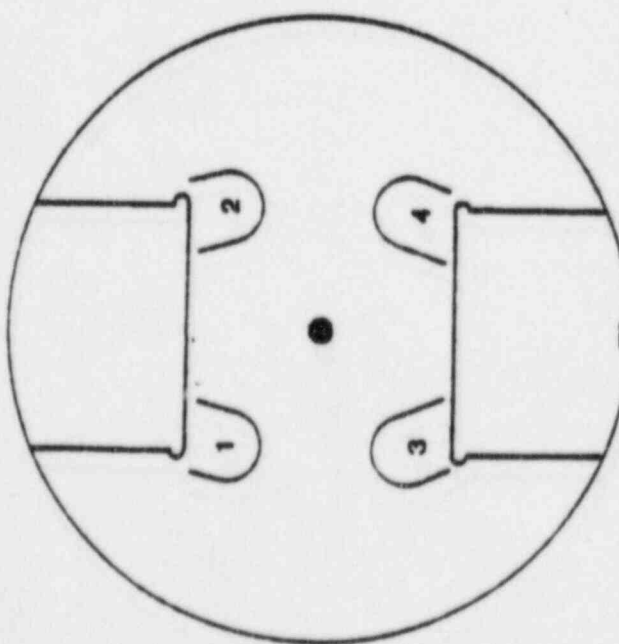
Overhead view



Side views, looking out from inside

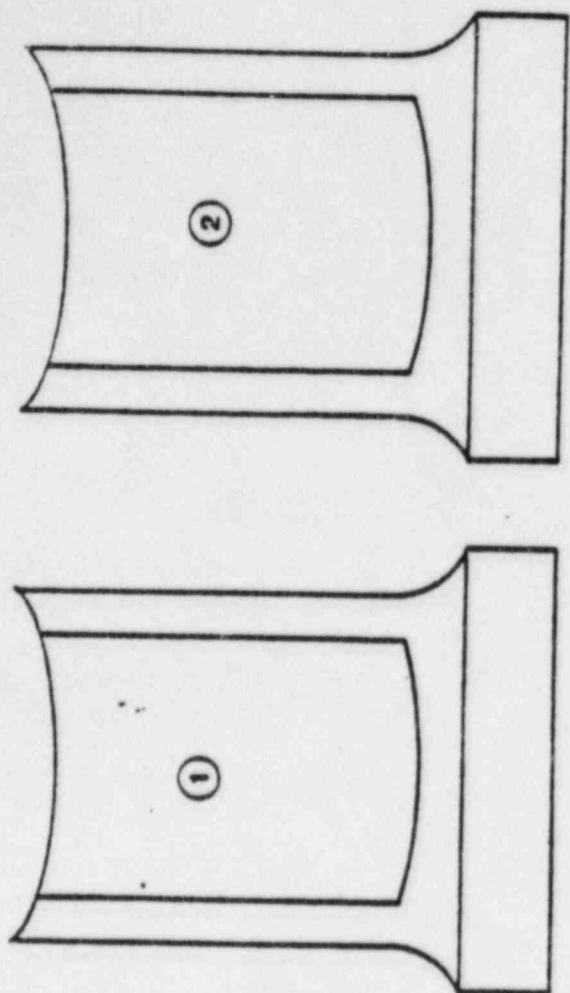


Diesel engine # D5101
 Piston # 7
 Condition SAT

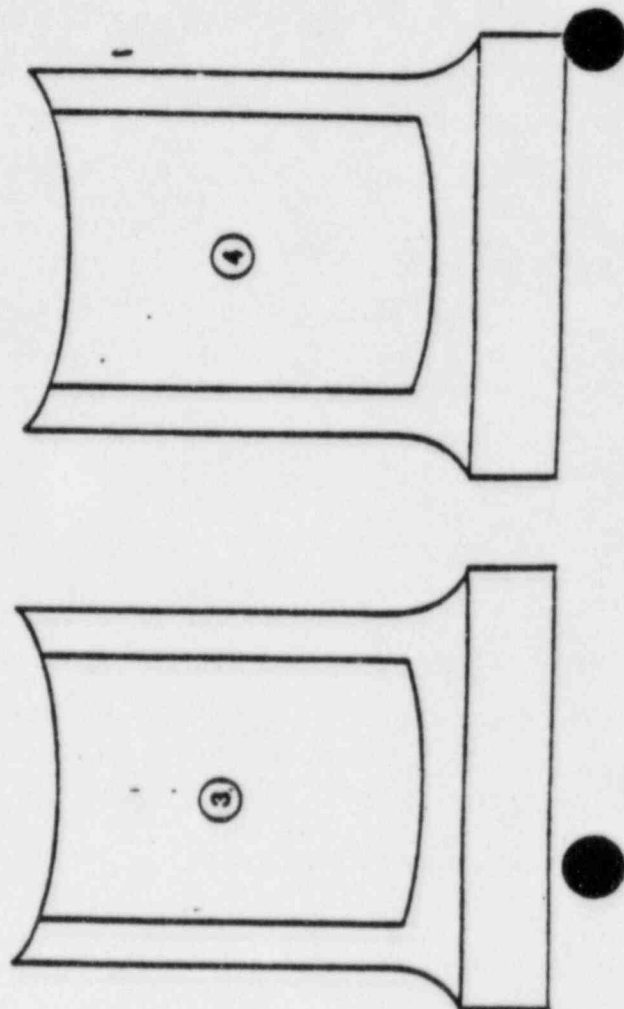


Notch side

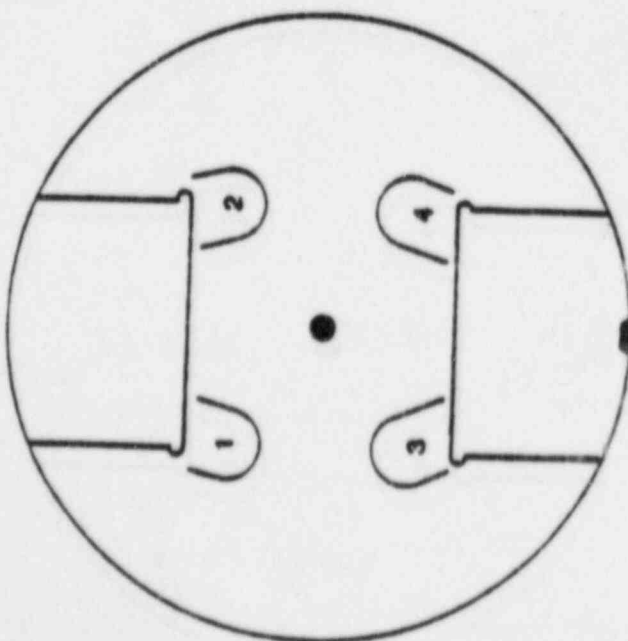
Overhead view



Side views, looking out from inside

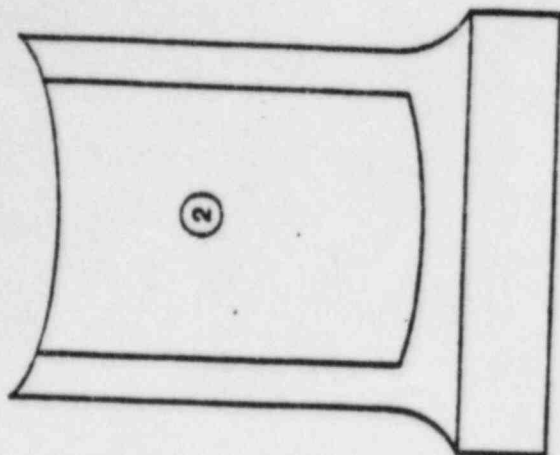
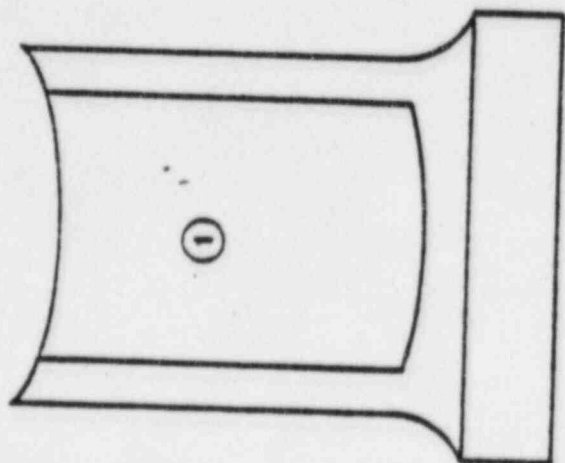


