

INSPECTION REPORT

DATE: September 12, 2017

TO: Mr. Nicholas Cook, City of Deer Park

CC: Ms. Kathy, Kilsby, Northstar

FROM: Alex Rokhsaz

SUBJECT: Vertical Turbine Pump (1-Stage, RPM: 1800, S/N: 52481-1-1, 12 DKM, VOLTS: 230/460, MODEL: BF34)

We have disassembled and inspected the subject unit. The following is an outline summary of our findings and recommended scope of repairs (see attached photos):

DESCRIPTION	FINDINGS	RECOMMENDED SCOPE OF REPAIRS
SUCTION BOWL ASSEMBLY	<ul style="list-style-type: none"> The shaft bushing is worn. The case wear ring surface is worn and corroded. 	<ul style="list-style-type: none"> Fabricate new bronze bushing. Install the new bushing and machine to final sizes. Skim cut and true-up the wear ring surface. Setup and cleanup threaded sections.
SERIES BOWL ASSEMBLIES	<ul style="list-style-type: none"> The bowl fit is within acceptable tolerances. The shaft bushings are worn. 	<ul style="list-style-type: none"> Face and true-up the landing face. Fabricate new bronze bushings. Install the new bushings and machine to final size. Cleanup all threaded connections.
IMPELLER	<ul style="list-style-type: none"> The impeller wear ring is worn and out of tolerance. 	<ul style="list-style-type: none"> Machine and true-up the impeller with its respective bore. Fabricate and machine a new bronze wear ring. Install wear ring and machine to size. Dynamically balance the impeller and shaft assembly.
PUMP & LINE SHAFTS (4)	<ul style="list-style-type: none"> The pump and intermediate shafts are worn and out of tolerance. 	<ul style="list-style-type: none"> Fabricate (4) new 1-3/16" shaft sections using 416, PSQ stainless steel (UPGRADE).
LINE SHAFT COUPLINGS	<ul style="list-style-type: none"> The couplings are in poor condition. 	<ul style="list-style-type: none"> Fabricate (3) new threaded couplings as per samples using 410 stainless steel.

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COLUMNS (3)	<ul style="list-style-type: none"> • All column sections show significant sign of corrosion. • One column has major corrosion and has to be replaced. • The other two units are in marginal condition. 	<ul style="list-style-type: none"> • Fabricate (3) new pipe columns, using sch. 80 pipe (UPGRADE). • Setup and machine new pipe columns.
DISCHARGE HEAD & MOTOR MOUNT	<ul style="list-style-type: none"> • Check the register fits. • Check for parallelism of both units. 	<ul style="list-style-type: none"> • Setup the unit and check parallelism between the motor mount, seal box register fits. • Skim cut the pump column fit. • Skim cut the seal box seat.
SEAL BOX	<ul style="list-style-type: none"> • Check register fit and landing face. 	<ul style="list-style-type: none"> • Setup and cleanup the stuffing box faces and seal register fit. • Manufacture and install a new throttle bushing. • Supply and install a new mechanical seal.
ROTATING ASSEMBLY		<ul style="list-style-type: none"> • Assemble the impeller on to the pump shaft. • Dynamically balance the rotating assembly.
ELECTRIC MOTOR	<ul style="list-style-type: none"> • Found the stator to be shorted to be damaged. • Found the OCE housing to be out of tolerance. 	<ul style="list-style-type: none"> • Burn-out and remove the damaged windings • Sandblast, clean and test the stator core. • Insulate and line the stator slots. • Manufacture new sets of windings per sample. • Install and internally connect the windings. • Dip and bake the stator in Class "H" Insulation. • Electrically test the windings recording surge, Hi-pot, resistance and Meg-Ohm data. • Fabricate a new bushing. • Setup and machine the OCE housing. • Install a new OCE bushing and machine to size. • Dynamically balance the rotor. • Supply and install new bearings and seals. • Supply and install new hardware. • Reassemble and test run the unit.

