



Layne Christensen Company
721 W. Illinois Avenue
Aurora, IL 60506

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graniteconstruction.com

February 23, 2021

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

Re: Well 23

Mr. Leible:

The Aurora Well 23 Byron Jackson submersible pump has been removed due to a dead short in the motor windings. The motor, bowl, pipe, cable, and pitless adapter have been inspected. Please find the Aurora Well 23 Pump Inspection Report (PIR) attached.

Based upon the recommendations of the PIR, estimated project cost is as follows:

1. Labor and equipment to remove pump, inspect bowl and motor, HyPot test cable	\$ 24,966
2. Byron Jackson 350 HP, 17", 2300V, Type M exchange motor, 12 weeks delivery	\$129,100
3. Rebuild bowl with ten reconditioned 13MQ/12MQH impellers, estimate	\$ 20,000
4. Rehabilitate (1) lengths 10", schedule 60, 8RND, estimate	\$ 500
5. Rehabilitate pitless adapter, estimate	\$ 2,500
6. Televiser Well	\$ 1,350
7. Sand Bail up to 5 Days	\$ 19,000
8. Miscellaneous consumables (airline, banding, etc.) estimate	\$ 1,000
9. Remobilize, set and test pump, estimate	<u>\$ 35,000</u>
Total Project Estimate	<u>\$233,416</u>

These estimates include the Professional Service Agreement discounts.

If you have any questions or comments, please do not hesitate to contact me.


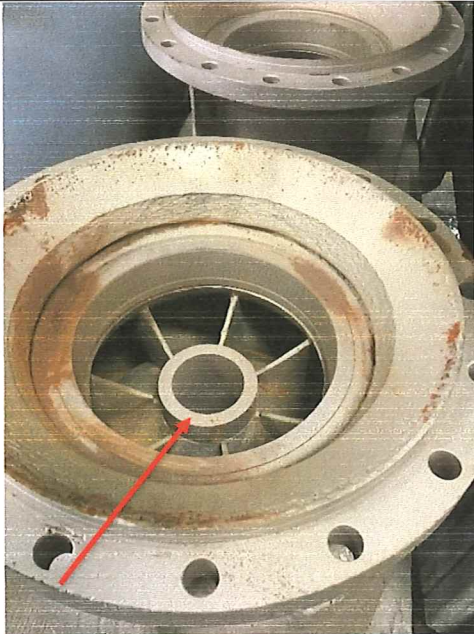
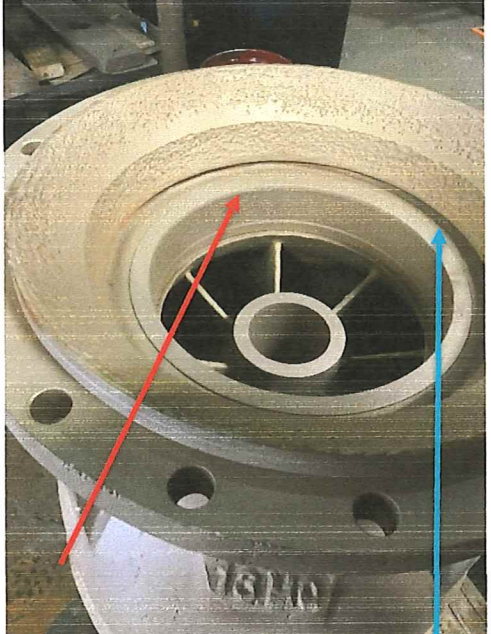
Layne Christensen Company

William Balluff, P.E.
Senior Account Manager



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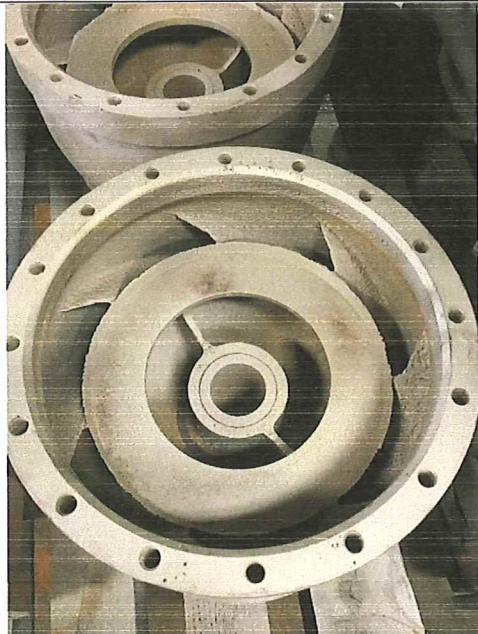
CITY OF AURORA WELL #23 PUMP INSPECTION REPORT

JOB NAME	Aurora		WELL	23	DATE	1/28/2021
JOB NO.	108747	INSPECTED BY	J. Gilchrist, J. Kopp			
		BOWL ASSEMBLY	Byron Jackson 11 stage 13MQ/12MQH all bronze			
		COLUMN ASSEMBLY	903' of 8" T&C Line Pipe, SRL			
		MOTOR	Byron Jackson 350 HP, 17", 2300V, Type M			
MOTOR						
Motor Observations						
The motor windings meg dead short.						
Motor Recommendations						
Send the motor to Flowserve for inspection, report, and probable exchange motor replacement.						
BOWL ASSEMBLY						
						
The bronze bowl exteriors are in excellent condition.		Bowl bushings exhibit minimal wear and all are within specified tolerance.		Wear ring clearances exceed acceptable tolerances and range from .059" to .084". There is moderate undercutting in the volutes above the wear rings (Typ.).		



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The casting interiors are in good condition (Typ.)

Ten of the eleven impellers have thin cross-sectional measurements...

...and moderate vein tip deterioration.

