ProSpec
TECHNOLOGIES INC.

EQUIPMENT REPAIR REPORT

Date: December, 2013

Customer:

Our Reference: 5000011888

Subject:

Attention:

Thank you for choosing ProSpec Technologies Inc. as your source for pump repair. We appreciate the opportunity to provide you with this estimate.

EQUIPMENT INFORMATION

Description: Vertical turbine, less driver (500 hp 575 v US Electric in a 5009PH frame).
Manufacturer: ITT-Goulds
Rating: 7000 usgpm @ 225 feet
Type: Vertical turbine, two stage
Model: VIT FF 20 EHC
Serial Number Reference:
RPM: 1770
Lubrication: Pumpage
Shaft Sealing: Packing
Sealing chamber: Straight bore
Rotation: CW
Impeller: Fully enclosed, bronze
Originally supplied as new: 1999
Previous Repairs: R1176 (2003), R1499 (2005), R1849 (March 2008), R1982 (November 2008), R2182 (March 15, 2010), R2393 (March, 2011) R2525 (March 2012) R2692 (March 2013)

OBSERVATIONS

The pump was received less motor, adjusting nut and strainer. Upon receipt we conducted a manual rotational test and found that the pump shaft rotated freely. The exterior of the pump was found to be in generally good condition with light corrosion areas where the finish coat had been removed or damaged. The pump was dismantled and we proceed to do our measurements.

Just like last year and the year before most the pump interior has no corroded areas exceeding .080" in depth. However the pump is now fourteen years old and the machines fits are loose and in need of repair. Descriptions of our findings with these fits are as follows:

The suction bell to bottom bowl fit is 0.010" loose. This is high but acceptable.

The bottom bowl to top bowl fit is 0.014" loose. This is high but acceptable.

The top bowl to bottom column fit is 0.031" loose. This is too loose and could result in shaft binding. In order to bring this fit back into tolerance we will weld repair the column and machine the bowl spigot outer diameter.

The bottom column to top column fit is 0.013" loose. This is high but acceptable.

We found that the top column to head fit was 0.041" loose. This is too loose and could result in shaft binding. In order to bring this fit back into tolerance we will weld repair the column and machine the head inner diameter.

The stuffing box (616) has also suffered from erosion to the point that the registered fit has been compromised. Last year the stuffing box was replaced and the fit was repaired. The repair to the fit in the head has eroded but it is acceptable. Next year this fit will require welding and machining.

The impeller (673) and bowl (670) were visually checked for cracks and pitting. Last year we reported that the impellers were showing signs of erosion. We mentioned last year that impeller replacement may be required this season. We also mentioned that we may need to skim cut the impeller and machine a wear ring for the bowl and balance the impellers. Although impeller replacement this season is not required the impeller wear on the nose has reached an unacceptable level.

The 1st stage impeller clearance to the bowl is 0.026" and the 2nd stage clearance is 0.033". After our work is complete this clearance will be under 0.016".

The bowls and the suction bell are lined with vitraglass / herisite coated (green coating) at the factory. As we mentioned in previous years this coating was wearing away. As can be seen in the photo below the web in the suction bell is eroding. We will grit blast and build up the eroded area of the suction bell with Belzona Ceramic S metal and then coat with Belzona Super Metal Glide coat in order to preserve the remaining cast iron.

The line/column shaft (648) was checked for straightness and is within the acceptable tolerance with the average total run out less than 0.0005" T.I.R. per foot and never exceeding 0.005" T.I.R. over the length of shafting. As can be seen from the photos the shaft is worn at the location of the packing. It is also worn at the shaft bearing. The year before last year we chromed the shaft at the locations that were worn. Last year we were able to invert the shaft end for end exposing a new shaft area to the bearing and packing, no chroming was required last year. This year we will machine and chrome the again to bring the shaft back to within the required tolerance.

The drive shaft was checked for straightness and is within the acceptable tolerance with the average total run out less than 0.0005" T.I.R. per foot and never exceeding 0.005" T.I.R. over the length. The drive shaft is in good condition.

The impeller shaft was checked for straightness and is within the acceptable tolerance with the average total run out less than 0.0005" T.I.R. per foot and never exceeding 0.005" T.I.R. over the length. The impeller shaft is in good condition and suitable for reuse.

