

1 **Q. Project C-14: Upgrade Work – Cat Arm**

2 With reference to Section 3.2.2 - “Vendor Recommendations” of the Report at Tab
3 6, Vol. II, please provide any details of the cost of refurbishment of the servomotors
4 provided by the O.E.M.

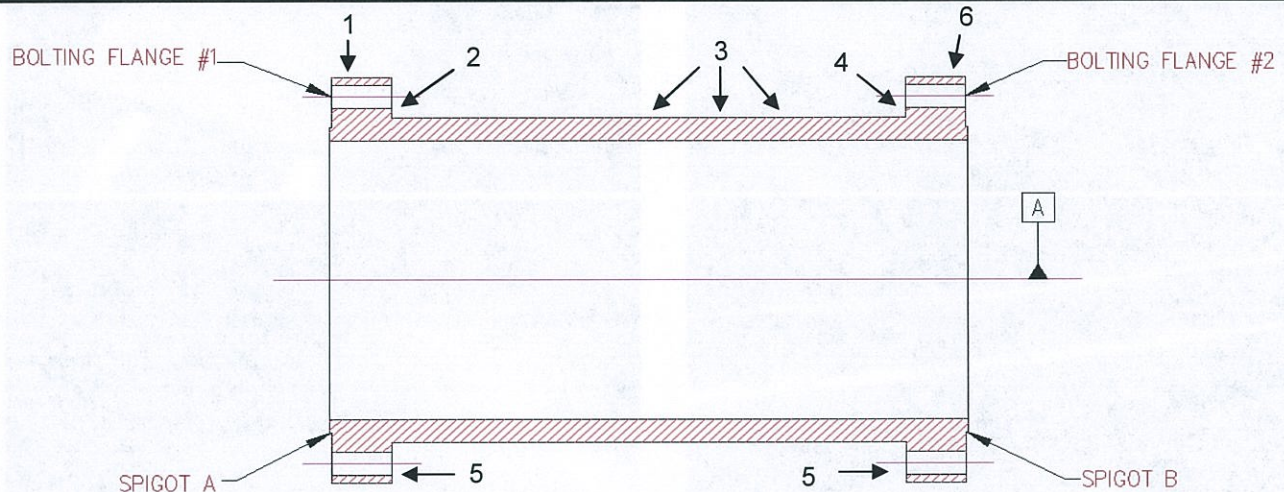
5

6

7 **A.** In July of 2014, the failed servomotor was sent for an assessment to determine the
8 refurbishment cost. The cost of a new servomotor was also requested. The
9 fabrication company began the cost estimate of refurbishing the servomotor and
10 based on the partial assessment (see attachment – Partial Assessment), the cost of
11 the refurbishment was estimated to be more than the replacement option and this
12 was communicated verbally to Hydro. It was then decided to stop the assessment
13 at that time due to the refurbishment option being more costly. Therefore, a full
14 assessment of the old servomotor was not complete and the total refurbishment
15 cost was not explored, however it was confirmed by the fabrication company to be
16 more than the replacement option.

FAB 3R**Rapport d'inspection /
Inspection report**

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Cylinder #1 (big diameter) (oil side)Index: item: Type rapport / report: Visual at receivingDessin/Dwg: 1262-001Rev.: 0

1- 3 punch marks, scratches and dents all around the flange, up to .010" deep.

LEAVE AS IS

2- Rust and blackened welded joint all around flange.

" "

3- Scratches and marks all around & 1" wide machined surface by .010" deep for run out purposes.

LEAVE AS IS

4- Lightly rusted diameter and blackened welded joint all around.

" "

5- Lightly damaged holes on back of both flanges.

" "

6- 2 punch marks, scratches and dents all around flange up to .010" deep. (Punch marks are inline on both end)