Diesel engine # DG101
 Piston # 5
 Condition - SAT

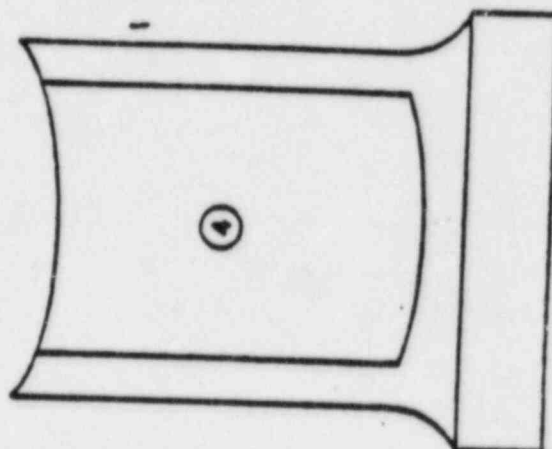
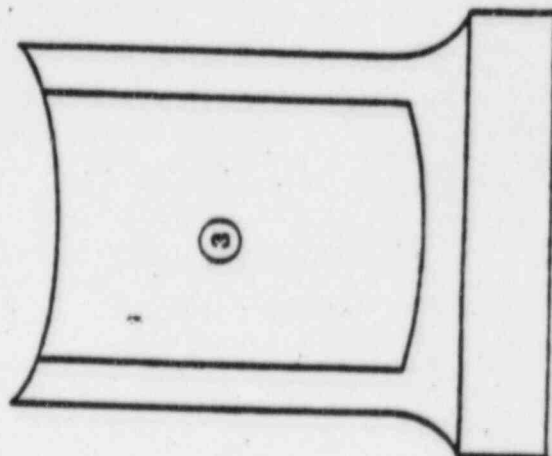


Notch side

Overhead view



Side views, looking out from inside



EDG 102

INFO

COMPONENT TASK EVALUATION REPORT

Q-38 S.P.

ITEM/COMPONENT NO. 23-341A	TDI PART NO. 1A-6522	INITIATOR <i>[Signature]</i>	DATE 2/20/84	ORGANIZATION <input type="checkbox"/> ENGINEER <input checked="" type="checkbox"/> QUALITY
-------------------------------	-------------------------	---------------------------------	-----------------	--

ADDITION DETAILS: ATTACHED INSPECTION REPORT (5 PAGES) BY D.O. JOHNS.
 AT D2-14-84 WAS GENERATED AS INFORMATIONAL, AS NO ACCIDENT
 2. WRIA WAS PROVIDED PRIOR TO THE PERFORMANCE OF THE INSPECTION.
 SUBJECT I.R. GENERATED BY F.A.A. (EDDY CURRENT)
 RECOMMENDATIONS: FORWARD TO DESIGN REVIEW FOR EVALUATION
 AND ALSO TO SEQ AND LSU FOR INFORMATION ONLY.

REQUIRED COMPLETION DATE: 2/21/84

ASSIGNMENT		
SECTION ASSIGNED TO ENGINEERING <input type="checkbox"/> QUALITY	RESPONSIBLE CHAIRPERSON <i>R. Frasier</i> SIGNATURE	DATE 2-21-84

DISPOSITION
 DISPOSITION DETAILS: Send copy to C Wells / FAA, SEQ, and
 ISO. See TEL to Q-60. gsf

DISPOSITION ASSIGNED TO <input type="checkbox"/> ENGINEERING <input type="checkbox"/> QUALITY <input type="checkbox"/> NONE REQUIRED					
APPLIED BY <i>[Signature]</i>	DATE 2/23/84	REVIEWED BY <i>[Signature]</i>	DATE 2/23/84	APPROVED BY <i>[Signature]</i>	DATE 2/23/84
		RESP. CHAIRPERSON		PROGRAM MANAGER	

ACTION	
SECTION ASSIGNED TO 2 Wells / FAA	ACTION COMPLETED BY <i>[Signature]</i> DATE 03-06-84

C. CKS/GWR/RJN/EFM
 TER LOG

E.T. FOR 5,6,7,8

MASSA

11-4-10

EDDY CURRENT CALIBRATION REPORT

Failure
Analysis
Associates

03-341 A-11/84

Job No. PAO 7396 Date 2-13-84 Report No. 831302-1
 Material Description NODULAR CAST IRON PISTON SKIRTS
 Code or Specification NDE 11.5 Full On -1.5 Full Off +1.5
 Reference Standard PAO-S-1 Instrument MIZ 17 S/N 8133867

Instrument
 Freq. 2 MHz Gain 30 Volts/div 0.5 Phase 218
 Test Probe EM ECP-100-R1 S/N ECP 100-R1
 Reference Probe EM ECP-100 R-1 S/N ECP 100 R1

CALIBRATION

4 units @ -1.5 L/O
3.5 units @ -1 L/O

3.2 units @ -0 L/O
2.6 units @ +1 L/O

STRIP CHART RECORDER

Type N/A S/N N/A
 Channel 1
 Sen N/A
 Position @ Null Point N/A
 Chart Speed N/A mm/sec
 Channel 2
 Sen N/A
 Position @ Null Point N/A

Calibration Check

Time	Phase	Gain
<u>11:30</u>	<u>218</u>	<u>30</u>
<u>11:33</u>	<u>218</u>	<u>30</u>
<u>11:36</u>	<u>218</u>	<u>30</u>
<u>11:39</u>	<u>218</u>	<u>30</u>
<u>11:42</u>	<u>218</u>	<u>30</u>
<u>11:45</u>	<u>218</u>	<u>30</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
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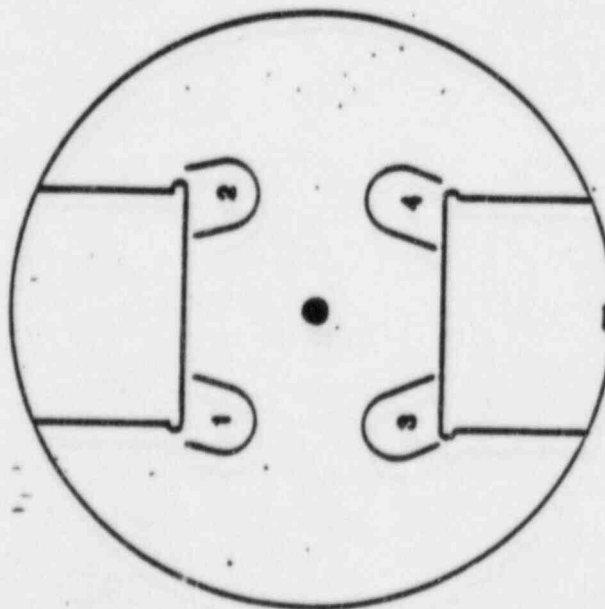
Examiner
R&D-KR-3*[Signature]*Level II ExaminerA-10535 Level

