



WATER · MINERAL · ENERGY

October 18, 2016

Mr. Robert Leible
City of Aurora
44 E. Downer Place
Aurora, IL 60507

Re: NP3 Repairs

Mr. Leible:

The subject pump has been removed due to excessive vibration, disassembled, cleaned, and inspected. Please see attached Pump Inspection Report for observations and recommendations.

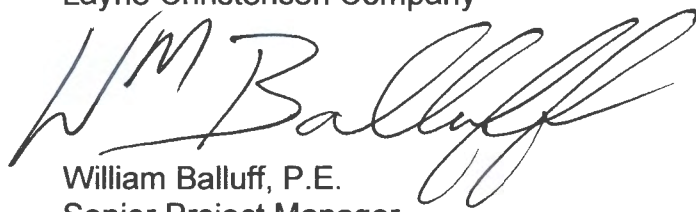
Project Scope and Estimate including PSA discounts

1. Labor and equipment to date to remove, disassemble, clean, and inspect	\$10,000
2. New 2 stage 18KXL CIBF bowl assembly with COS of 3000 GPM at 223' TDH, (11.68" impeller trim) Lead time 10 to 12 weeks	\$18,685
3. Replacement of mechanical seal and inner column assembly (less lower line shaft)	\$ 4,955
4. Replacement of 10" x 10' flanged column, coated Lead time 7 weeks	\$ 2,882
5. Estimate to assemble pump and install	<u>\$13,000</u>
 Total Project Estimate	 \$49,522

A one year warranty applies to all of the new pump components.

With the estimated lead time of 10 to 12 weeks, Layne should be in position for pump reinstallation 14 weeks from the City's written authorization to proceed with the repairs. If you have any questions, or if Layne may be of any service, please do not hesitate to contact me.

Layne Christensen Company



William Balluff, P.E.
Senior Project Manager

WATER RESOURCES



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CITY OF AURORA
 WTP NP3 PUMP
 INSPECTION REPORT

JOB NAME	Aurora NP3	WTP Booster	NP3	DATE	10/05/16
JOB NO.	42647	INSPECTED BY	J. Poppen, J. Kopp, B. Balluff		
		BOWL ASSEMBLY	Byron Jackson 2 stage 18KXL		
		COLUMN ASSEMBLY	18' 3 1/4" of 12 x 2 1/2 x 1 11/16 flanged in two pieces		
		MOTOR	US 200 HP, 460V VHS		

MOTOR

Motor Observations

US 200 HP, 460V, VHS motor

Motor Recommendations

Have motor inspected and serviced by a qualified motor repair shop.

BOWL ASSEMBLY



Two intermediate 18KX castings in Layne shop with moderate to severe exterior erosion.

Suction casting, discharge casting, and basket strainer in Layne yard. Basket strainer is in good condition.

Severe pitting and erosion in suction casting interior.

Bowl Assembly Observations

Bowl castings have moderate severe exterior corrosion and the interior of the suction casting is severely corroded. The bowl is to be modified with larger diameter impellers to meet a COS of 3000 GPM at 223' TDH

Bowl Assembly Recommendations

Replace bowl with impellers trimmed at 11.68"



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COLUMN ASSEMBLY



NP3 flanged column pipe racked in Layne yard. One 10' length, one 8' 3 1/4" length.



The 10' length has a "rash" of pitting throughout its length...



...with numerous deep pits.



Deep pits on 10' length.



NP3 oil tubing racked in Layne yard.



NP3 tubing illustrating 3 x 2 1/2 transition



Shafts racked in Layne yard after clean up.



Heavy scouring at seal location on top shaft. Lower shaft has some wear at bearing journals.



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Column Assembly Observations

The upper 12" flanged column has mild exterior pitting. The lower 10' length of 12" flanged column has moderate pitting throughout with numerous severe pits. The length of 10' column section had extremely close tolerances with the Plant's overhead crane when removed. The line shaft was very difficult to extract from the oil tubing indicating heavy buildup of scale/or corrosion in the interior of the tubing (confirmed). This is undoubtedly the primary cause of the pump's vibration. The top shaft is heavily scoured at the mechanical seal journal. The lower shaft has some wear at the bearing journals.

Column Assembly Recommendations

Replace the 12" x 10' flanged column. Replace all tubing, bearings, and top shaft. Reinstall pump with lower shaft end-for-end.

Discharge Head – The mechanical seal and tube tension bearing are worn beyond acceptable tolerance and should be replaced.