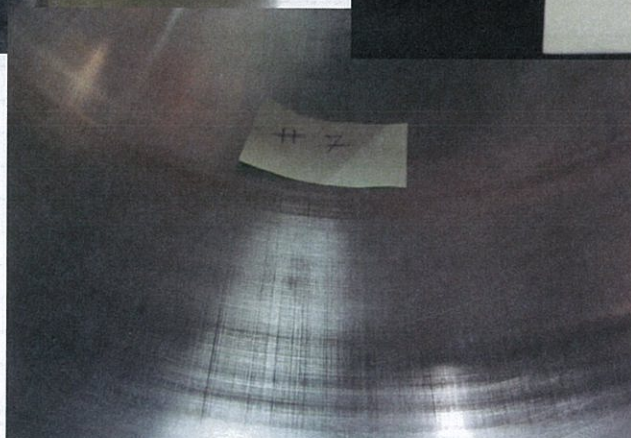
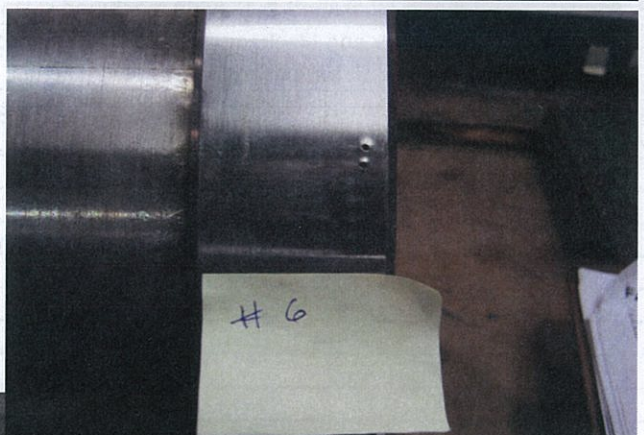
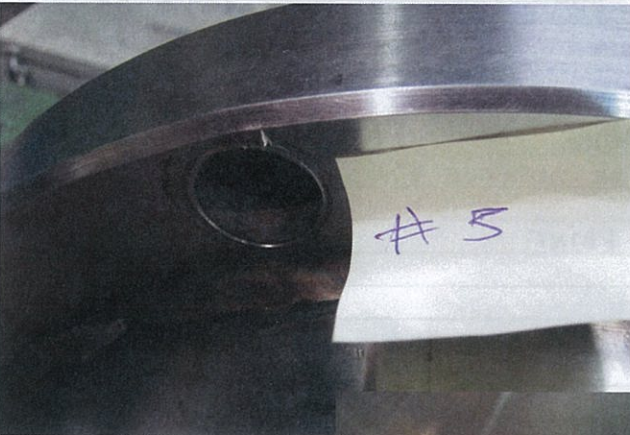
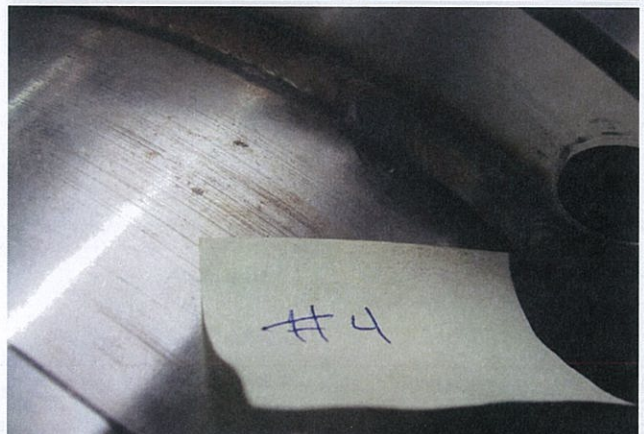
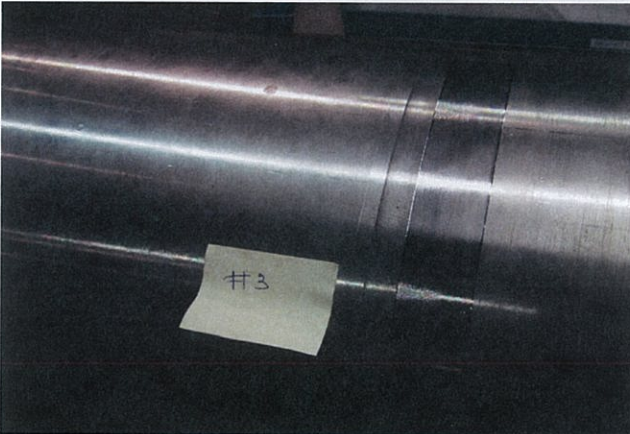
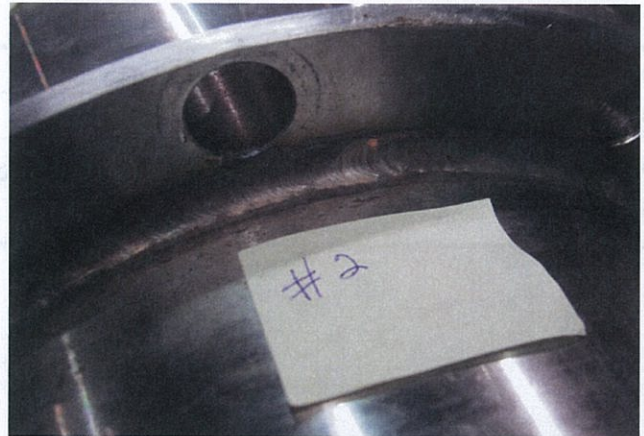
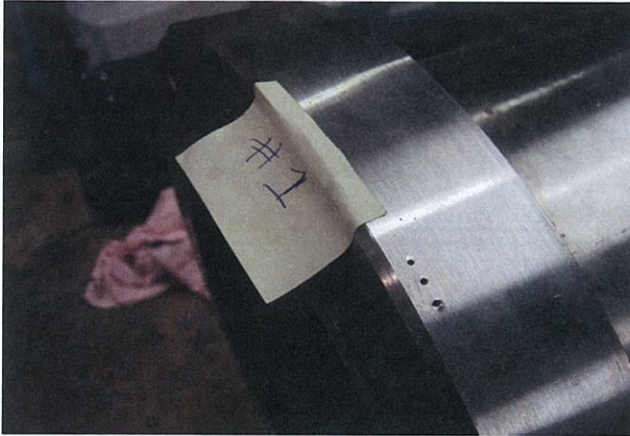
LEAVE AS IS

7- Light scratches all around the inside diameter, no depth.

HONE THE CYLINDER TO RESTORE
THE SURFACE FINISH TO N6- SAND BLAST AND PAINT.

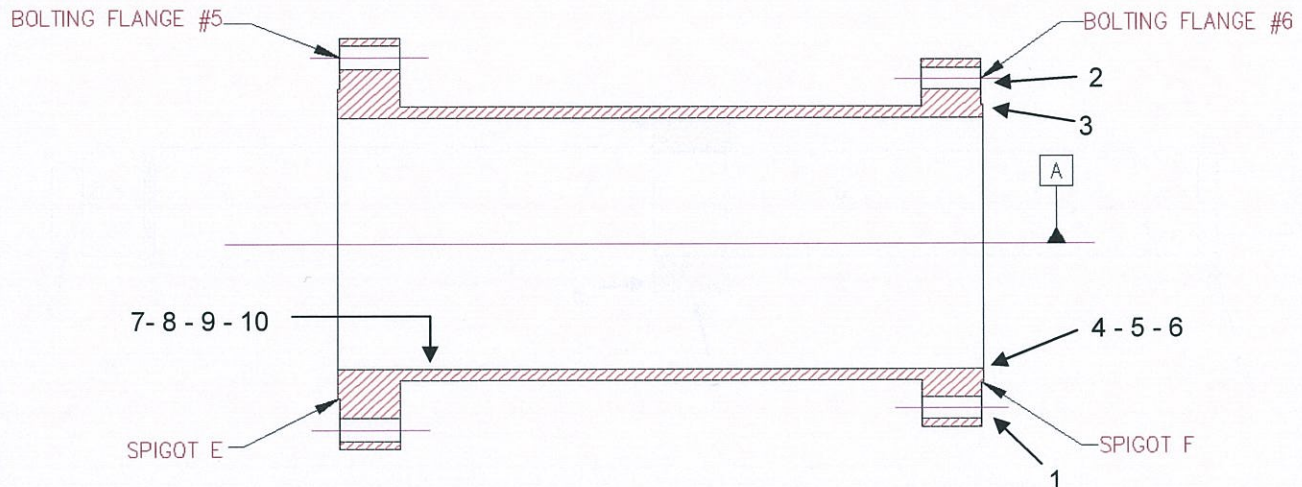
Inspecté par/Inspected by:

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FAB 3R**Rapport d'inspection /
Inspection report**

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Cylinder #2 (small diameter) (WATER SIDE)Index: item: Type rapport / report: Visual at receivingDessin/Dwg: 1262-002Rev.: 0

1- Bump on bolting flange #6 about 1/4" long x .003" height.