The pump was supplied with a bronze suction bearing (690), two bowl bearings (672), one spider bearings (653) and a throttle bushing (617). We checked all of bearings for excessive wear and corrosion. All bearing I.D.'s and O.D.'s were also checked. Just as in the last repair the bearings are worn, not excessively however as part of a sound repair the bowl bearing, suction bell bearing, line shaft bearing and throttle bushing will be replaced.

SCOPE OF WORK

- Receive unit, perform initial visual inspection and record findings.
- Disassemble unit, sand blast the interior and exterior surfaces using Ebony Grit copper slag and polish all machine fit surfaces.
- Perform detailed component inspection and record findings.
- Repair the line shaft (machine, chrome and grind)
- Repair all fits as described above
- Replace all shaft support bushings with new ones.
- Replace all O-rings and gaskets.
- Replace the packing and throttle bushing.
- Clean up impellers to remove burrs and rough edges.
- Clean and prepare exterior surface of discharge head for finish coat. Mask off accordingly.
- Apply ICI Speed Enamel 9400 blue paint to exterior non-machined surfaces.
- Chase all threads, utilize all new fasteners and assemble with never seize thread lube.
- Reassemble; apply appropriate tags and identification plates.
- Touch up finish, package and prepare for shipment.

Total Price for the pump repair ……. $

The pricing quoted is in Cdn funds, taxes not included, is subject to our standard terms and conditions of sale. If any further repairs or parts are required during the cleaning process. We will provide a quotation in writing prior to proceeding. The turn-around time for the proposed scope of work is 10 weeks after receipt of approval to proceed. We will make every effort to repair this pump in as short a time frame as possible.

Thank you very much for the opportunity to present our report. Please contact us with any questions or additional information requirements.