11.6.8.4

03-541A

Diesel engine # DG 102

Piston # 8



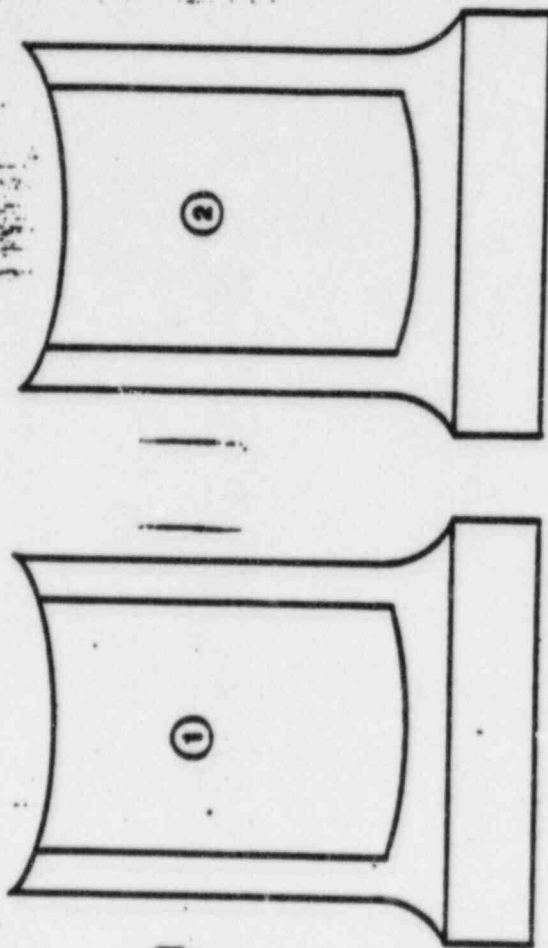
Notch side

REMOVED Overhead view

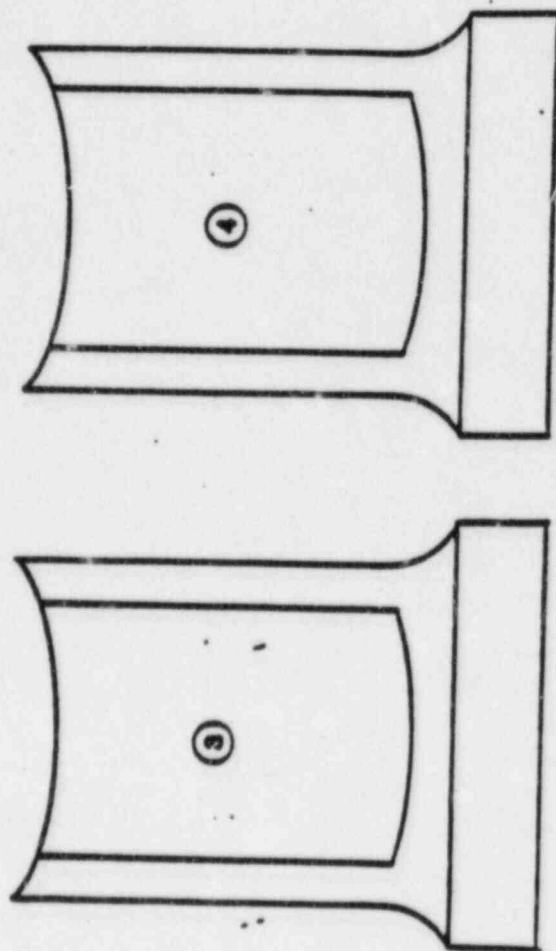
NON INNOVATION
EXAM IS SAT

11.6.8.4

DRF 2-13-84



Side views, looking out from inside

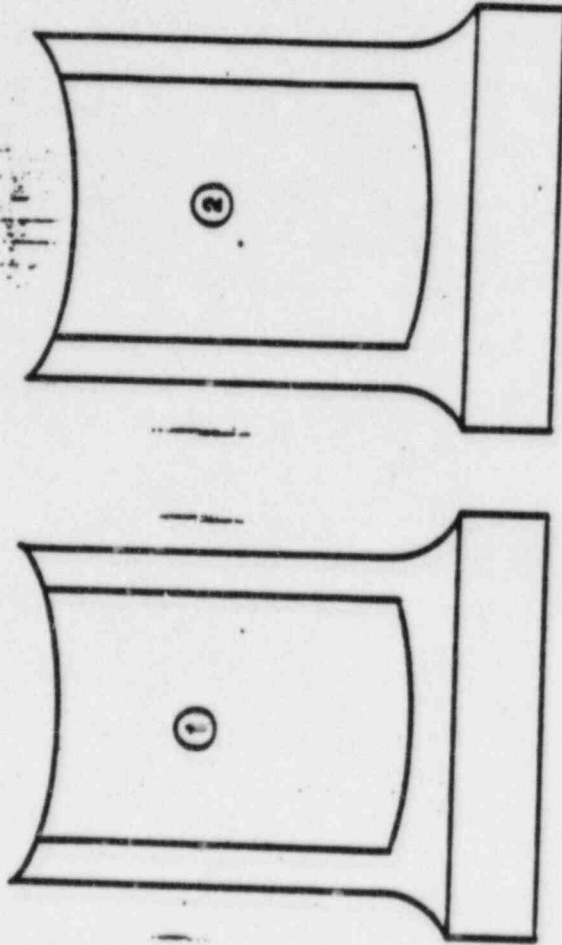


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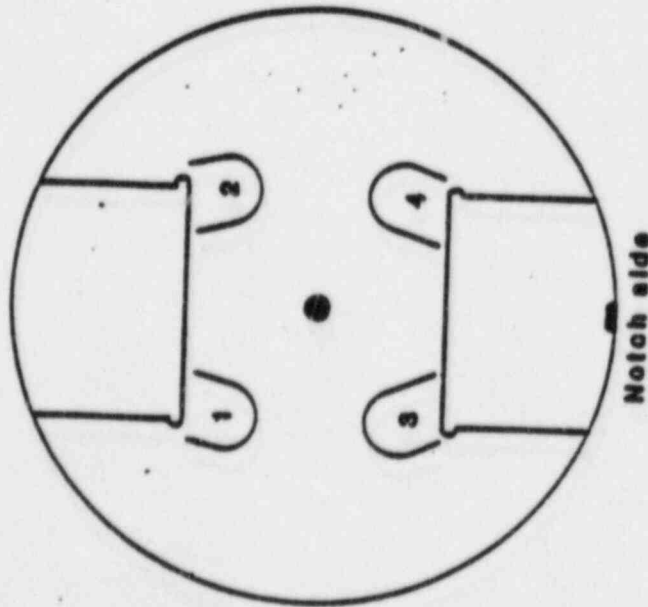
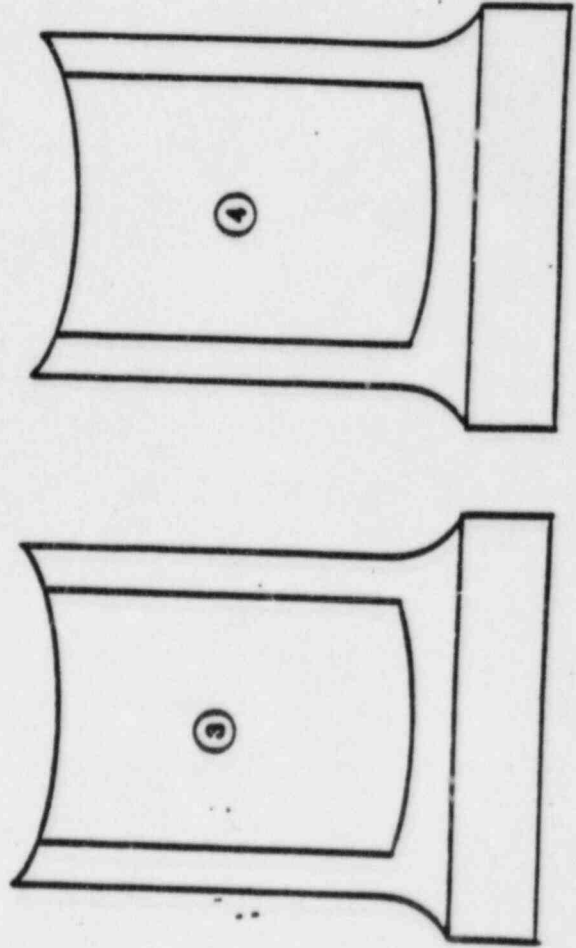
03-341A