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COMPLETE PUMP ASSEMBLY		<ul style="list-style-type: none">• Sand-blast the unit.• Apply two coats of marine grade surface coating to the unit (Color: Blue).• Assemble the unit using 304 stainless steel bolts and 316 stainless steel nuts.
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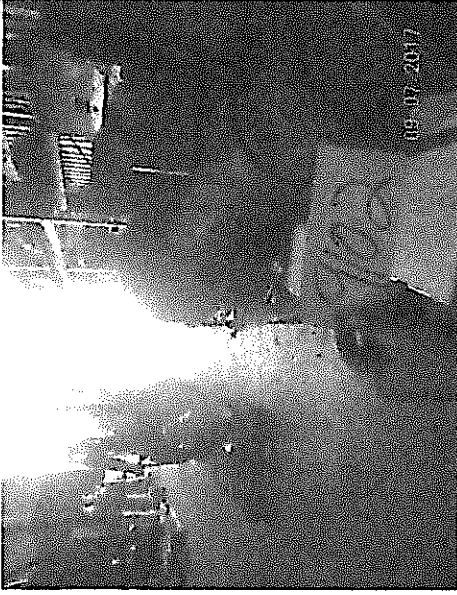
The price to carry-out the above-mentioned scope of repair is as follows:

- Pump overhaul: \$24,762.44
- Electric motor repair: \$2,429.57 (New Motor Replacement: \$3,752.19)
- Transportation, crane, installation and startup: \$7,360

Total: \$34,552.01

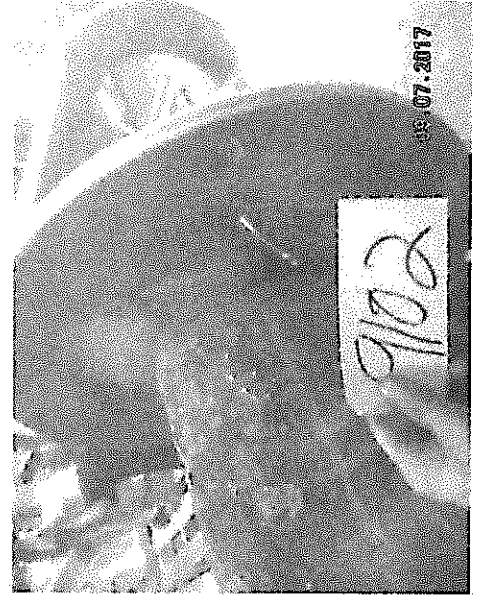
The Estimated Delivery of 3-weeks, ARO. We look forward to your instructions. Meanwhile, if you have any questions, please advise. Thank you.

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CITY OF DEER PARK: VERTICAL TURBINE PUMP