2- Bump on bolting flange #6 about 3/8" long x .010" height.

3- Puck on bolting flange #6, 3/4" x 1/8" x .010" deep.

4- 5- 6- Pucks on spigot F, up to 3/16" x 3/32" x .005" deep.

7- 8- 9- 10- Heavy wear on inside diameter at 4 places spaced by 90° on 80% of the length.

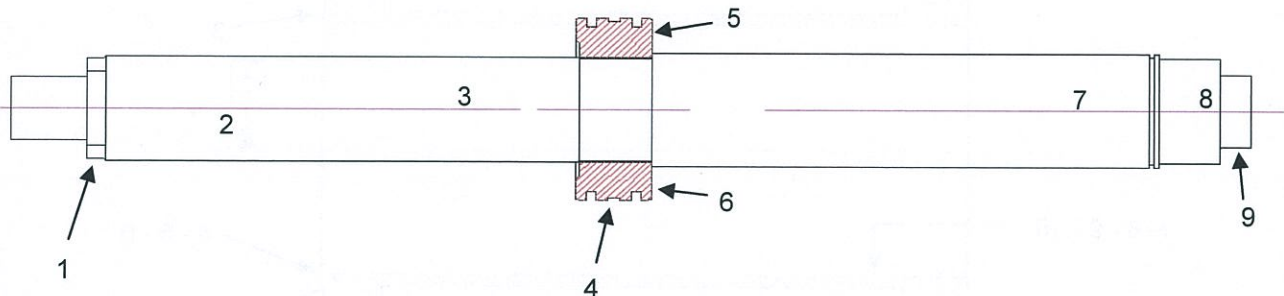
REPLACE CYLINDER BY A NEW CYLINDER MADE
OF STAINLESS STEEL.

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Inspection report**

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Piston RodIndex: item: Type rapport / report: Visual at receivingDessin/Dwg: 1262-003 & 1262-004Rev.: 01- Damaged flat 5/8" long x .030" deep. SLIGHTLY GRIND TO REMOVE BURRS.2- 6 hollow spots up to .003" deep x Ø .040". LEAVE AS IS3- Linear scratches all around 17" long up to .001" deep. POLISH TO RESTORE NO SURFACE FINISH

4- Damaged outside diameter on piston up to .180" deep 4 places : 0° - 90° - 180° - 270°.

5- 2 holes Ø 3/8", 180° appart.

6- 1 holes Ø .080" x .040" deepé

} MAKE NEW PISTON
MADE OF STAINLESS

7- Black marks and scratches, no depth.

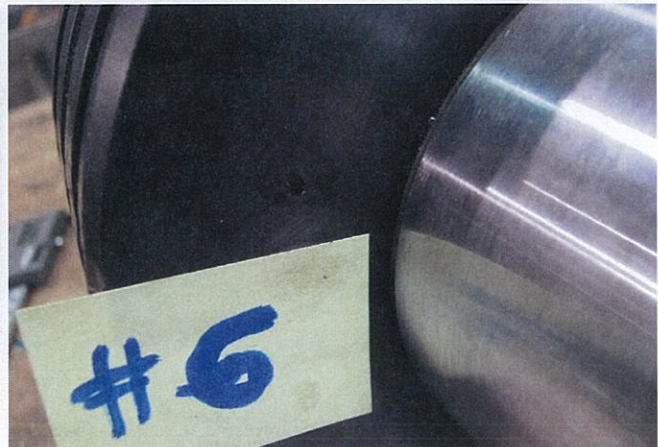
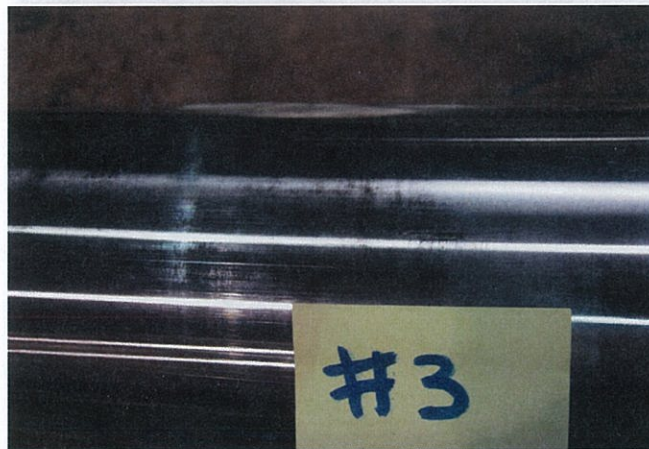
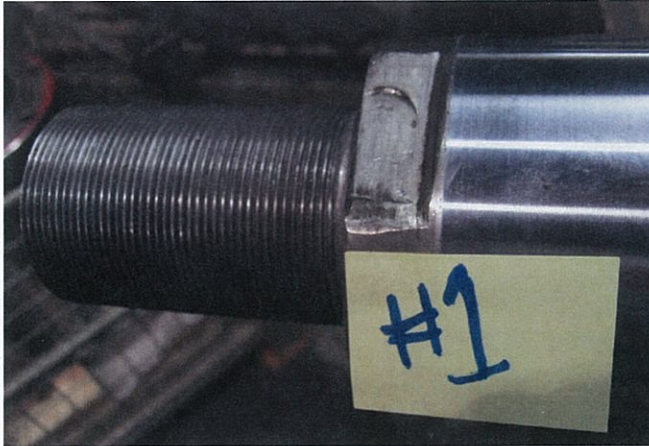
LEAVE AS ISSTEEL.8- 3/4" long threads used to lock piston on rear end. REFRESH USING A DIE9- Scratches and marks all around the diameter, up to .005" deep. LEAVE AS IS10- Damaged seal. REPLACE BY A NEW SEAL