Diesel engine # DC 102

Piston # 7



Side views, looking out from inside



Notch side

Overhead view

REMARK:
UNIDIRECTIONAL
FLAME IS SAT

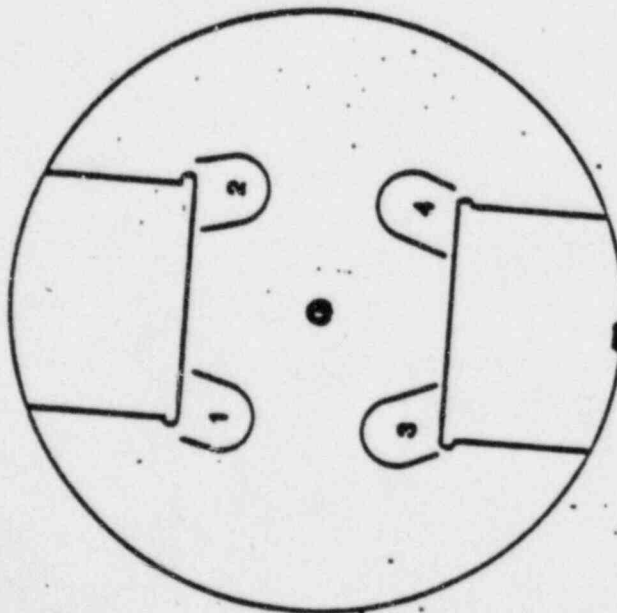
DDP 2-13-84

1-3-87

03-341A

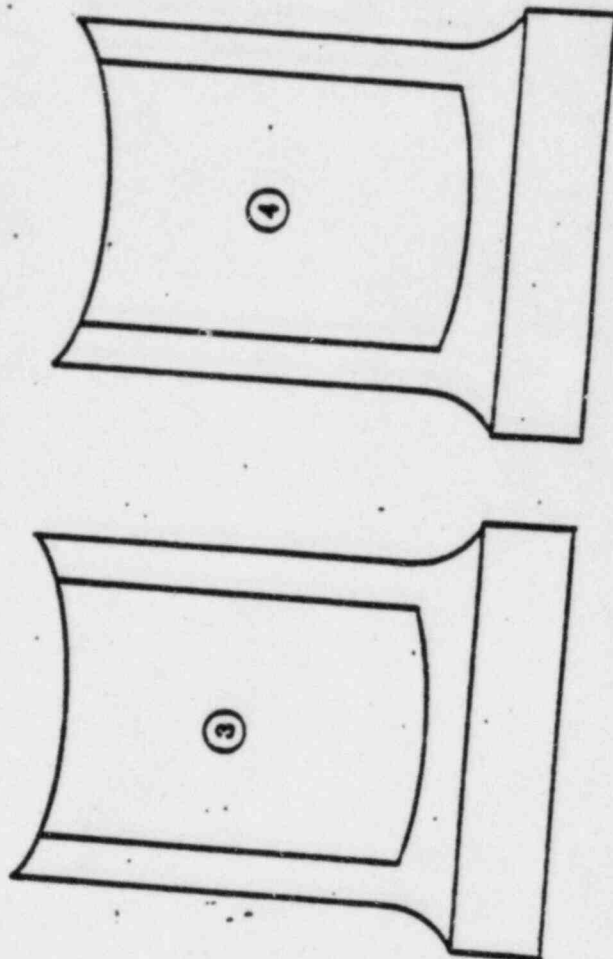
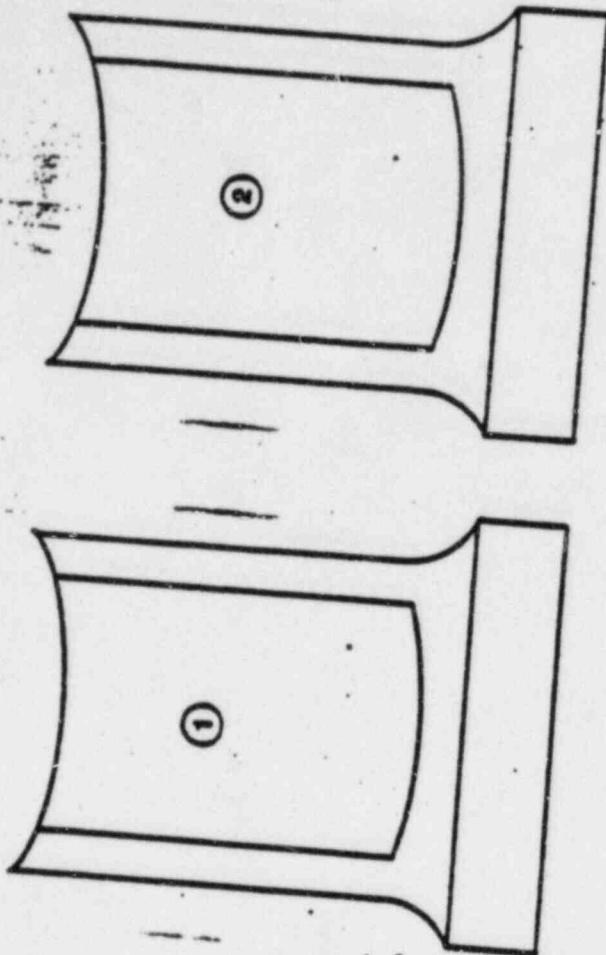
Diesel engine # DG 102

Piston # 5



Notch side

Side views, looking out from inside



Overhead view

RELMAT

NONDICTION

EXAM IS SAT

DDP 2-13-84

11.1.10

EDDY CURRENT CALIBRATION REPORT

Failure
Analysis
Associa

Job No. PAO 7396 Date 2-13-84 Report No. 03-341A
 Material Description NODALY CAST IRON PISTON SKIRTS
 Code or Specification NDE 115 Full On -1.5 Full Off +1.5
 Reference Standard PAO-C-1 Instrument MIZ 17 S/N 5123867

Freq. 2 MHz Gain 30 Instrument Volts/div 0.5 Phase 218
 Test Probe EMEA ECP-100-P-1 S/N ECP-100-P-1
 Reference Probe EMEA ECP-100-B-1 S/N ECP-100-B-1

CALIBRATION

4 units @ -15 L/O
3.5 units @ -1 L/O

3.2 units @ -6 L/O
2.6 units @ +1 L/O

Type N/A STRIP CHART RECORDER S/N N/A

Channel 1
 Sen N/A
 Position @ Null Point N/A
 Chart Speed N/A mm/sec

Channel 2
 Sen N/A
 Position @ Null Point N/A

Calibration Check

Time	Phase	Gain
<u>2:21 PM</u>	<u>217</u>	<u>30</u>
<u>2:25 PM</u>	<u>217</u>	<u>30</u>
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain
Time	Phase	Gain

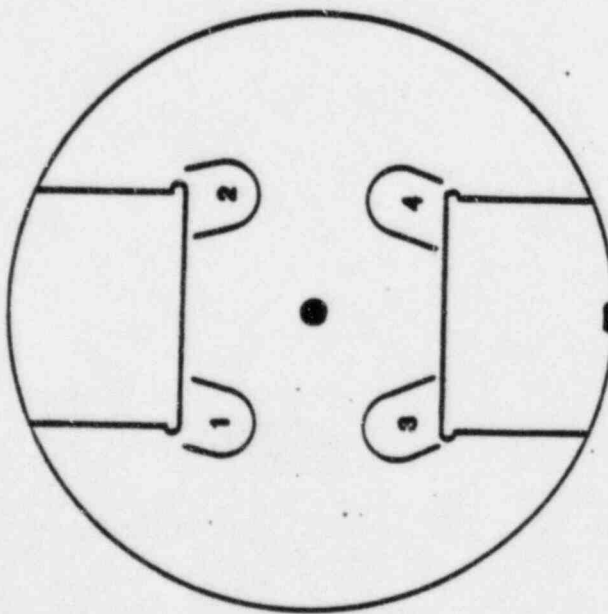
Examiner
R&D-KR-3Level II

Examiner

14 0539

Level

03-341A
 Diesel engine # DG 102
 Piston # 6



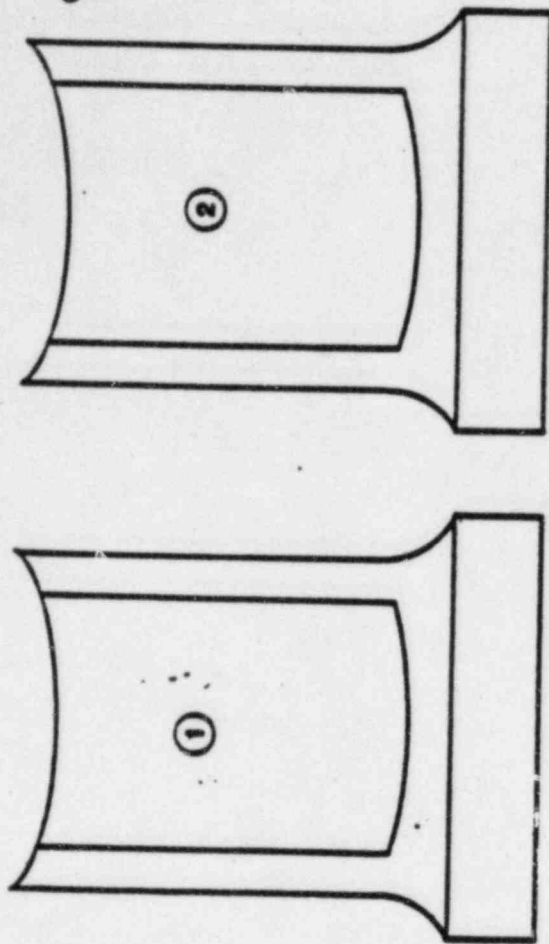
Notch side

Overhead view

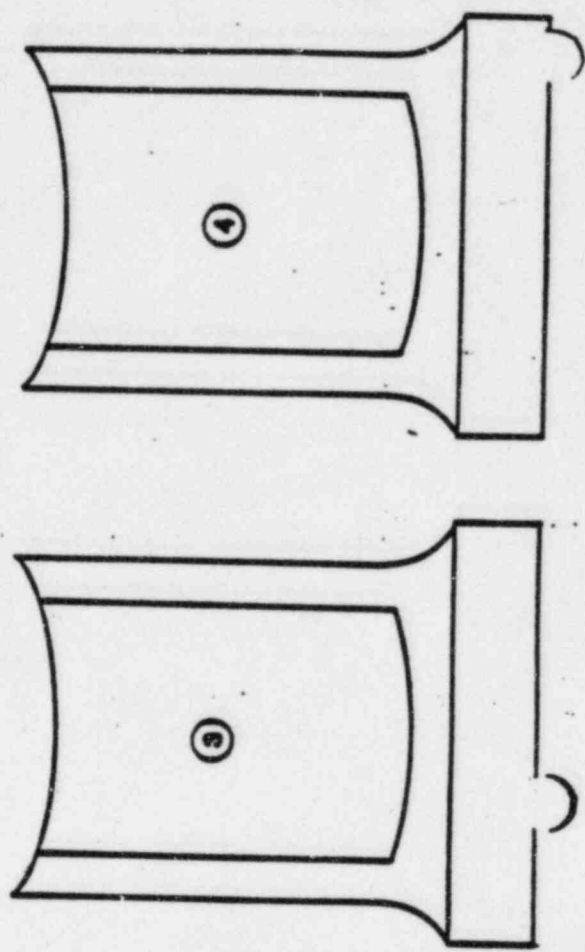
NO REFLAT INDICATIONS

Exam is SAT.