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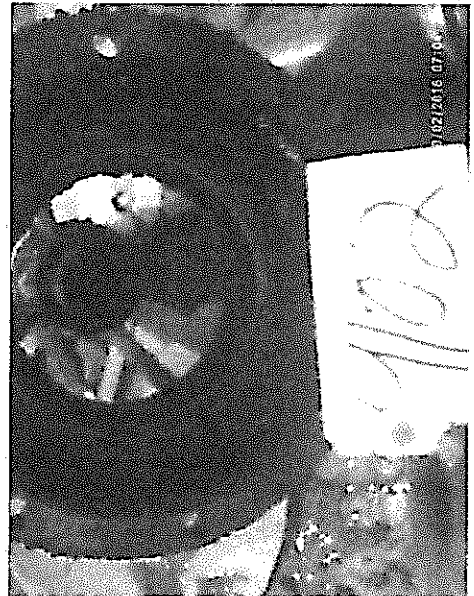
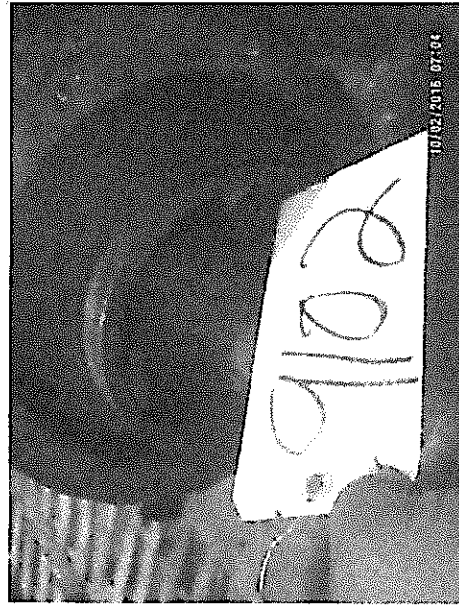
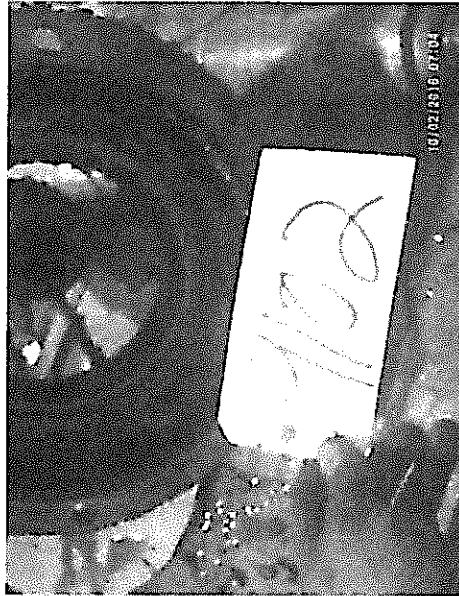
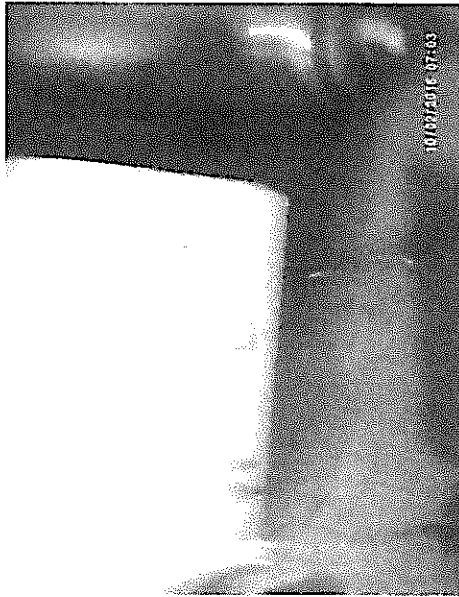
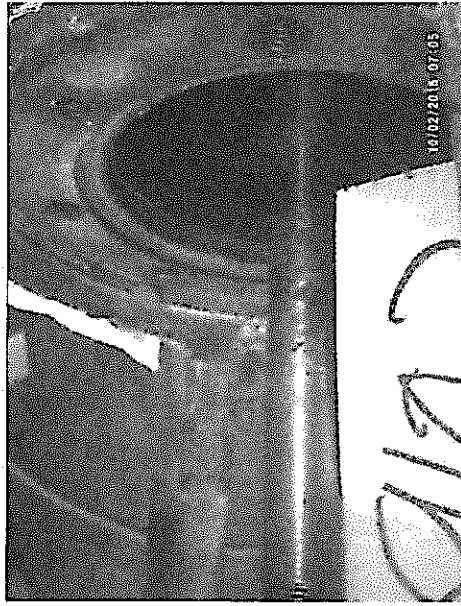
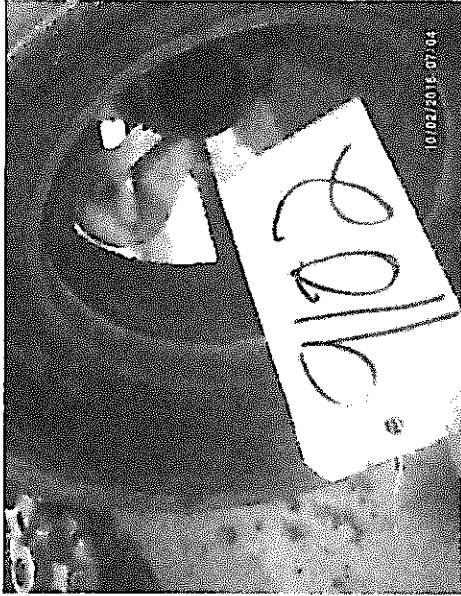