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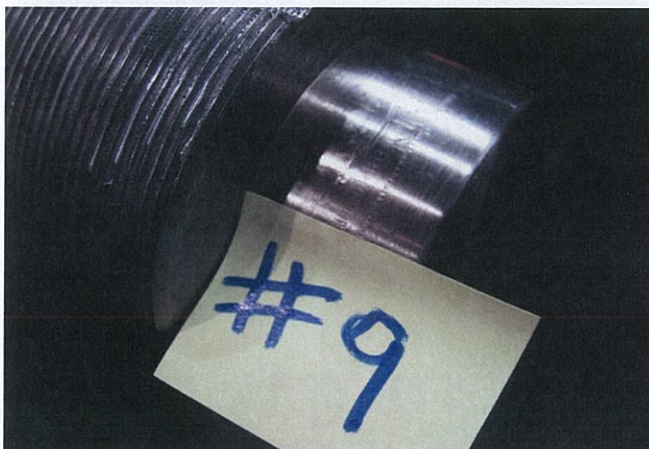
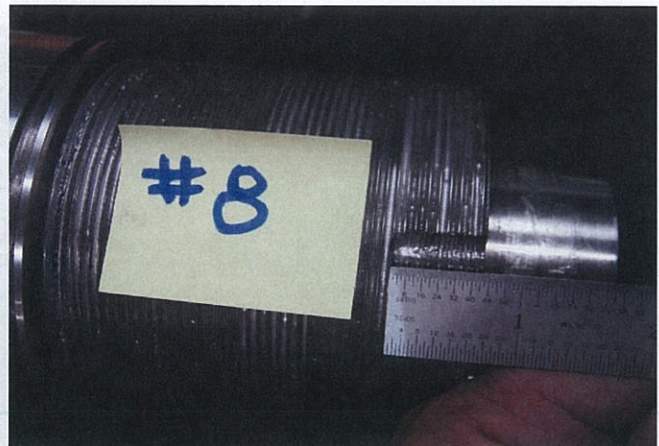
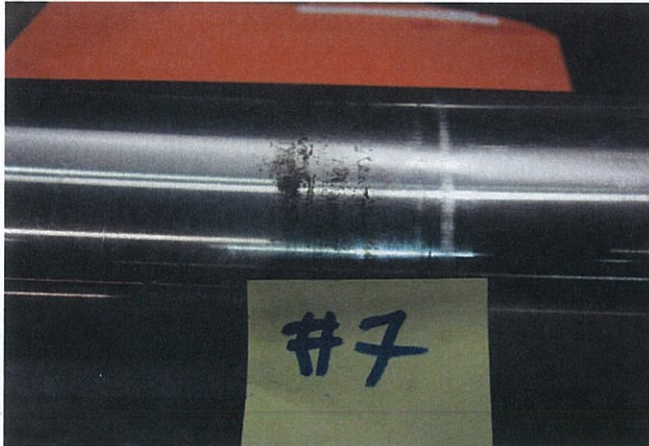
FAB 3R

**Rapport d'inspection /
Inspection report**



FAB 3R

**Rapport d'inspection /
Inspection report**



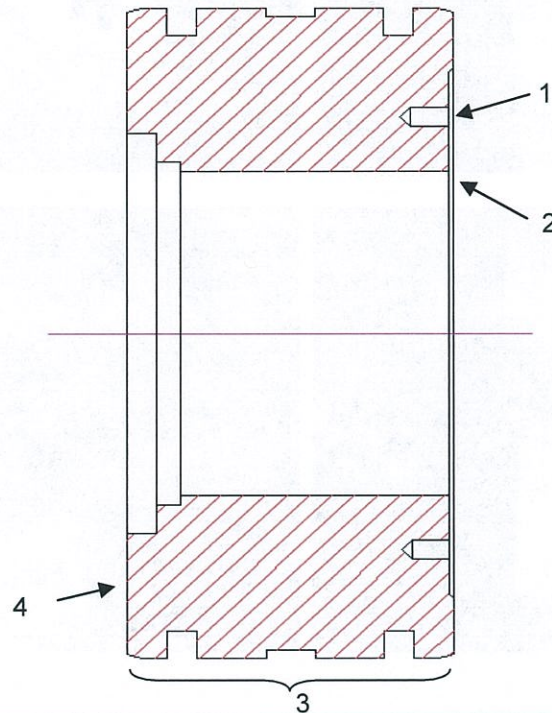
**Rapport d'inspection /
Inspection report**

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Piston #1

Index: _____

item: _____

Type rapport / report: Visual at receivingDessin/Dwg: 1262-004Rev.: 01- One $\varnothing 3/8$ " damaged hole.

LEAVE AS IS

2- 3/4" long locking threads for piston rear end.

LEAVE AS IS

3- Rust all around the diameter.

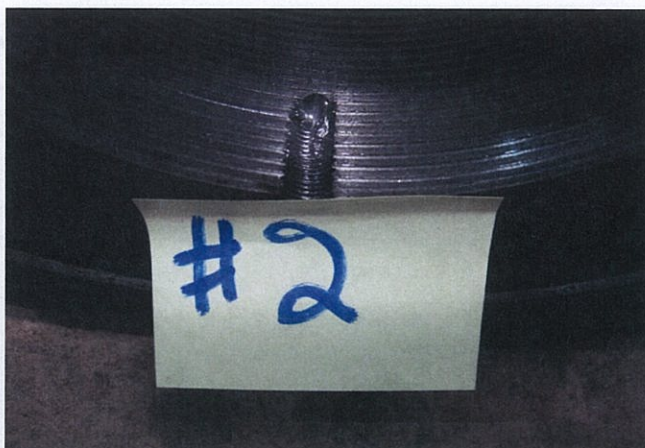
CLEAN UP USING STEEL WIRE BRUSH AND SOLVENT WITH RAG

4- Rust and minor scratches all over face. Scratches are up to .002" deep.