Best regards,

Mark Lemieux – mlemieux@prospectech.com

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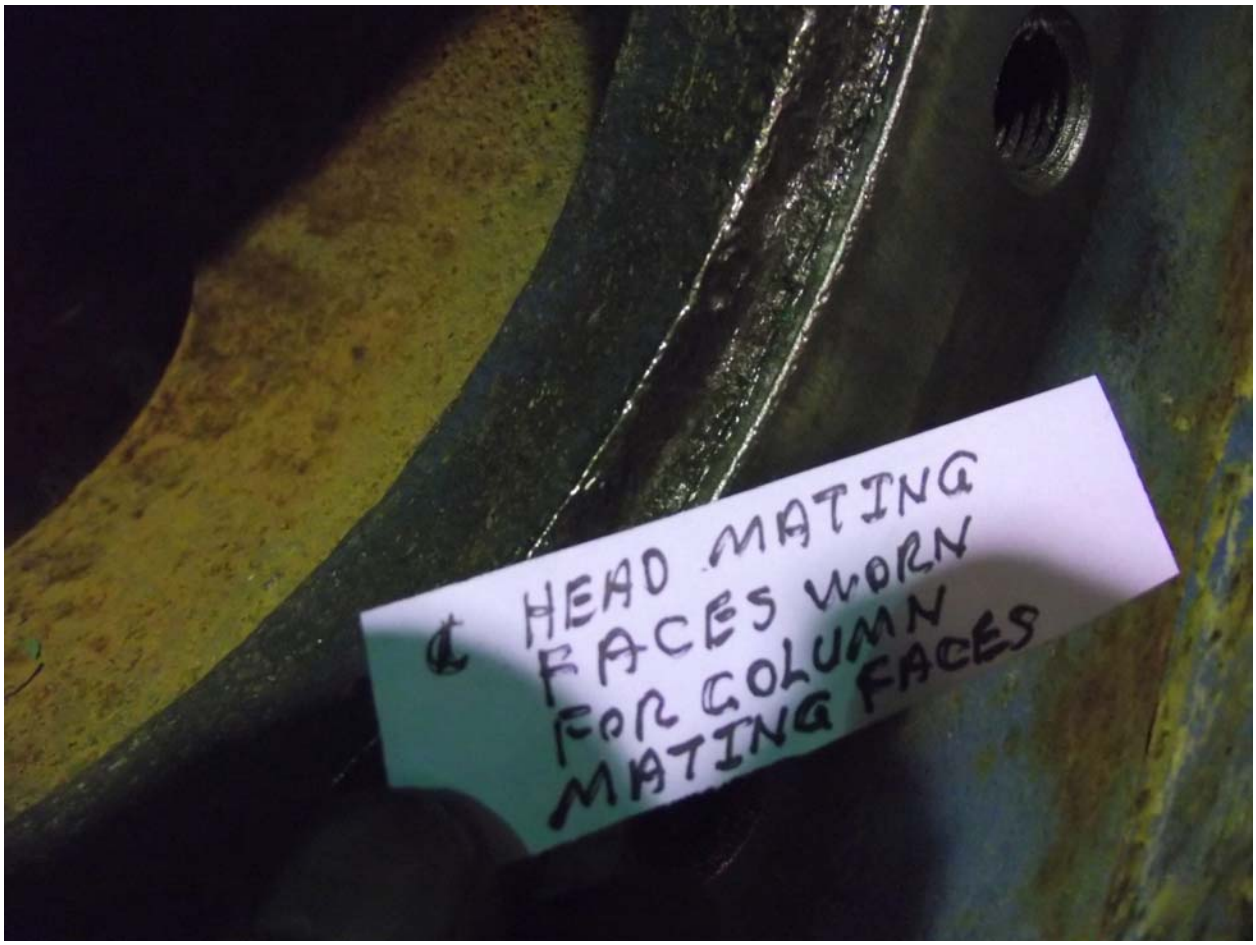