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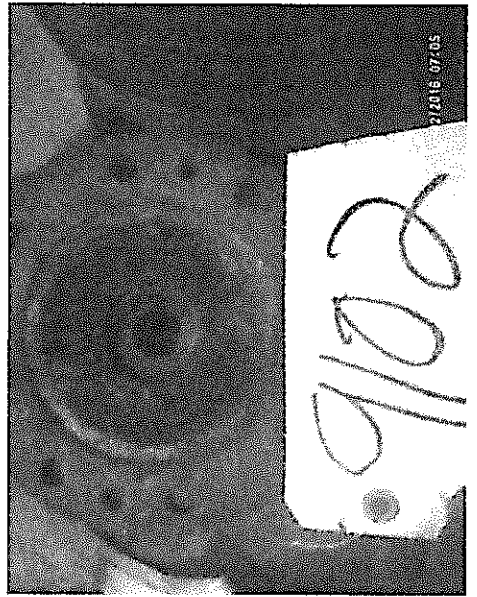
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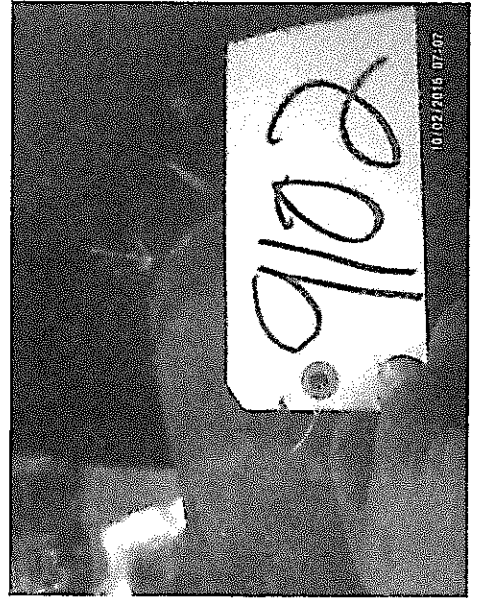
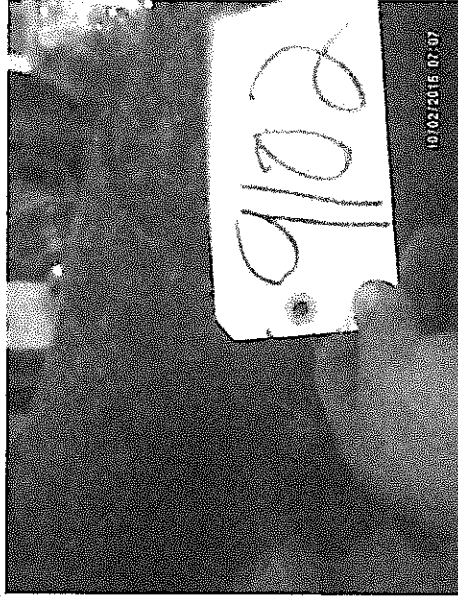
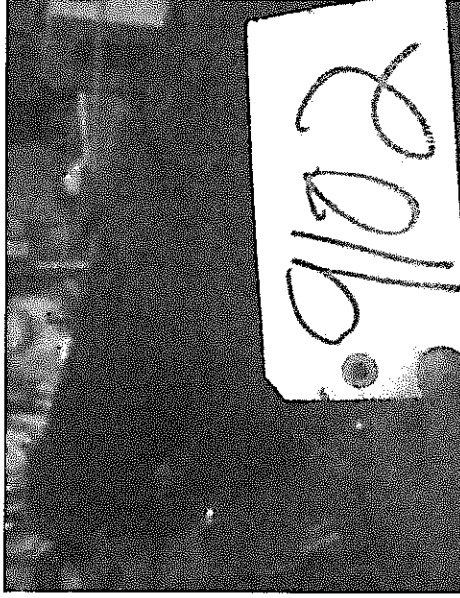
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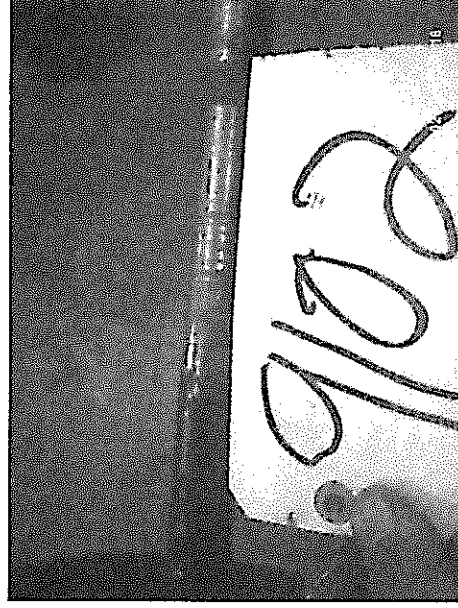
Page 2 of 6