LEAVE AS IS

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Inspection report**

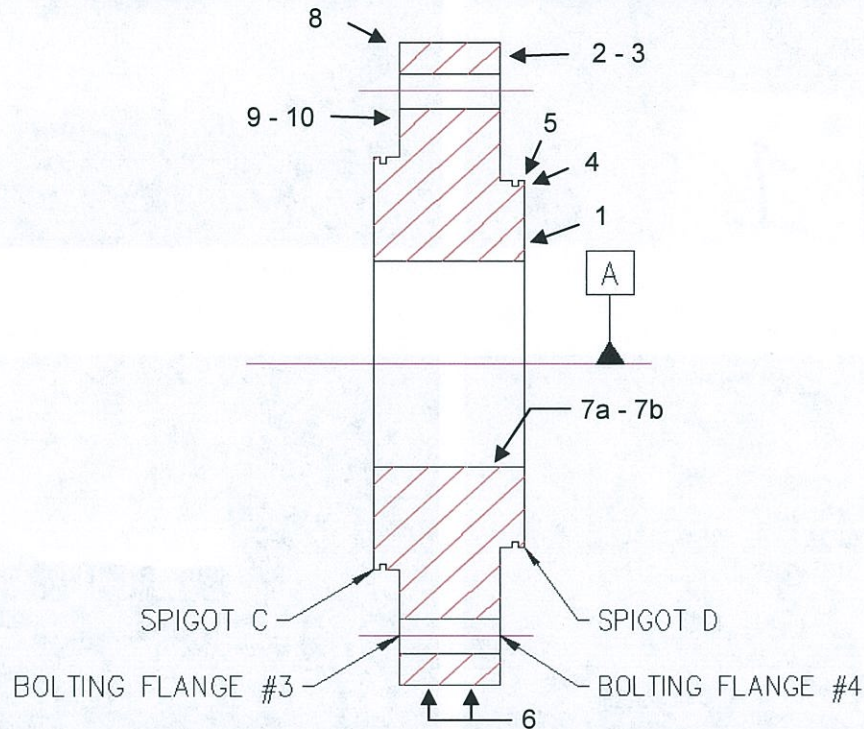
FAB 3R**Rapport d'inspection /
Inspection report**

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Intermediate flange

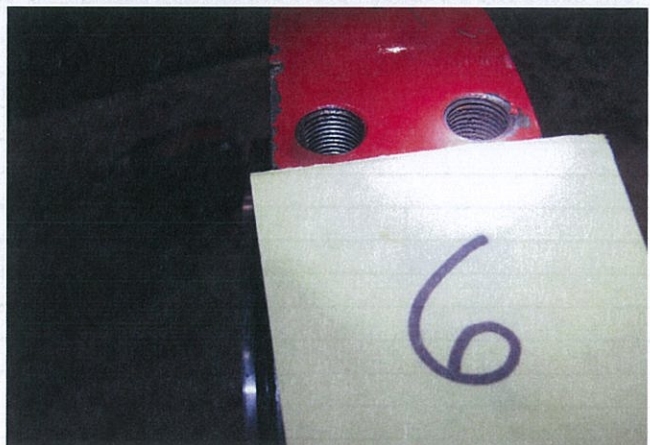
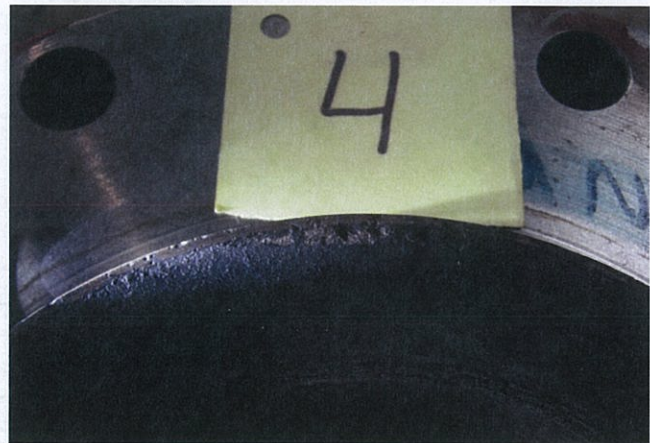
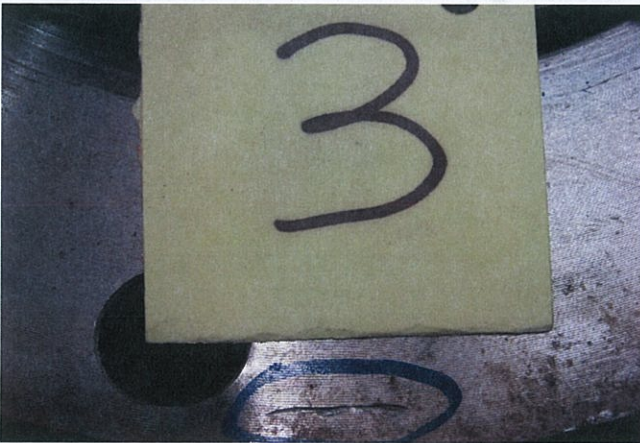
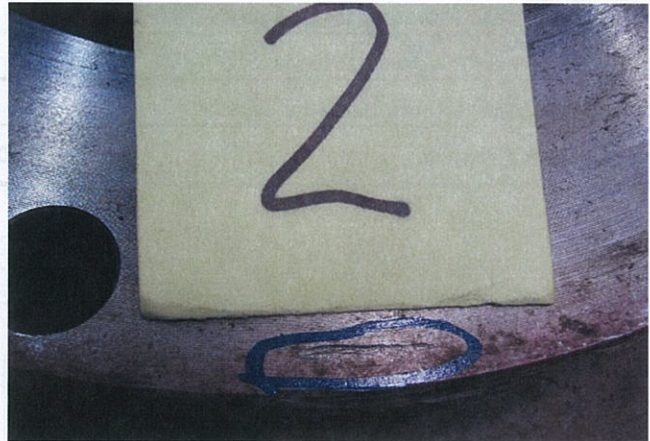
Index: _____

item: _____

Type rapport / report: Visual at receivingDessin/Dwg: 1262-004Rev.: 01- Dirt on this side & wear about $\varnothing 5 \frac{1}{2}$ " x $\frac{3}{16}$ " width x .015" deep. **LIGHT SANDING TO REMOVE BURRS ONLY.**2 & 3- Scratches about $\frac{3}{4}$ " x $\frac{1}{16}$ " x .010" deep. **LIGHT SANDING TO REMOVE BURRS ONLY.**4- Pits up to $\frac{1}{4}$ " x $\frac{3}{16}$ " x .020" deep. **REBUILD SPIGOT WITH STAINLESS STEEL WELDING MAT'L**5- Puck on spigot "D" about .020" deep. **AND REMACHINE TO ORIGINAL DIAMETER. DO A NEW 'O' RING GROOVE.**6- One of the two threaded holes have dirt and rust in. **→ REFRESH WITH A TAP**7a & 7b - Good condition of inside diameter. **→ OK**8- Grinder marks up to $\frac{1}{32}$ " deep. **GRIND SMOOTH TO REMOVE BURRS**9 & 10- Many light scratches and tool marks up to .002" deep. **LIGHT SANDING TO REMOVE BURRS ONLY**Good condition of spigot "C". **→ OK**