DDP 2-13-84



Side views, looking out from inside



OVERHEAD

Q-38

03-341A

(This inspection report is acceptable for
design review

K. John for C. Wells
Conversation 3/6/84

100502

EDG 103

[

INTEROFFICE CORRESPONDENCE

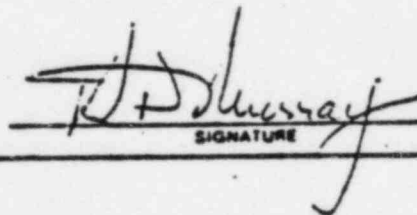
TO: DISTRIBUTION	LOCATION SNPS-1	SUBJECT / REFERENCE / J.O. NO. 11600.37 Component No. 03-341A
FROM: E. MURRAY	LOCATION QEG	TRANSMITTAL OF SAT I.R.'s

MESSAGE: —

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3-13-84

DATE



SIGNATURE

TELEPHONE

REPLY:

DIST. R. NAJUCH (IOC ONLY)
 G. ROGERS DRG W/ ATTACHMENTS

DATE

SIGNATURE

TELEPHONE

A 000 130

EDDY CURRENT CALIBRATION REPORT

Associa

Job No. 03341A Date 3-13-84 Report No. 840313-1
 Material Description NODULAR IRON PISTON SKIRTS
 Code or Specification NDE 11.5 Full On -1.5 Full Off +1.5
 Reference Standard ASME 9396-840227 Instrument M12 17 S/N 033833

Freq. 2 MHz Gain 30 Instrument Volts/div 0.5 Phase 202
 Test Probe EMA ECP100P S/N 100P
 Reference Probe EMA ECP100P S/N 100 P-1

CALIBRATION

2.2 units @ 0 L/O
2.0 units @ +1 L/O

1.8 units @ +1.5 L/O
1.6 units @ +2.0 L/O

STRIP CHART RECORDER

Type N/A S/N N/A

Channel 1

Sen N/A
 Position @ Null Point N/A
 Chart Speed N/A mm/sec

Channel 2

Sen N/A
 Position @ Null Point N/A

Calibration Check

Time <u>16:37</u>	Phase <u>202</u>	Gain <u>30</u>
Time <u>16:45</u>	Phase <u>202</u>	Gain <u>30</u>
Time <u>16:52</u>	Phase <u>202</u>	Gain <u>30</u>
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____
Time _____	Phase _____	Gain _____

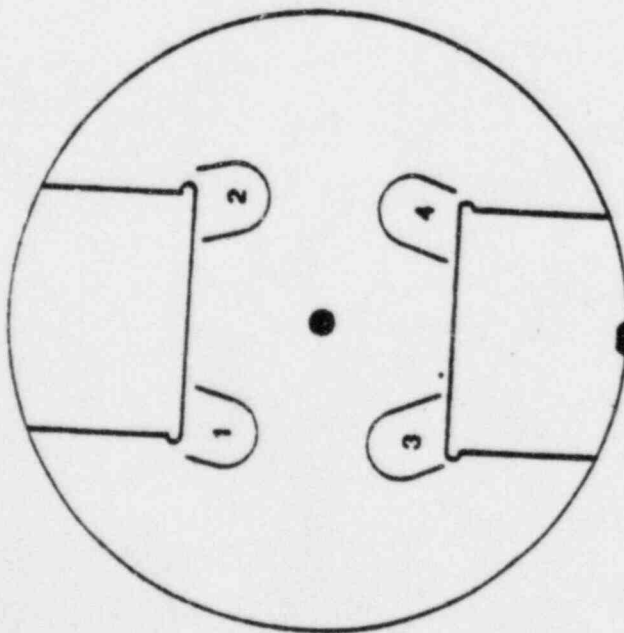
Examiner [Signature]
 R&D-KR-3

Level II Examiner _____

Level _____

Material MODULAR IRON PISTON SKIRT		Type: PISTON SKIRT		Fabricated process: <input type="checkbox"/> Welded <input checked="" type="checkbox"/> Cast <input type="checkbox"/> Worked		ET Component I.D. PISTON SKIRTS 00 06103 #5 #7 #8	
Cross section thickness:		Max. N/A Inch	Min. N/A Inch	Surface condition: <input checked="" type="checkbox"/> Machined <input type="checkbox"/> Ground <input type="checkbox"/> As fabricated <input type="checkbox"/> Other:		Geometry: <input type="checkbox"/> Pipe <input type="checkbox"/> Plate <input type="checkbox"/> Rod <input checked="" type="checkbox"/> Other: COUNTER BORE	
NDE Procedure no. 11.5		Job no. 03341A		Report no. 841313-1			
Test condition: Ver +1 VNT Hor 0		Unit 2.2 Unit at 0 Lo		Unit 2.0 Unit at +1 Lo			
Unit 033813 Sen 30 Frq 2MHz		Unit 1.8 Unit at +1.5 Lo		Unit 1.6 Unit at +2.0 Lo			
Full-on -1.5 Full-off +1.5							
Reference no. 100P-1 Probe type 100P							
Indication no.	Magnitude of indication	Length of indication	Remarks				
			NO RECORDABLE INDICATIONS				
Specific examination area							
SCAN AREA IN SIDE BEJULIE WASHER AREA, AROUND RADIUS.							
Sketch or other data (use other side)							
Acceptance criteria	Indication Greater than 50% of Reference Standard		Operator: DOU Johnson Level: IL Date: 3-22-81				
Attest	W. H. [Signature] Responsible certified personnel		Level IL Date 3-22-81				
Job name & no. PISTONS 03341A Plant/location DIESEL GENERATORS ELU, G3							