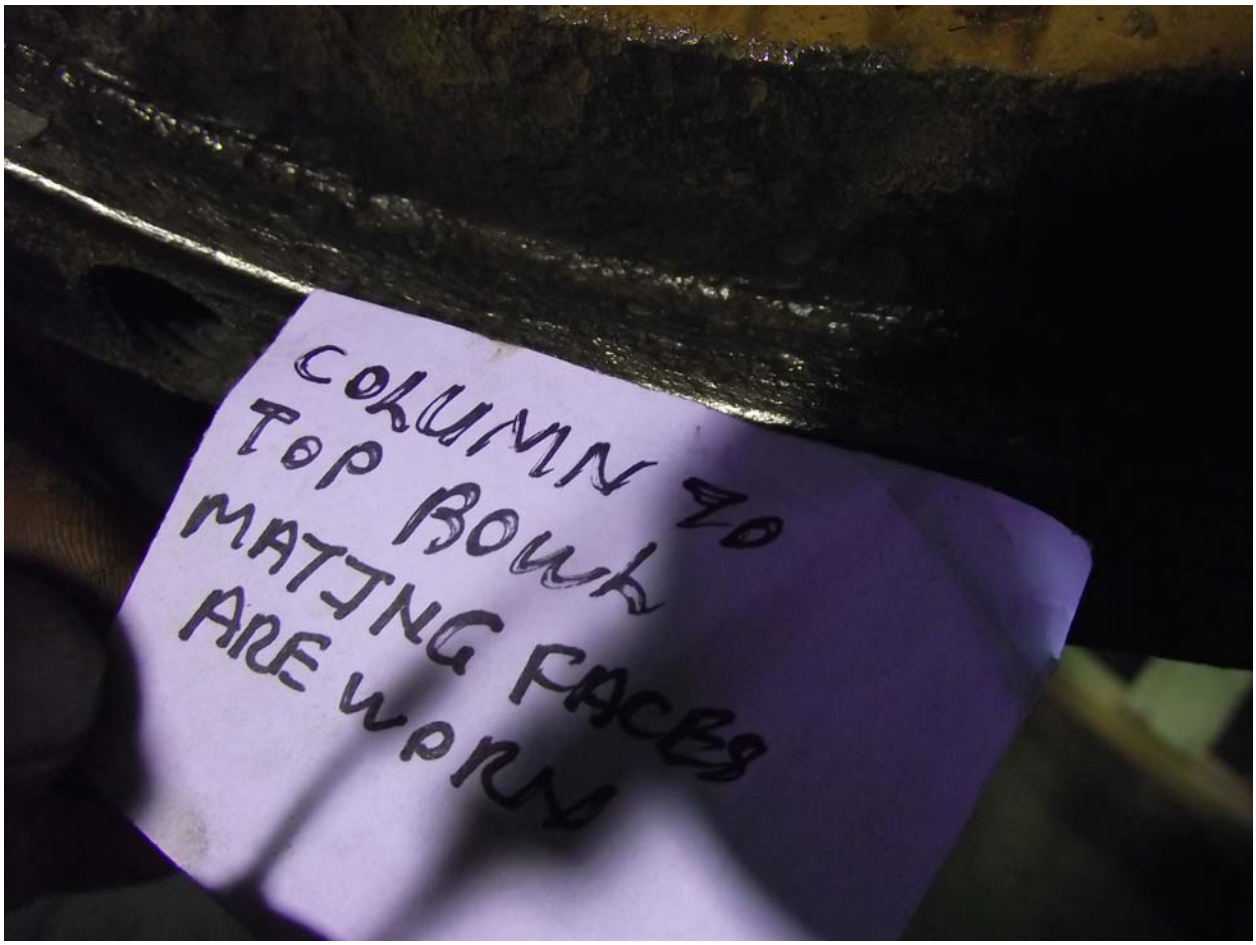
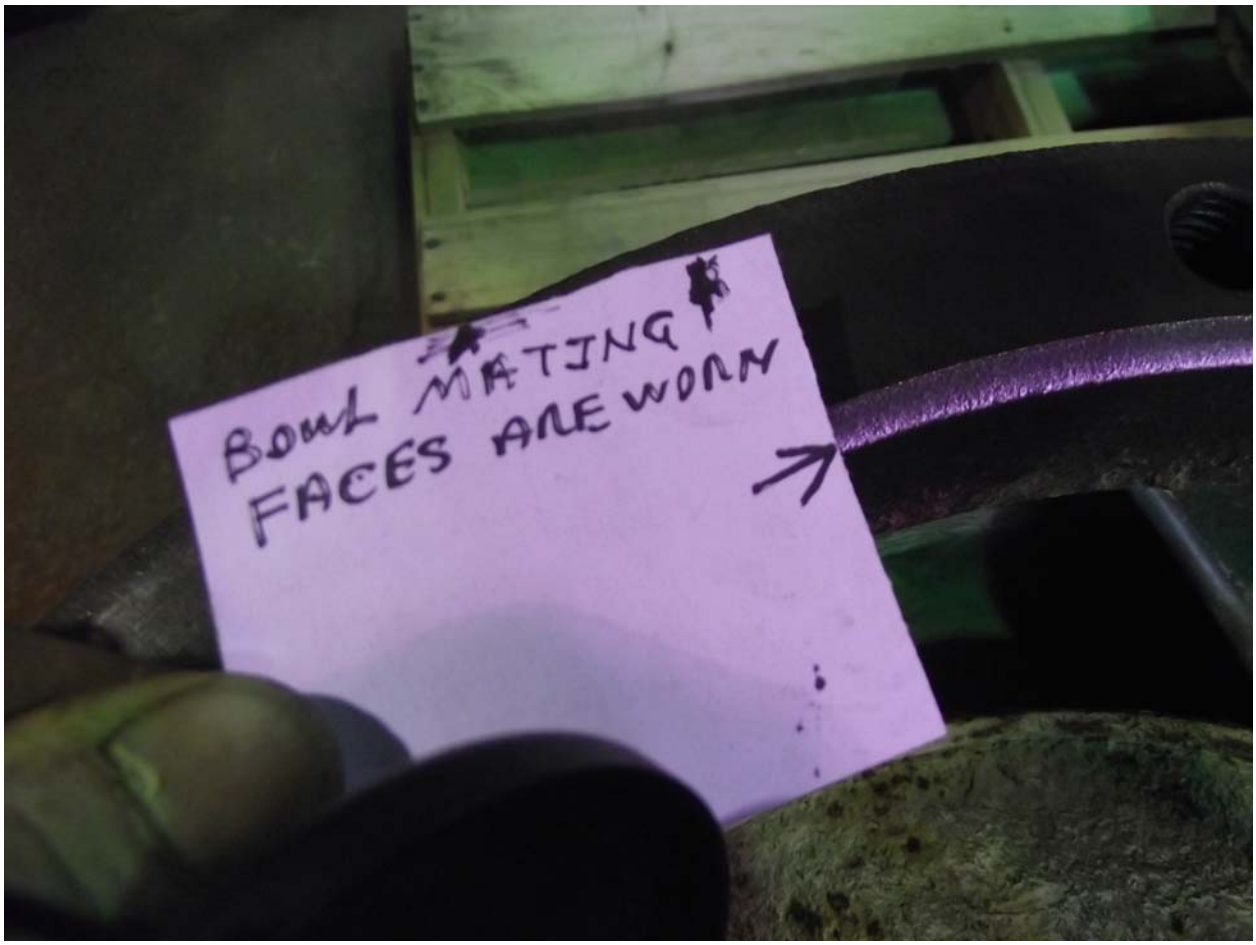