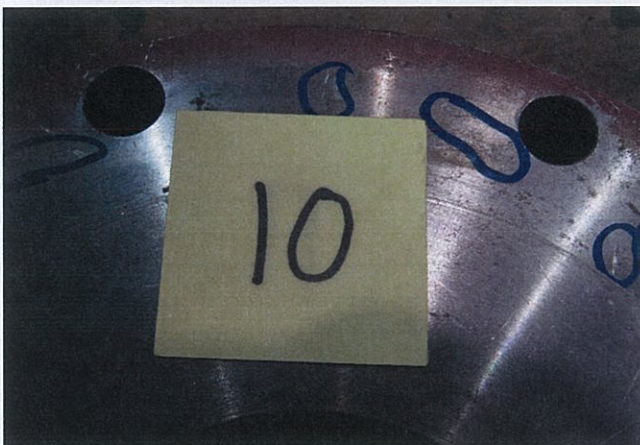
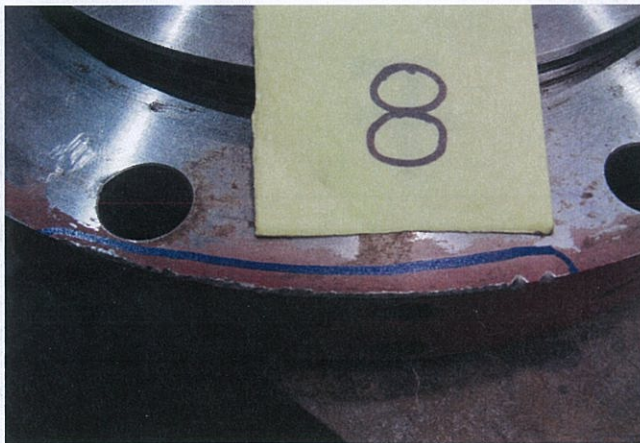
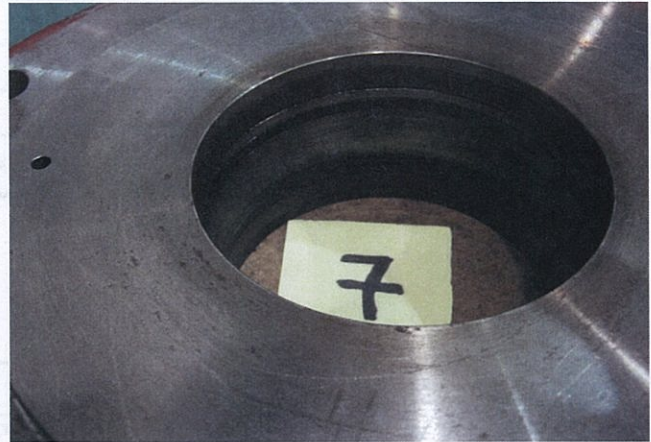
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Inspection report**

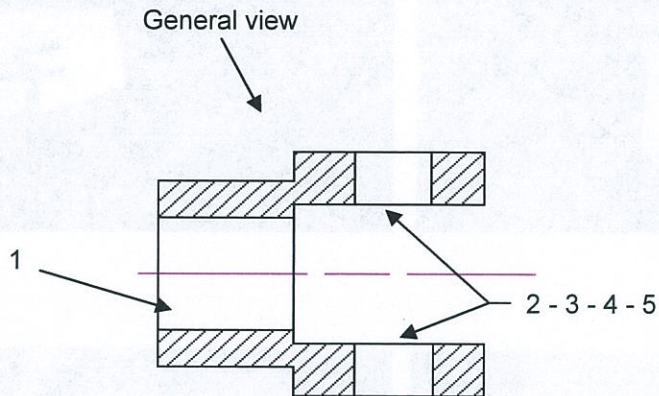


Rapport d'inspection / Inspection report

Contrôle qualité/
Quality control

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807 Rapport / Report # : RC 3.0
Client/Customer: Andritz Hydro Ltée # Contrat/contract: 1262 Qtée/Qty: 1
Produit/Product: Yoke Index: item:
Type rapport / report: Visual at receiving Dessin/Dwg: 1-745-28-002 Rev.:



1- Good condition of threads → OK.

2 - 3 - 4 - 5 - Rust inside diameter. → LEAVE AS IS.

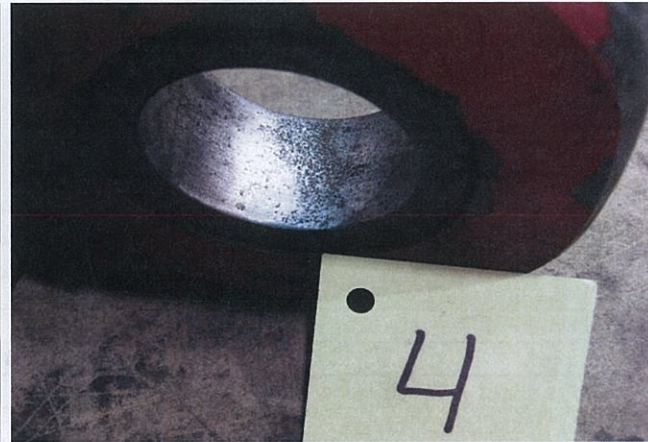
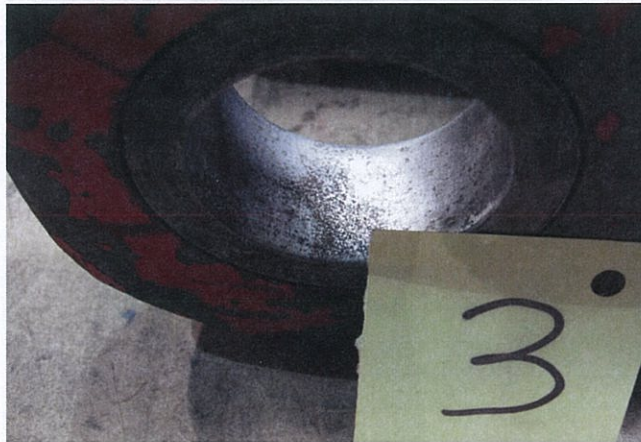
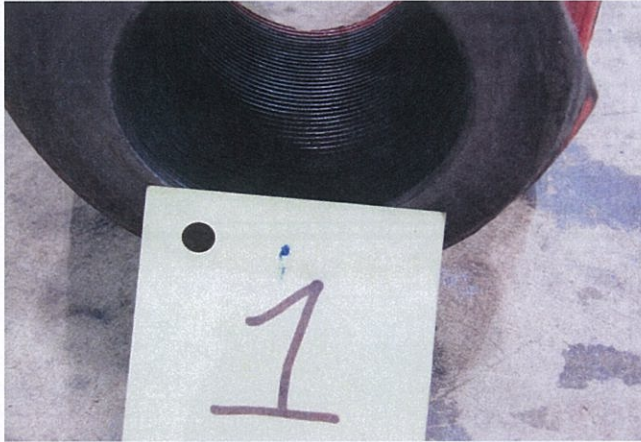
General view : Paint peeling → SAND BLAST AND PAINT