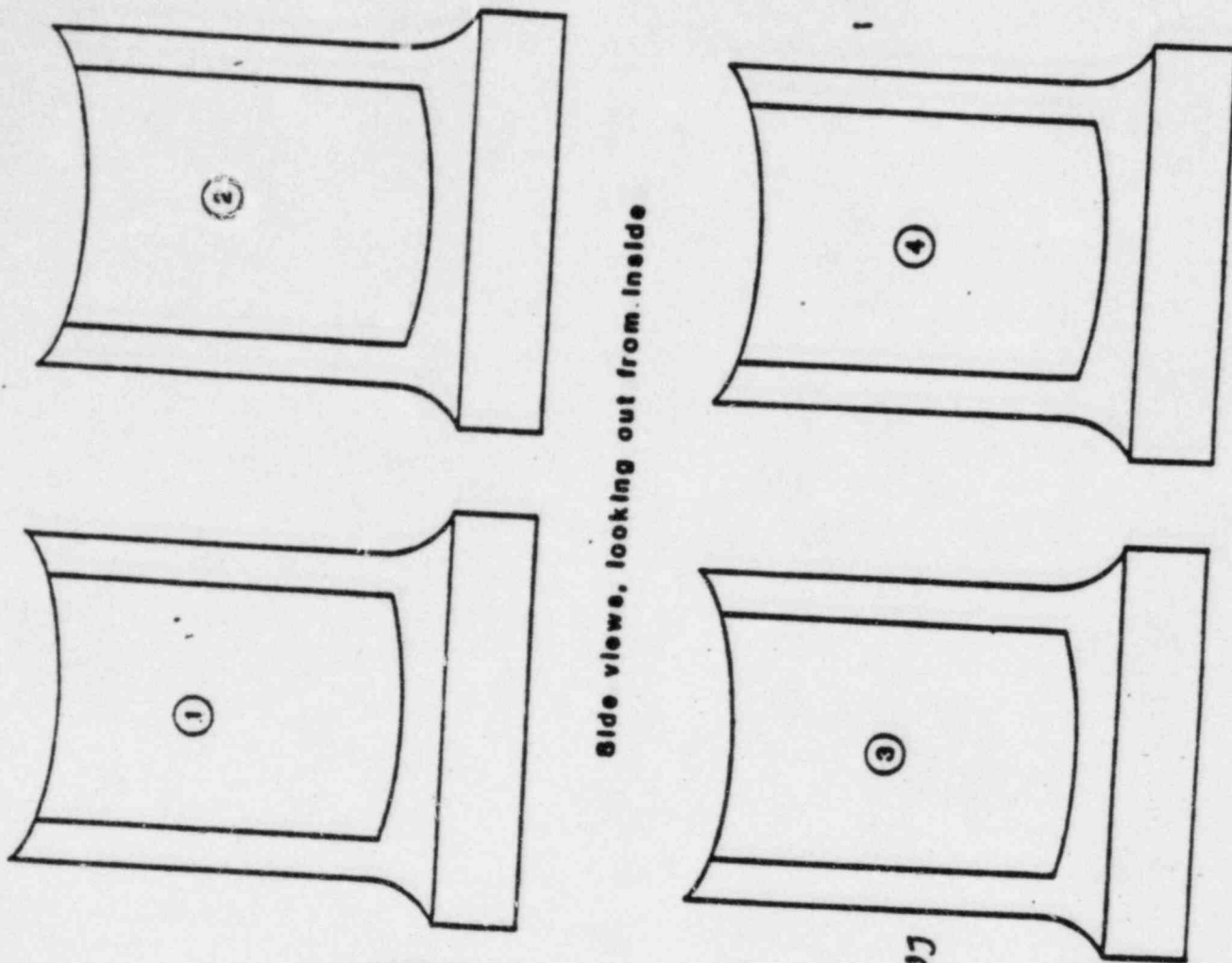
Diesel engine # 103
Piston # 5



Notch side

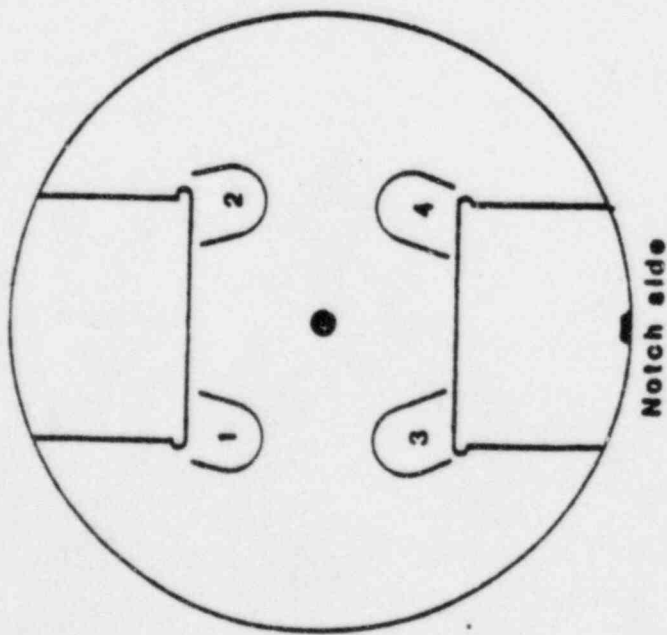
Overhead view

NO RELEVANT INDICATIONS



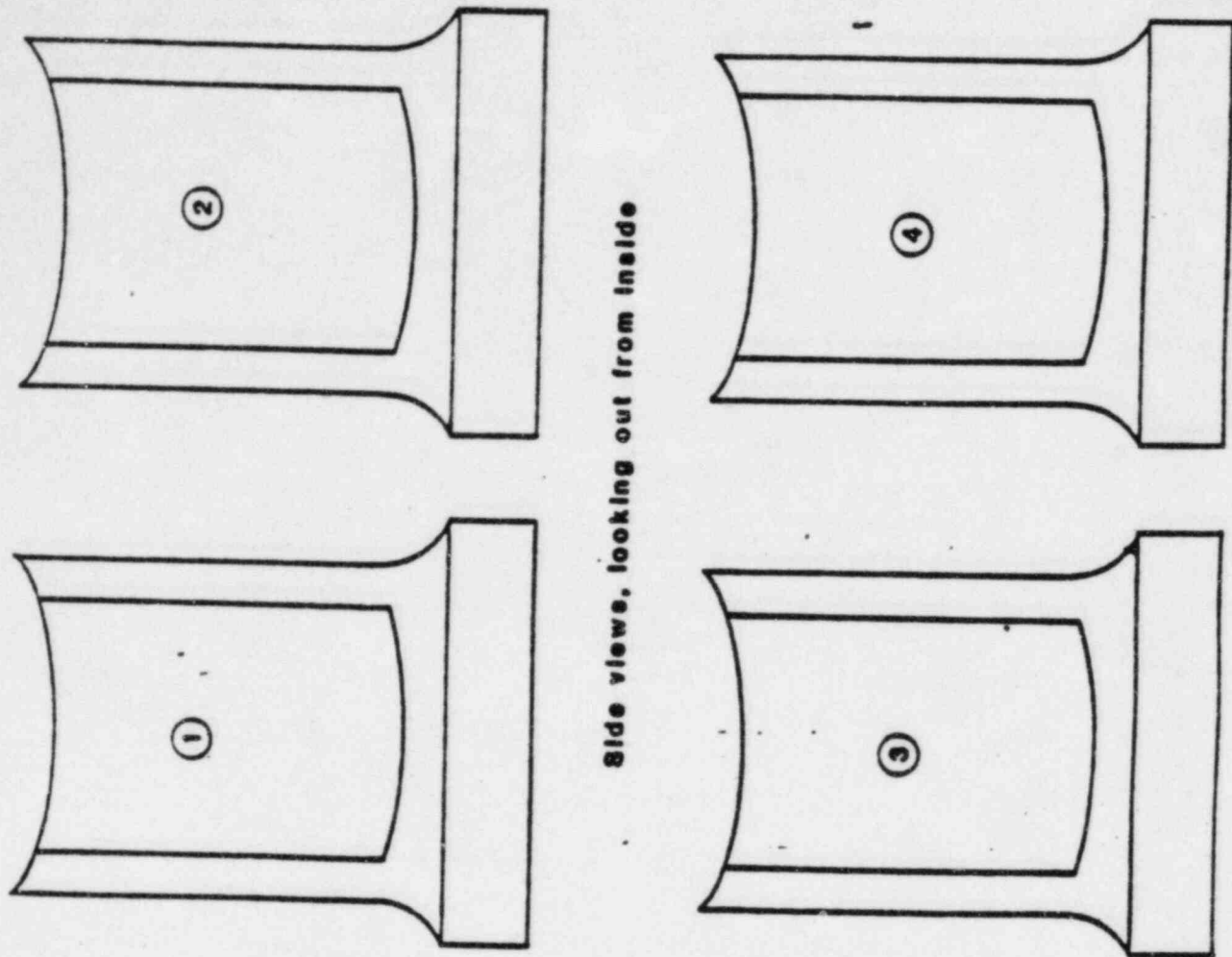
Side views, looking out from inside

Diesel engine # 103
Piston # 7

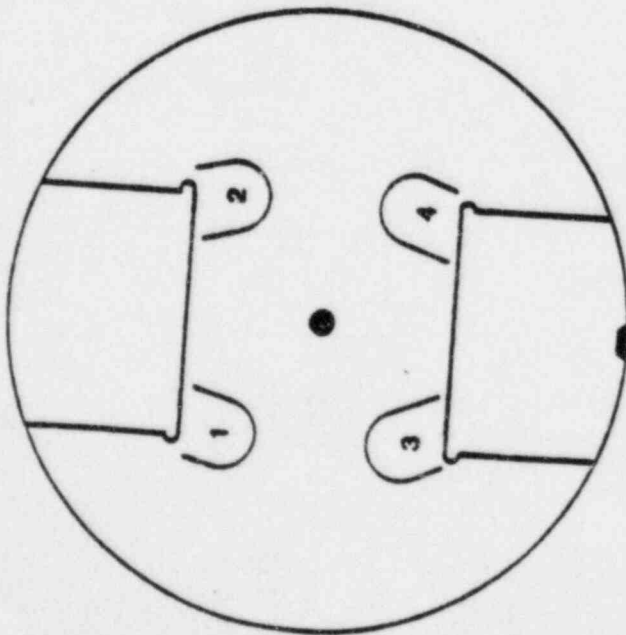


Overhead view

NO RELEVANT INDICATIONS



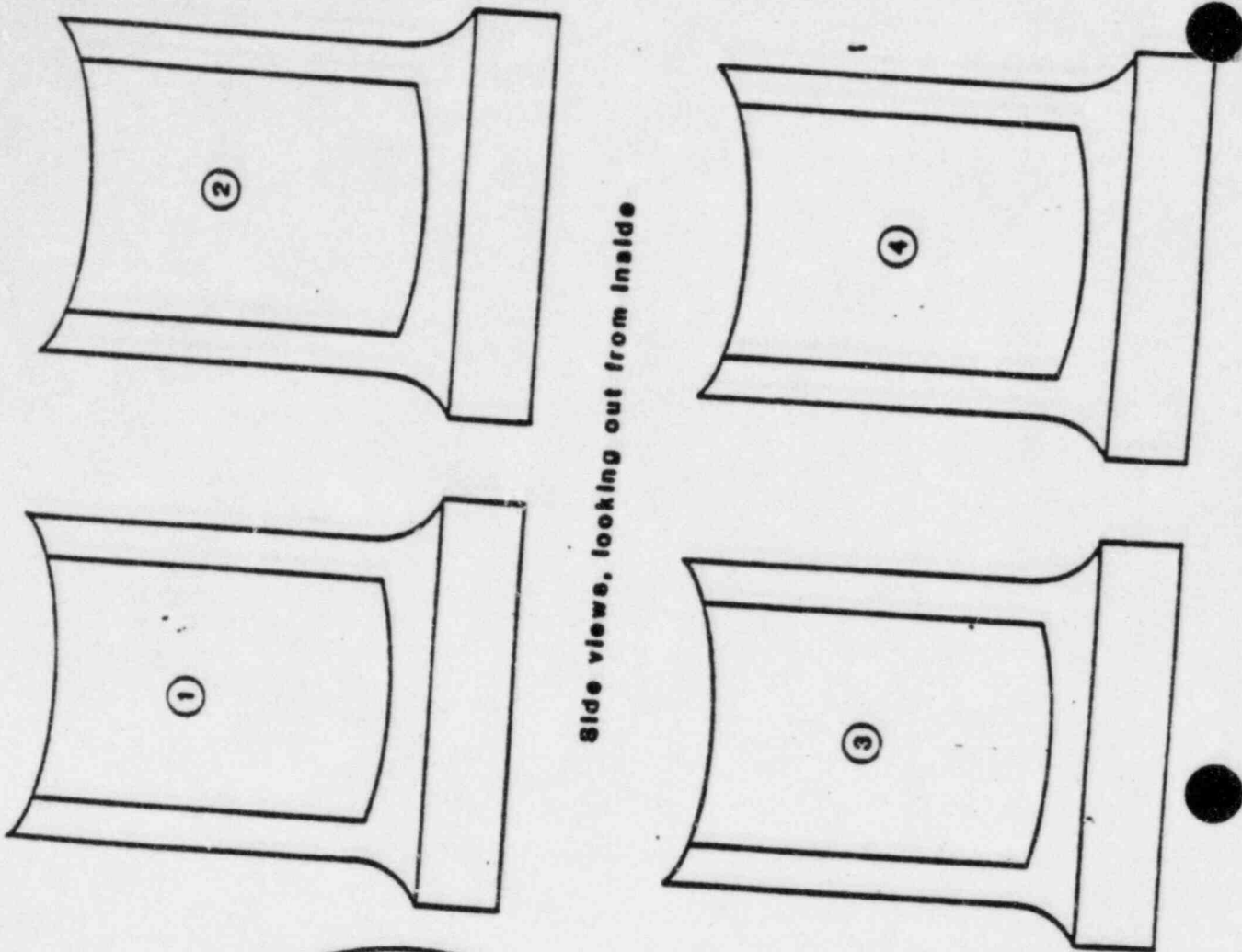
Diesel engine # 103
Piston # 8



Notch side

Overhead view

No RESURF INDICATIONS



Side views, looking out from inside

FaAA NDE Procedure

11.5, Rev. 0

Failure Analysis Associates

NONDESTRUCTIVE EXAMINATION PROCEDURE

Title: EDDY CURRENT INSPECTION PROCEDURE
FOR MODULAR PISTON SKIRTS

NDE: 11.5

Page 1 of 2

Revision: 0

Date: 11/02/83

Reviewed - NDE Level III: Duan O Johnson

Date: 11-18-83

1.0 Purpose and Scope

- 1.1 To establish calibration, scanning and evaluation techniques for eddy current examination of nodular iron piston-skirts.
- 1.2 This instruction covers the eddy-current examination of the boss areas near the 4-bolt-holes inside the piston skirt.

2.0 Personnel Certification

- 2.1 Personnel performing eddy-current examination shall be certified to SNT-TC-1A Level II.

3.0 Equipment

- 3.1 Eddy-current instrument used with this instruction shall be an impedance-plane display instrument.
- 3.2 The eddy-current test probe shall be a FaAA-ECP-100-P or FaAA-ECP-200-P.
 - 3.2.1 The reference crack standard shall be PAO-C-1.

4.0 Examination Surface

- 4.1 Only those surfaces that have a machined or ground finish shall be tested.

5.0 Calibration Procedure

- 5.1 Set frequency to 2 MHz for ECP-100P probe or to 500 KHz for ECP-200P probe.
- 5.2 Set volts per division at 0.5.
- 5.3 Set gain at 30.
- 5.4 Adjust vertical and horizontal positioning controls such that balance point is at (0v, 1v).

Failure Analysis Associates

P-27-27

NONDESTRUCTIVE EXAMINATION PROCEDURE

Title: EDDY CURRENT INSPECTION PROCEDURE

FOR MODULAR PISTON SKIRTS

NDE: 11.5

Page 2 of 2

Revision: 0

Date: 11/02/83

- 5.5 Balance with probe on test piece.
- 5.6 Adjust horizontal attenuator such that horizontal saturation is greater than 1.5v and less than -1.5v.
- 5.7 Adjust phase angle such that probe lift-off causes the beam to move horizontally to the right on the CRT.
- 5.8 Adjust gain such that the crack in reference standard PAO-C-1 gives a $2v \pm 0.2v$ negative signal at the horizontal center of the CRT.
- 5.9 Repeat steps 5.4 through 5.8 until items 5.4 through 5.8 are accomplished without further instrument adjustments.

6.0 Examination

- 6.1 Examination shall be of machined areas on the boss where color contrast penetrant show linear indications greater than 1/32 inch.

7.0 Recording Criteria

- 7.1 All indication showing a crack indication greater than 10% of the crack signal in the reference standard PAO-C-1 shall be recorded.