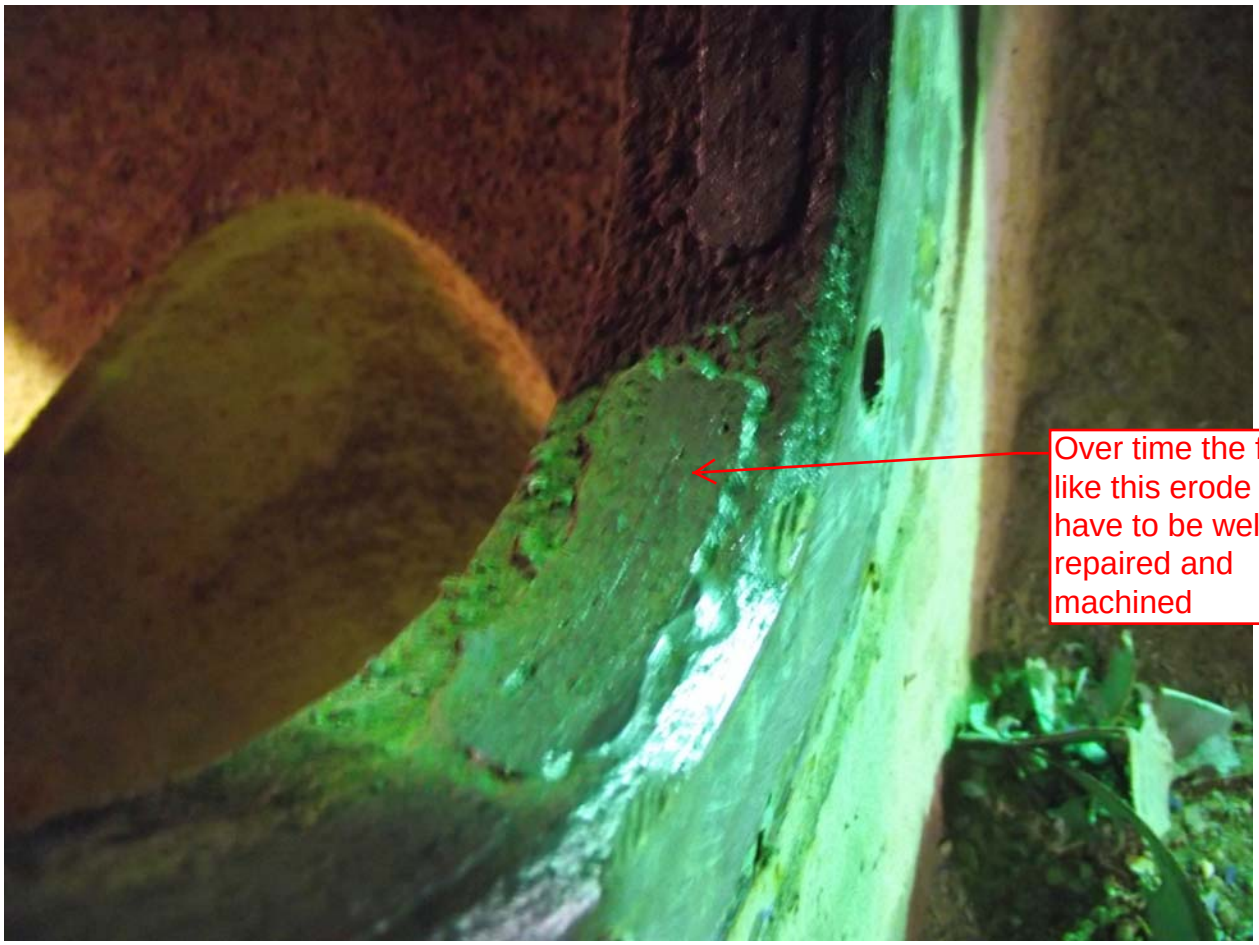
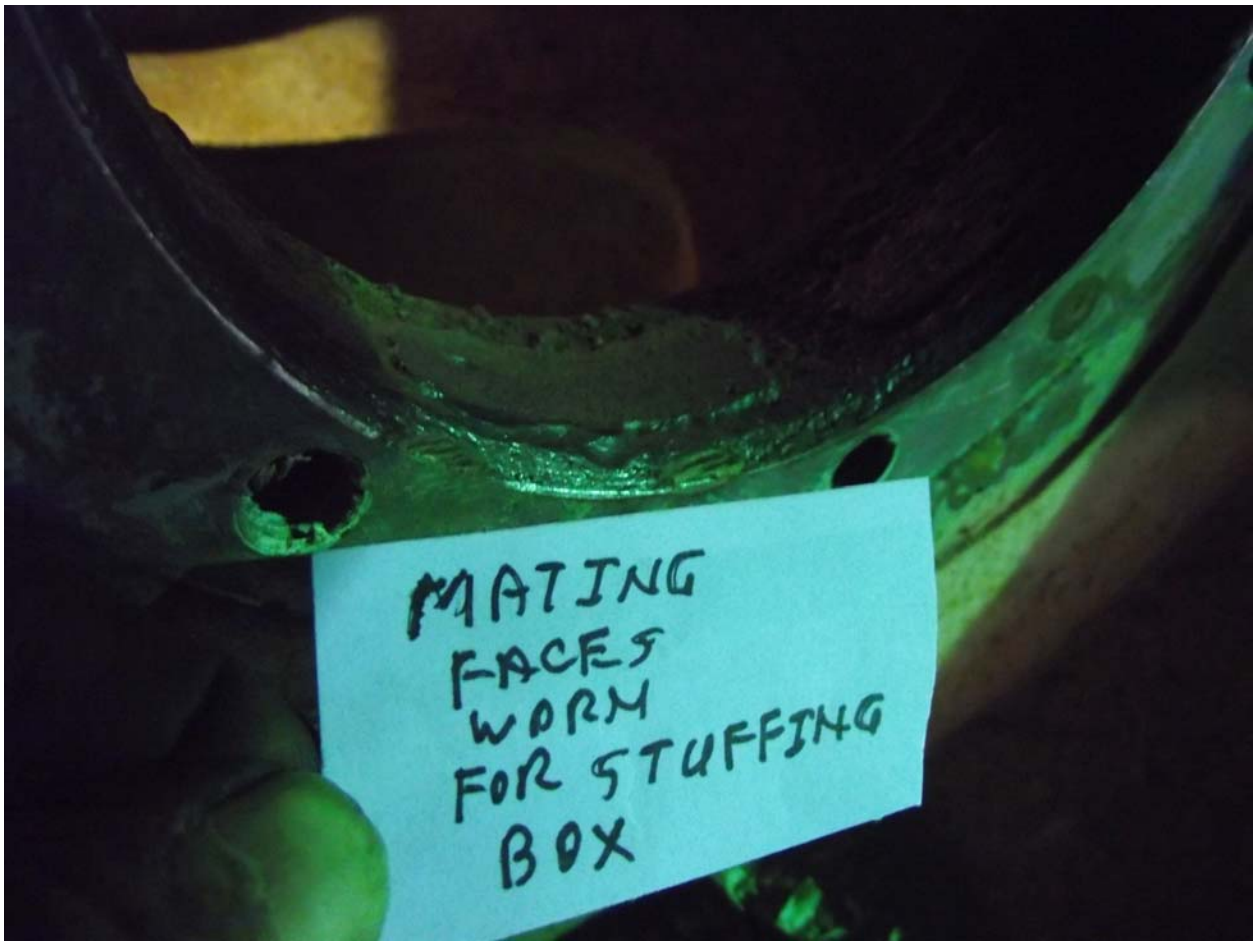