Inspecté par/Inspected by:



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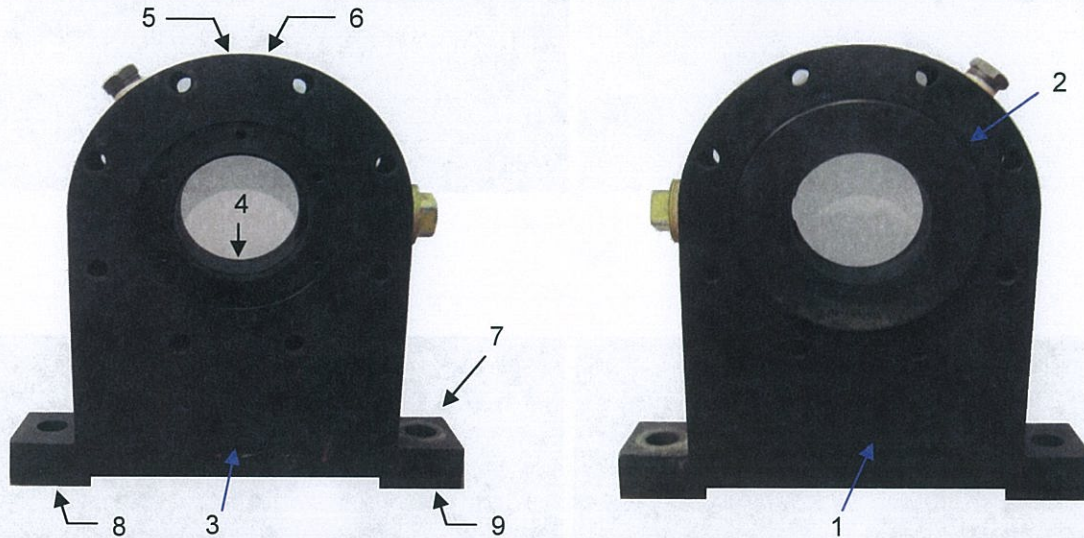
FAB 3R**Rapport d'inspection /
Inspection report**

Rapport d'inspection / Inspection report

Contrôle qualité/
Quality control

Rev.:

Projet / Project : Servomotor - CAT ARM - PO4501166807 Rapport / Report # : RC 3.0
Client/Customer: Andritz Hydro Ltée # Contrat/contract: 1262 Qtée/Qty: 1
Produit/Product: Front Head Index: item:
Type rapport / report: Visual at receiving Dessin/Dwg: 1-745-28-002 Rev.:



- 1- Good condition of all surface of this side.
- 2- Good condition of o-ring and groove.
- 3- Good condition of all surface of this side.
- 4- Good condition of inside diameter.
- 5- Punch mark.
- 6- Many pits about .002" deep on 2" x 1" area.
- 7- Puck 1/4" x 1/4" x 1/8" deep.
- 8 - 9 - Good condition of face.
- Good condition of all holes and threaded holes.

LEAVE AS IS

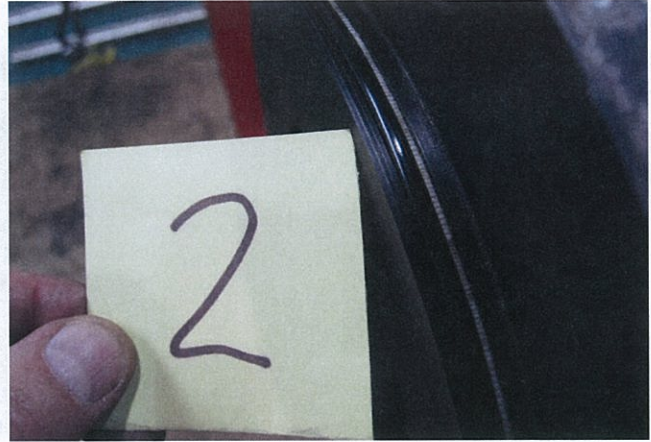
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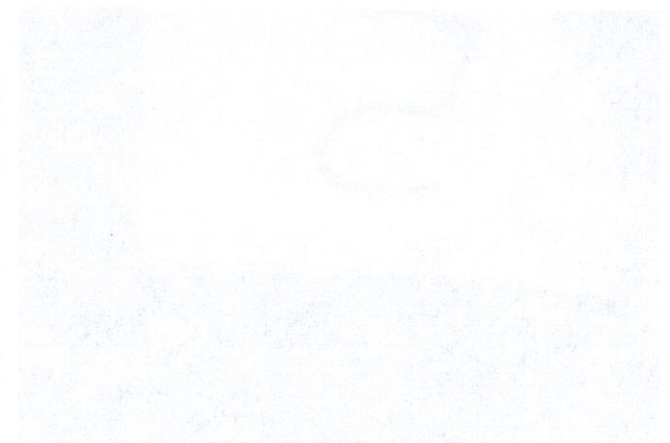
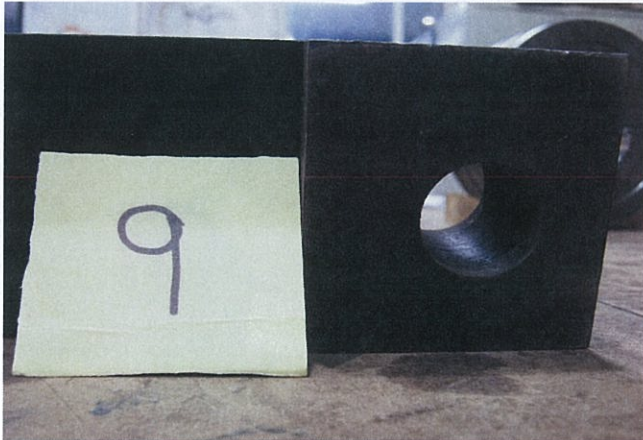
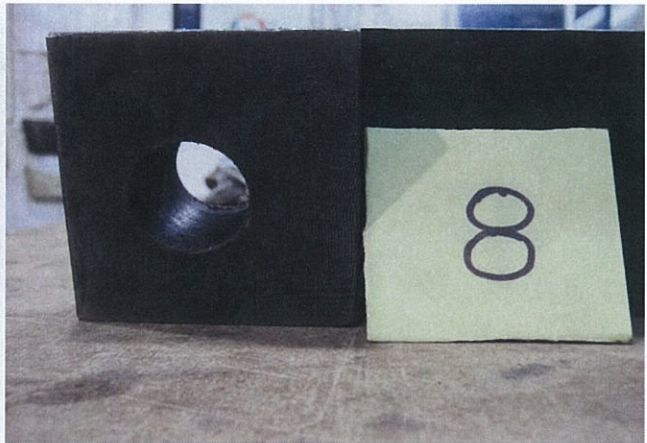
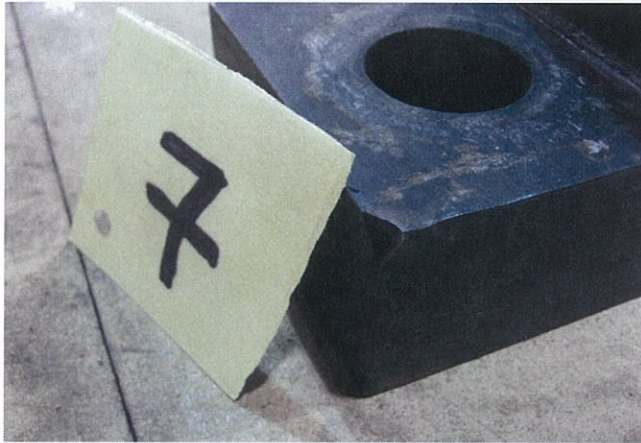