- 7.2 The length and orientation of the indication shall be recorded.

8.0 Records

- 8.1 The results of the examination shall be recorded on eddy current examination reports. All required entries shall be addressed. A "N/A" shall indicate when a response is not applicable.
- 8.2 All recorded signals shall be located by measurement from a specific point to center of probe.
- 8.3 All calibration data sheets and examination records shall be filed according to job number.

FaAA NDE Procedure

11.5, Rev. 1

Failure Analysis Associates

NONDESTRUCTIVE EXAMINATION PROCEDURE

Title: EDDY-CURRENT INSPECTION PROCEDURE

FOR MODULAR IRON PISTON-SKIRTS

NDE: 11.5

Page 1 of 3

Revision: 1

Date: 11/02/83

Date: 1/31/84

Date: 1/31/84

Approved by NDE Manager: Duane P. Johnson

Reviewed - NDE Level III: Duane P. Johnson

1.0 PURPOSE AND SCOPE

- 1.1 To establish calibration, scanning and evaluation techniques for eddy-current examination of nodular iron piston-skirts.
- 1.2 This instruction covers the eddy-current examination of the boss areas near the 4-bolt-holes inside the piston skirt.

2.0 PERSONNEL CERTIFICATION

- 2.1 Personnel performing eddy-current examination shall be at least a certified Level II Eddy-Current Inspector, as per "FaAA Practice for Certification and Qualification of NDT Personnel."

3.0 EQUIPMENT

- 3.1 Eddy-current instrument used with this instruction shall be an impedance-plane display instrument.
- 3.2 The eddy-current test probe shall be a FaAA-ECP-100-P.
- 3.2.1 The reference standard shall be PAQ-7396-831230.

4.0 EXAMINATION SURFACE

- 4.1 Only those surfaces that have a machined or ground finish shall be tested.

5.0 CALIBRATION PROCEDURE

- 5.1 Set frequency at 2.0 ± 0.2 MHz.
- 5.2 Set volts per division at 0.5.
- 5.3 Set gain at 30.
- 5.4 Adjust horizontal and vertical positioning controls such that balance point is at (0 V, 1 V).

Failure Analysis Associates

NONDESTRUCTIVE EXAMINATION PROCEDURE

Title: EDDY-CURRENT INSPECTION PROCEDURE

FOR MODULAR IRON PISTON-SKIRTS

NDE: 11.5

Page 2 of 3

Revision: 1

Date: 11/02/83

- 5.5 Balance with probe on test piece.
- 5.6 Adjust horizontal attenuator such that horizontal saturation is greater than 1.5 V and less than -1.5 V.
- 5.7 Adjust phase angle such that probe lift-off causes the beam to move horizontally to the right on the CRT.
- 5.8 Adjust gain such that the $1/16 \times 1/32$ inch EDM notch in reference standard PAO-7396-831230 gives a 1.0 ± 0.1 V negative signal at the horizontal center of the CRT.
- 5.9 Repeat steps 5.4 through 5.8 until steps are accomplished without further instrument adjustments.
- 5.10 Recalibration shall be completed at least once an hour.
- 5.11 Eddy-current instrument should be on at least 10 minutes before calibration or testing.

6.0 EXAMINATION

- 6.1 Examination shall be of the legs on the boss where color contrast penetrant show linear indications greater than $1/32$ inch length.