HEAD MATING
FACES WORN
FOR COLUMN
MATING FACES

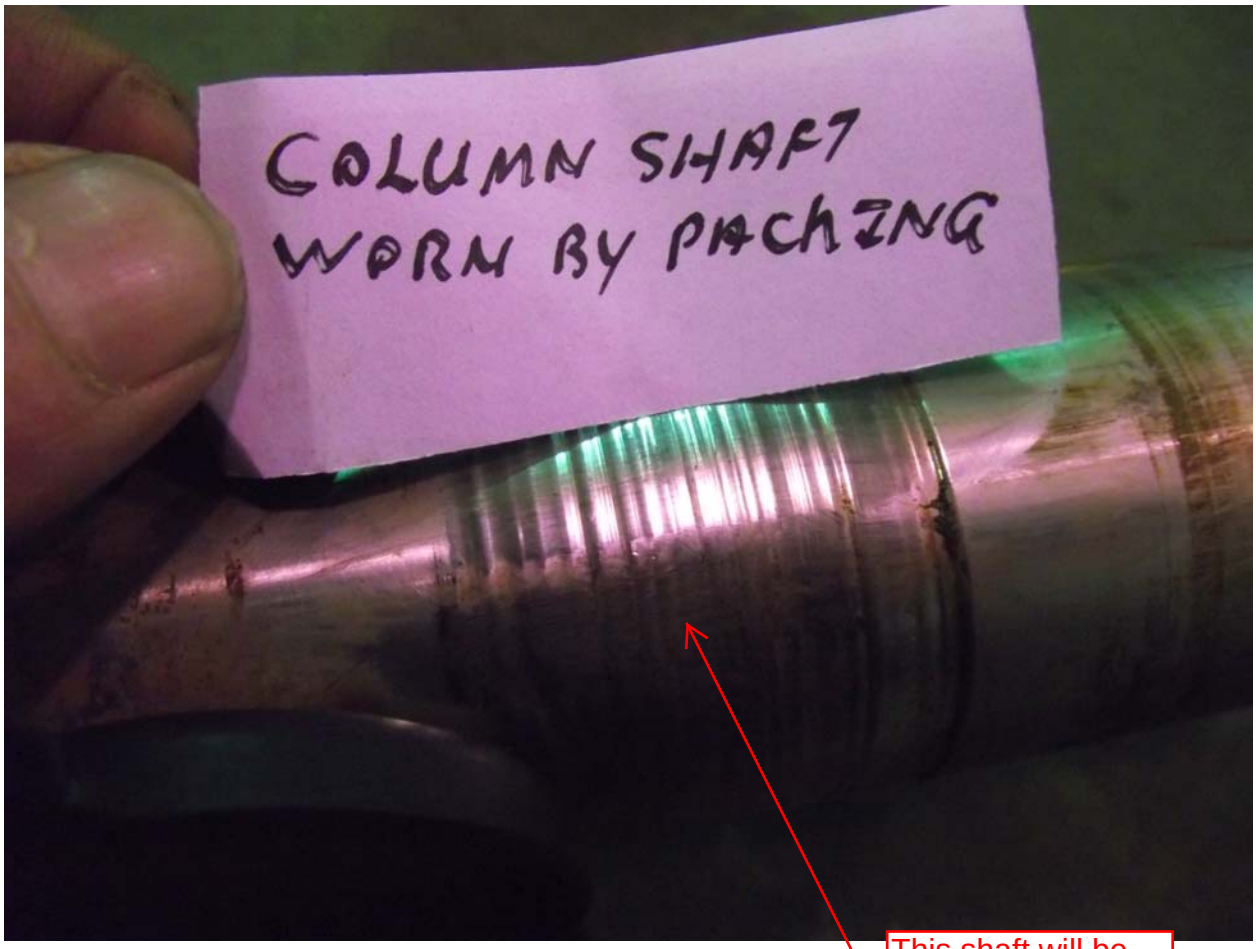

COLUMN TO
TOP BOWL
MATING FACES
ARE WORN


BOWL MATING
FACES ARE WORN


we will repair areas like this with ceramic S metal and then coat with supermetal glide