Team Mac

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Inspection report**

Rev.:

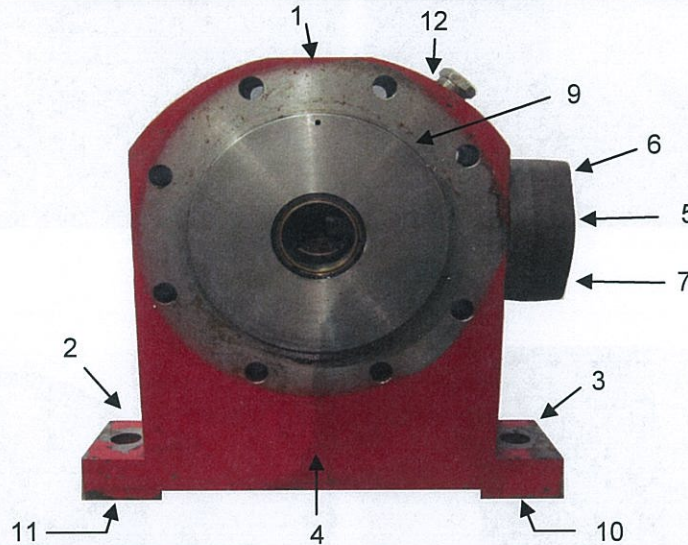
Projet / Project : Servomotor - CAT ARM - PO4501166807Rapport / Report # : RC 3.0Client/Customer: Andritz Hydro Ltée# Contrat/contract: 1262Qtée/Qty: 1Produit/Product: Rear Head

Index: _____

item: _____

Type rapport / report: Visual at receivingDessin/Dwg: 1-745-28-002

Rev.: _____



1- Punch mark

LEAVE AS IS

2 - 3 - Paint peeling

SAND BLAST AND PAINT

4- Good condition of face.

5- Good condition of inside diameter.

6- Light rust on face.

LIGHT SANDING TO CLEAN SURFACE

7- Dirt in threads.

→ REFRESH USING A TAP

8- Good condition of inside diameter.

→ OK.

9- Good condition of the o-ring and groove.

→ OK. REPLACE "O" RING ONLY

10 - 11- Good condition of face.

→ OK.

12- Dirt in NPT threads and on thread of plug.

→ REFRESH THREADS USING A TAP

Good condition of all holes.

→ OK.

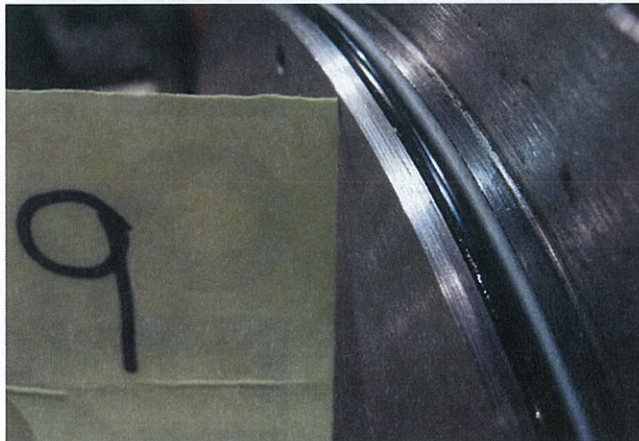
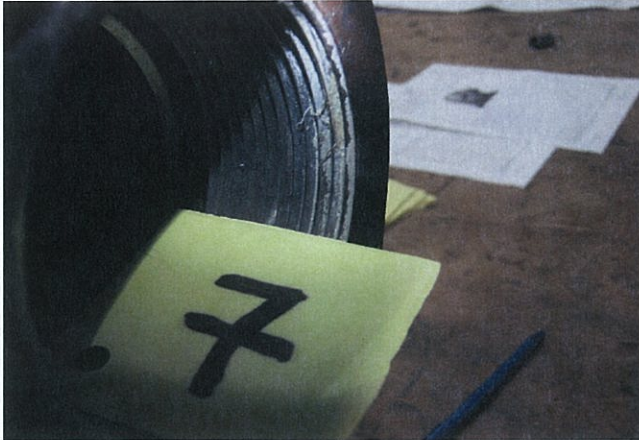
Inspecté par/Inspected by:

François MacLellanDate: July 17, 2014Page 8 de 8



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**Rapport d'inspection /
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