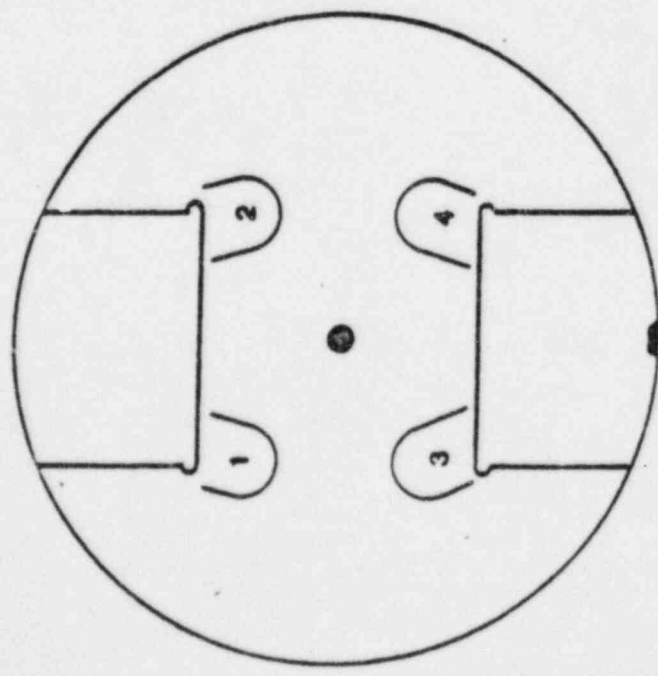
7.0 RECORDING CRITERIA

- 7.1 All eddy-current crack indications with signal magnitude greater than 50% of the signal magnitude obtained from the $1/16 \times 1/32$ inch EDM notch in the reference standard PAO-7396-831230 shall be recorded.
- 7.2 The magnitude, location and orientation of the indication shall be recorded.

8.0 RECORDS

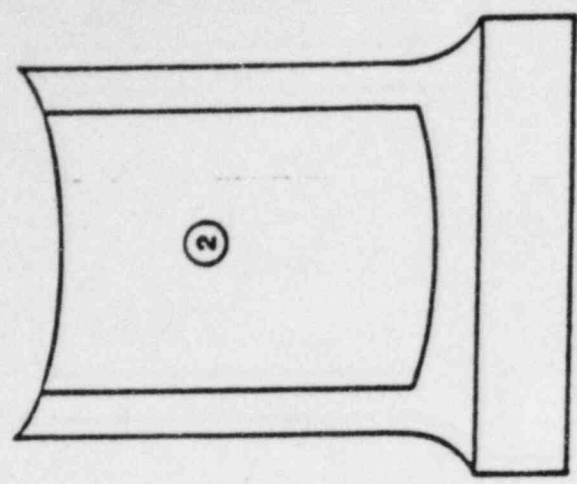
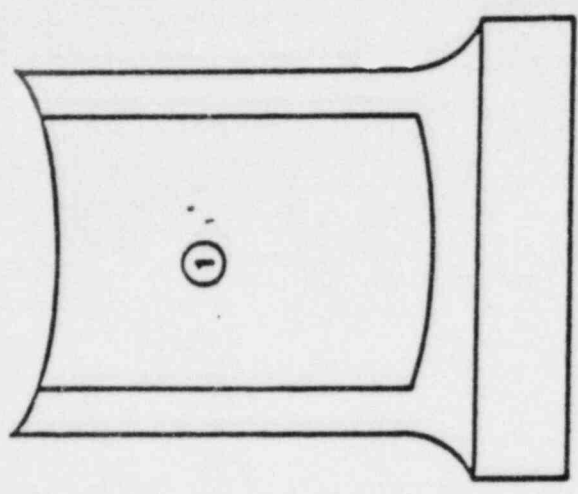
- 8.1 Set-up and calibration shall be recorded on report form 11.1.10.
- 8.2 All recordable indication shall be recorded on report form 11.5.8.4 (see next page).
- 8.3 All records shall be filed according to job number.

Diesel engine ☐ _____
Piston ☐ _____

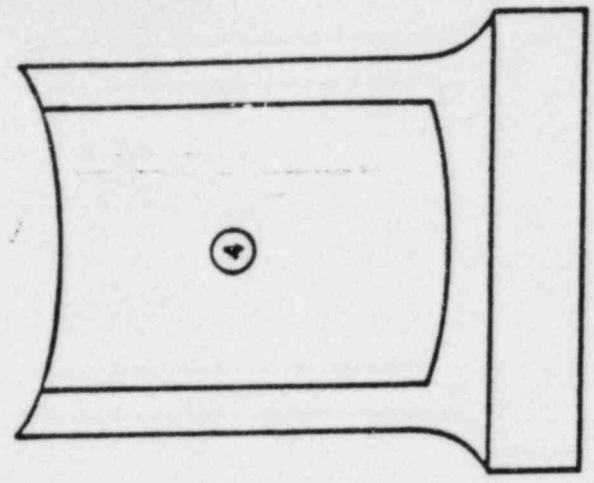
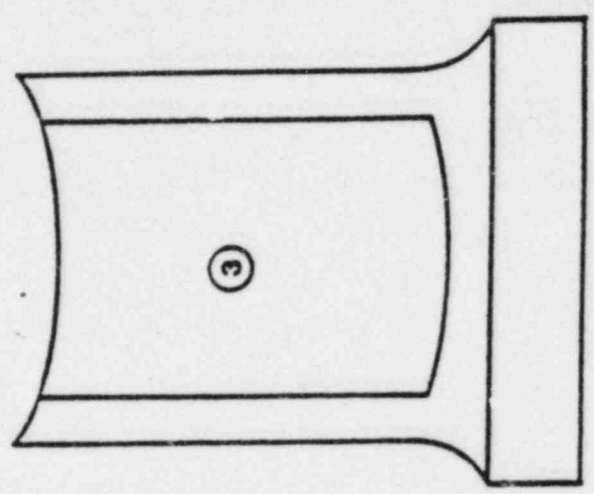


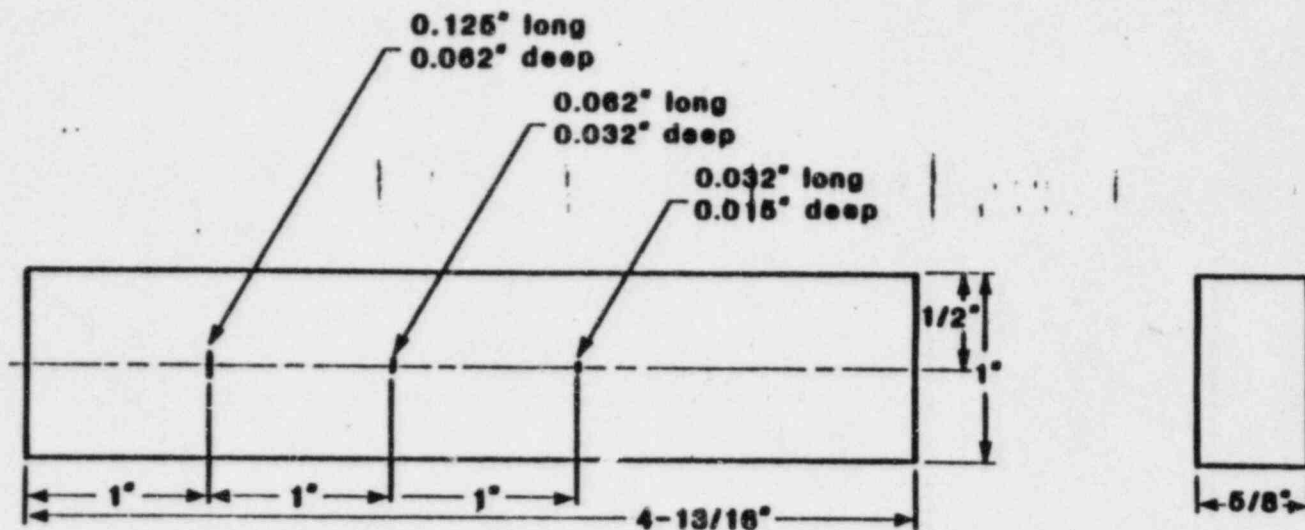
Notch side

Overhead view



Side views, looking out from inside





Slot width less than 0.005"

Fractions $\pm 1/64$ "

Chemical Analysis

Iron	92.568%
Carbon	3.46%
Silicon	2.43%
Other	1.542%

Note: Material from TDI piston skirt.

DESCRIPTION: Nodular Iron reference standard		Failure Analysis Associates 2225 East Bayshore Road P.O. Box 51470 Palo Alto, California 94303				
PA0-7396-831230	EDM on machine surface					
TOLERANCES UNLESS OTHERWISE SPECIFIED	DRAWN	CHECKED	APP'D	DATE	CASE	DWG.
X.XX - \pm	<i>ESK</i>	<i>[Signature]</i>	<i>[Signature]</i>	1-3-84	PA07396	831230
X.XXX - ± 0.002 "						