Over time the fits like this erode and have to be weld repaired and machined


MATING
FACES
WORN
FOR STUFFING
BOX


COLUMN SHAFT
WORN BY PACKING
This shaft will be machined, chromed and ground

CROSS SECTIONAL – VIT–FF (PRODUCT LUBE)

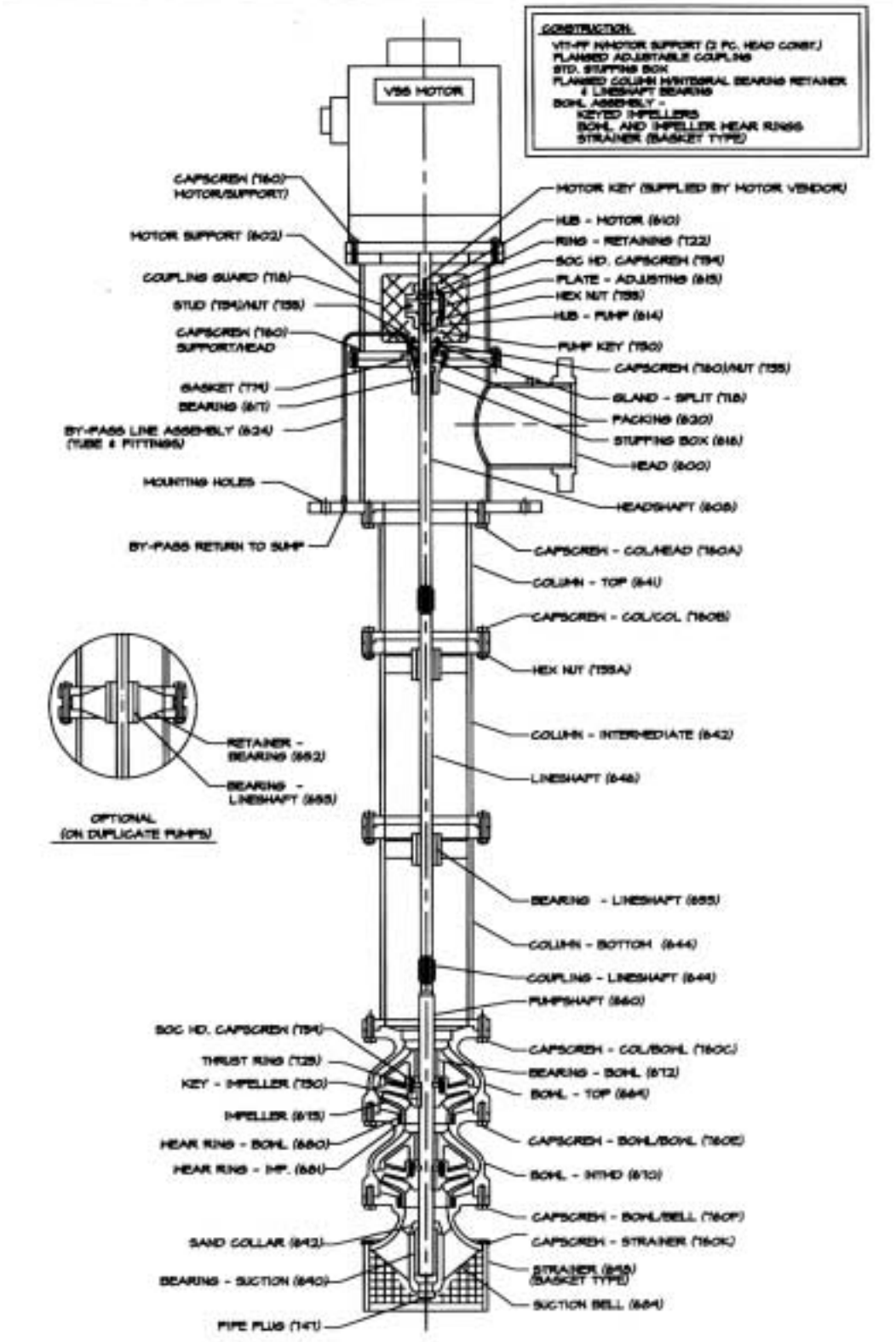


Fig. 5

Completed repair.