

Project Report

LARGE-SCALE PUMP REPAIR

It's in the details.

See how Kennedy Industries disassembled, transported, repaired, and reinstalled the Byron Jackson Model 84 HXH, Low Lift No. 3 Pump at the Lake Huron Water Treatment Facility.



Lake Huron

WATER TREATMENT FACILITY

The Lake Huron Water Treatment Plant began full-scale operations in 1974. The Plant supplies water to several communities across the thumb of Michigan including the cities of Lapeer and Flint, and has expanded to meet the needs of a growing population north of Detroit.

The Plant treats and transmits potable water, and is supplied from an intake in Lake Huron through a 16-foot diameter raw water tunnel. It discharges primarily through a 120-inch water main located on the west side of the plant. The plant's current pumping capacity is 400 million gallons per day.

RESTORING A 40-YEAR OLD PUMP TO FULL LIFE



400

Million GPD Pumping Capacity

Great Lakes Water Authority (GLWA) called the Kennedy Industries Field Service Team to help evaluate why their Byron Jackson Model 84 HXH, Low Lift No. 3 Pump was overloading the 2250 HP Motor. We were able to reset the lift and get the 139,000 gpm pump back into operation.

Fast forward two years later and we were once again called out to help diagnose what appeared to be the same problem. However, this time we discovered that one of the nine shaft couplings was likely broken because we were unable to lift the impeller. We then assisted GLWA in the removal of the pump, and transported it back to Kennedy Industries for evaluation. After fully repairing the pump, we returned it to GLWA's Plant where we assisted in its reinstallation and start up.

The removal process took only 2 weeks. The Plant had to use their in-house 85 ton bridge crane to lift the pump and remove it section by section, setting the load on a pair of I-beam's. It took about a week to reinstall the pump, which also had to be done section by section due to the pump's 110ft length. *continued*

The Details



SUCTION BELL

Suction bowl had a large crack through the support vane. The crack had to be metal stitched to restore integrity.



IMPELLER

Though the impeller is in good condition, it was set up in a machine to have concentricity checked between bore and impeller ring. The impeller ring was lightly machined to restore concentricity.



WEAR PLATE

The impeller vane face to wear plate contact was good and showed minimal wear. The wear plate was reused after it was set up in machine to check concentricity of wear surface and deburred.



DIFFUSER

The diffuser bearing clearances were within specification, so they could be reused. The diffuser was set up in vertical turret lathe to have bearing bores and registers checked for concentricity and faces checked to ensure parallel.

The Low Lift Pumps were originally installed in 1969 and take the raw water which is fed from Lake Huron to the Plant to be treated and distributed to their water customers. There are a total of four (4) Low Lift Pumps; two rated for 200 MGD and two rated for 100 MGD. This Project involved Low Lift Pump No. 3, which is the larger of the pump sizes, and is rated at 139,000 GPM @ 53' TDH with a 2250 HP Motor.



- CLOCKWISE FROM TOP:**
- 1) Dismantled pump head
 - 2) Refurbished impeller being assembled into diffuser
 - 3) Blasted and painted column
 - 4) Sections of original columns loaded for transit
 - 5) Finished bowl assembly ready for delivery.

Details (continued)



COLUMNS

Column to column registers were within specification, as were the enclosing tube to enclosing tube registers. The columns were then blasted to bare metal and coated with NSF 61 epoxy coating.



HEAD

The head was blasted to bare metal and wetted surfaces were coated with NSF 61 epoxy coated and the dry side of the head was painted with epoxy paint.



SHAFTS

The shaft T.I.R.'S were within specification and were reused. The shafts were UT tested per ASTM A 388 and no indications were found.



ENCLOSING TUBE BEARINGS

Enclosing tube bearings were measured and the clearance to the shafts were within specification. The enclosing tube bearings were also reused.

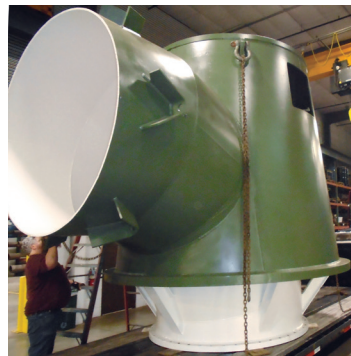


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2250

HP Motor



- CLOCKWISE FROM TOP:**
- 1) Cleaned, restored, and fully assembled bowl assembly
 - 2) Meticulously restored columns
 - 3) Pump head ready for delivery
 - 4) Sections of original columns in need of repair



LINE SHAFT COUPLINGS

The one oversized coupling bore was welded, stress relieved, and machined to restore proper clearance. The other couplings were reused as is. All threads for coupling nuts were chased. All line shaft nuts were replaced to prevent future failures.



STUFFING BOX

The stuffing box packing bore was pitted and eroded and consequently machine prepped. A new 410 stainless steel insert was installed to restore packing bore to OEM size. The stuffing box bearing was within specification.



PUMP COUPLING

The pump coupling bore was machine prepped, hard chrome plated, and precision ground to restore proper clearance to the head shaft. The pump coupling and adjusting nut were setup in a lathe to verify concentricity and parallelism.



HARDWARE

All pump hardware was replaced with new to ensure long life and reliability.