09/13/2017



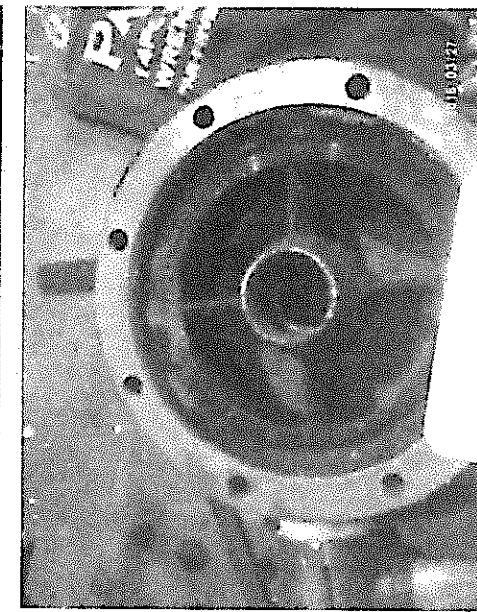
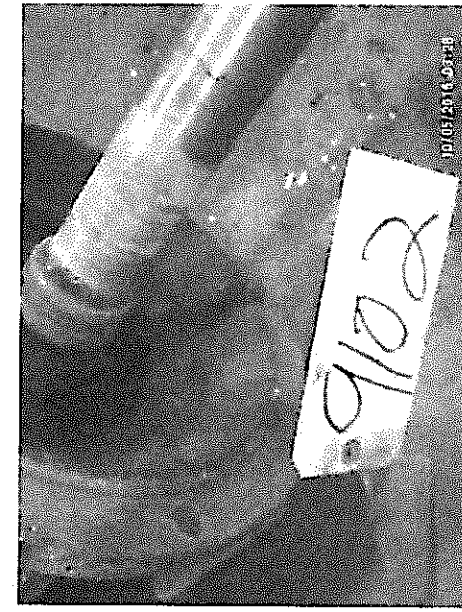
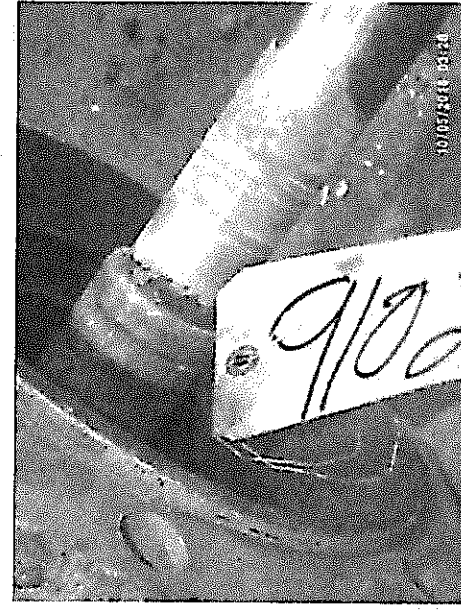
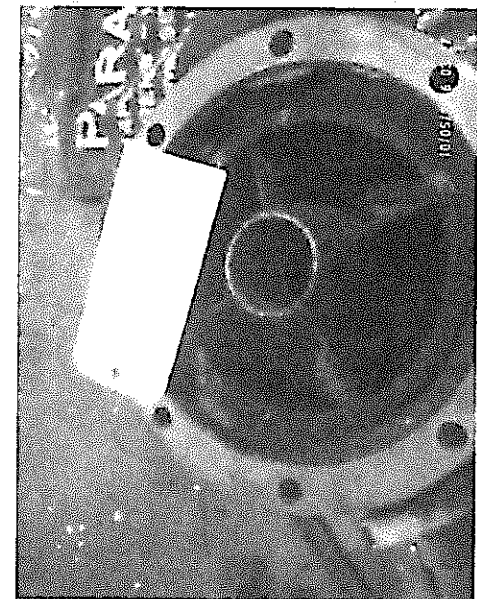
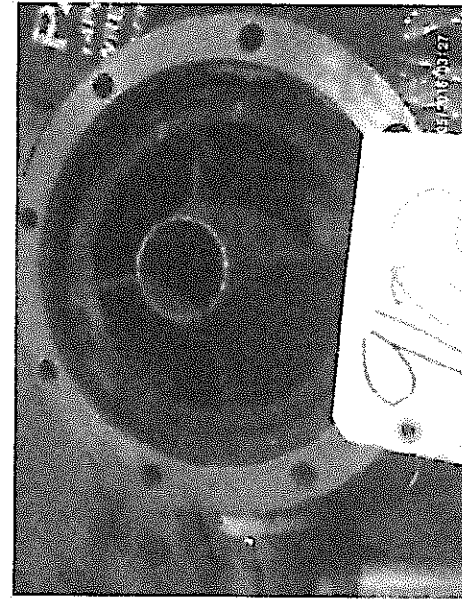
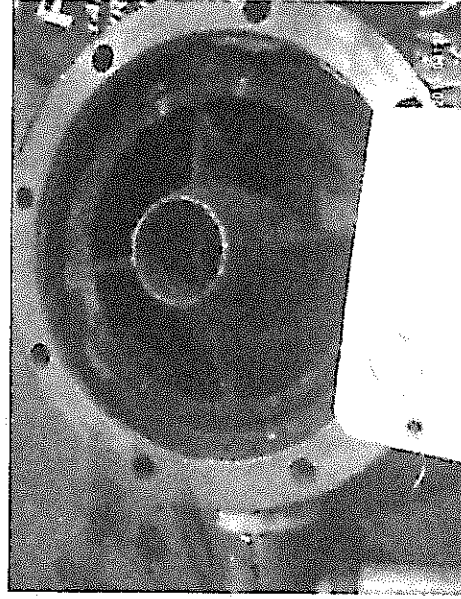
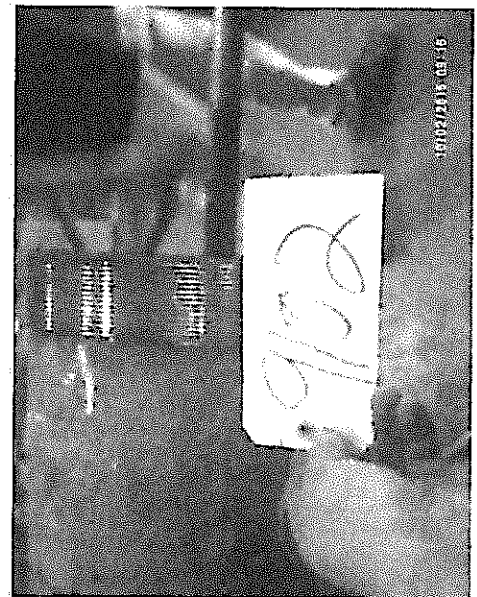
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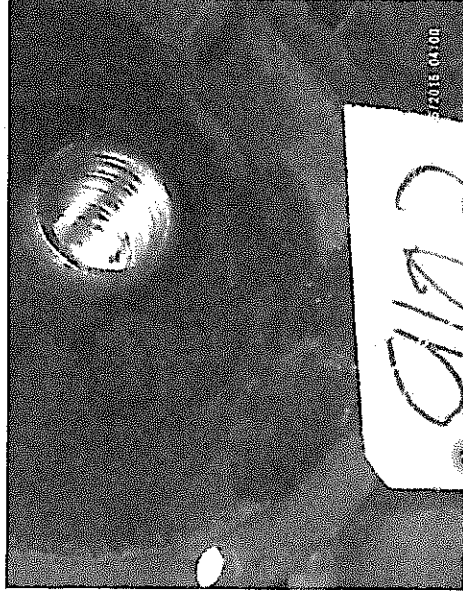
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Page 4 of 6