Bowl Assembly Observations

This all bronze bowl was installed in Well 23 in 1985. According to Layne records, it had previously been installed in Well 16. The bowl's bronze casting are in very good condition. Ten of the eleven impellers are showing their age with thinning skirts structural members and general metal loss deterioration. The eleventh impeller was installed as a good used impeller during the 2015 repair, replacing one impeller at that time that was also thin and worn. The impeller shaft is in good condition. The bushings are in good condition and meet clearance specification. The wear rings exceed acceptable clearances. The stainless steel strainer and fittings, with the exception of the lock washers, are in good condition. Reference attached Bowl Inspection Report.

Bowl Assembly Recommendations

Replace ten impellers with good used. True the impeller skirts and bore wear rings to fit for proper running clearances. Replace stainless lock washers. Apply ceramic coating to the bowls' lower and upper sections, particularly in the undercut areas on the volutes.

COLUMN PIPE

Pipe Observations

Overall, the pipe string is in good condition. One male thread exhibits corrosion.

Pipe Recommendations

Cut and apply new thread to the questionable male end.

DISCHARGE HEAD

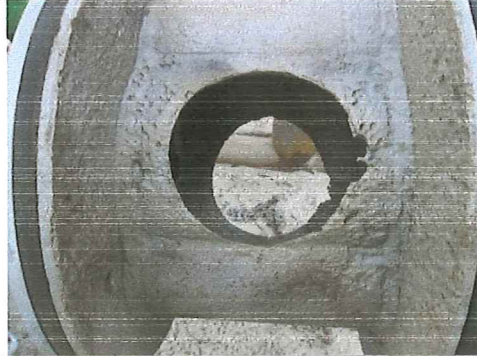


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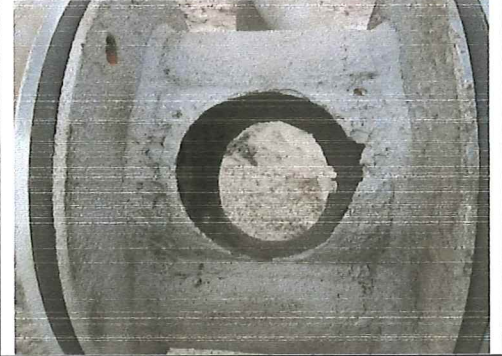
CITY OF AURORA WELL #23 PUMP INSPECTION REPORT



22x22 Baker pitless spool and lift out assembly after sandblasting



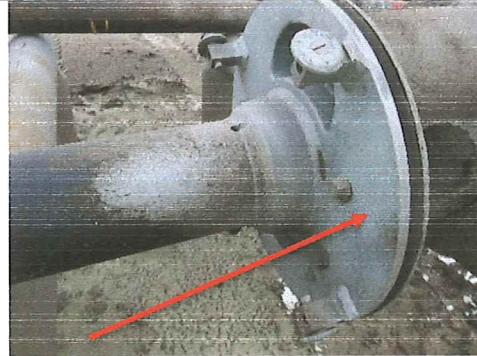
Spool ports have heavy corrosion at their edges.



Same, opposite port.



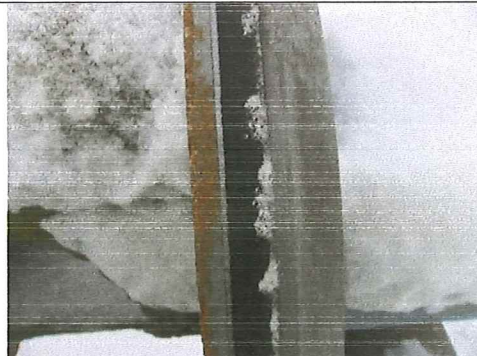
Interior of the spool has moderate metal loss



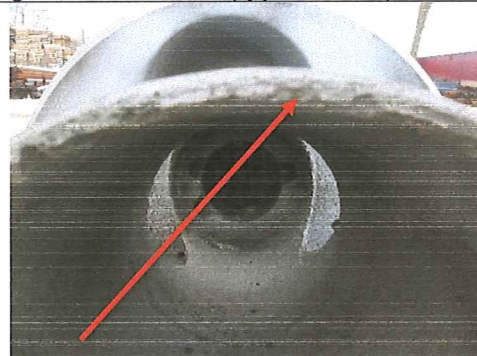
Outside o-ring flanges are in good condition (typical of both)



Interior o-ring flanges have moderate pitting (typical of both)



O-ring slots are in good condition (typical of both)



The ex-heavy 10" nipple face is heavily pitted.

Discharge Head Observations

The round ports in the spool have heavy corrosion on their edges. The interior of the spool and the spool flanges have moderate pitting but the corrosion does not appear to threaten the spool's integrity. The flanges' o-ring slots are in good condition. The worst of the spool's corrosion is at the spool port edges. The spool structure that is vital to sealing the spool within the pitless body has some corrosion but is still functional. The 2015 TV survey showed the interior of the pitless body in good condition.

Discharge Head Recommendations

Consider televising the interior of the pitless body to confirm if it remains in good condition and capable of sealing the spool port discharge. Consider replacing the spool and lift out assembly with a new unit versus replacing the ex-heavy nipple and applying an epoxy coating to the current spool.



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WELL #23 PUMP INSPECTION REPORT

CABLE

The cable / flat cable assembly was HiPot tested in Layne's yard. The assembly passed the test and is suitable for reinstallation. Reference attached Cable High Potential Test record.

WELL

The well has a history of producing sand. While the sand production appears to be on the decline, it is still a factor. The well's original total depth is recorded as 1424' below ground level (BGL). In 2003, sand was bailed from 1390' to 1421'. In 2015, sand was bailed from 1390' to 1428'. The current total has been measured at 1405'. Recommend sand bailing operation while the pump is removed.