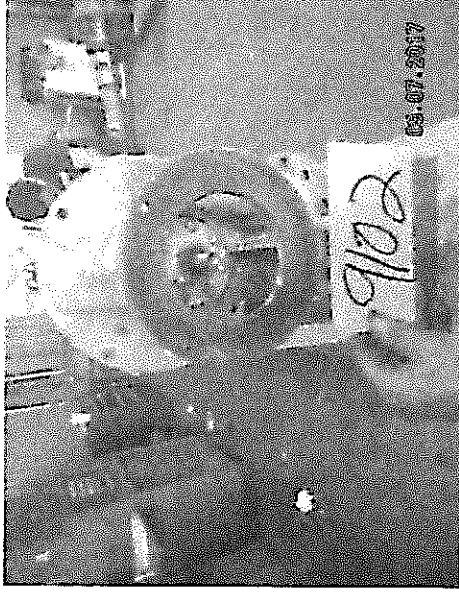
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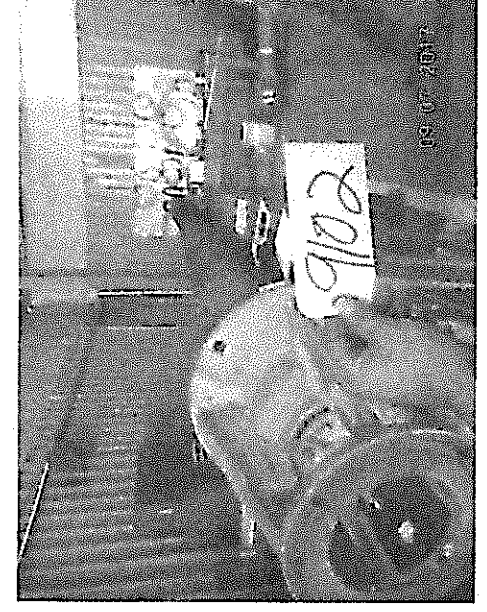
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Page 5 of 6

