



WATER · MINERAL · ENERGY

September 13, 2018

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

Re: Well 18

Mr. Leible:

The Aurora Well 18 Byron Jackson submersible pump has been removed; 10" Line Pipe racked on site; and the bowl and motor have been inspected. Please find the Aurora Well 18 Pump Inspection Report (PIR) attached. The reason for the pump's low capacity is apparent via a large hole in the Line Pipe. Also, it is probable that the lower surge control's flaps became fixed in the closed position.

The site configuration requires pump joint removal, and reinstallation, over the pump house roof. Consequently, an additional man and a crane are needed on this site as compared to an open site, pitless adapter location.

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

- 1. Labor and equipment to date to remove pump, handle components, inspect bowl and motor \$ 48,165
- 2. Transport Line Pipe to Layne yard, estimate \$ 5,000
- 3. Sandblast Line Pipe for inspection, estimate \$ 3,000
- 4. Service motor, estimate \$ 10,000
- 5. Hi-Pot test cable \$ 1,035
- 6. Televise Well \$ 1,350
- 7. Rebuild bowl assembly, estimate \$ 20,500
- 8. Rehabilitate up to (25) joints 10", schedule 60, 8RND, City stock, estimate \$ 20,000
- 9. Cut & thread estimated 20 joints 10" schedule 60, 8RND Line Pipe rehabilitation @ \$250 each \$ 5,000
- 10. (2) 10", 8RND surge control valves @ \$1,736 each \$ 3,526
- 11. 2300V x 35' flat cable motor link, contingency \$ 6,950
- 12. Rehabilitate surface plate elbow, estimate \$ 5,000
- 13. Dynotek transducer assembly, furnish and install to well head \$ 6,950
- 14. Miscellaneous consumables (airline, banding, etc.) estimate \$ 3,000
- 15. Remobilize with pump components, set and test pump, estimate \$ 55,000

Total Project Estimate \$194,476

WATER RESOURCES

The City is encouraged to visit our yard to inspect the bowl and motor components at any convenient time and to inspect the Line Pipe components once they have been sand blasted for examination.

As always, if you have any questions or comments, please do not hesitate to contact me.

Layne, a Granite Company

A handwritten signature in black ink that reads "W M Balluff". The signature is written in a cursive style with a large, stylized "W" and "M" at the beginning.

William Balluff, P.E.
Senior Project Manager

cc Michael McDonald, Layne Account Manager





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CITY OF AURORA
 WELL #18 PUMP INSPECTION REPORT

JOB NAME	Aurora	WELL	18	DATE	09/10/18
JOB NO.	50711	INSPECTED BY	J. Poppen, T. Healy, B. Balluff		
		BOWL ASSEMBLY	Byron Jackson 12 stage 13/12MQH		
		COLUMN ASSEMBLY	939' of 10" Sch 60 8RND		
		MOTOR	Byron Jackson 350 HP, 16", Type H		

MOTOR

Motor Observations

The motor/cable assembly megged 4000+ megohms from the starter panel and the well head prior to pump removal. The motor/cable assembly megged 350 megohms at the surface and the motor megged 680 megohms on its own. The crew noted high humidity during the surface megging. The motor megs 1892/2064/2164 in yard. The exterior body has some moderate pitting. The seal floats and rotation is good. Shaft projection exceeds spec due to shims. The balance tube is clear but crimped. Reference attached Motor Inspection Report.

Motor Recommendations

Perform standard field service. Epoxy fill exterior pits. Replace balance tube.

BOWL ASSEMBLY



Bowl exterior pre sand blast



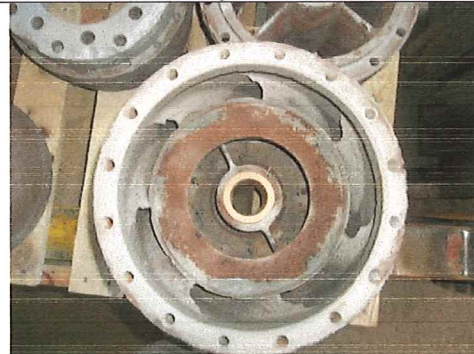
Bowl exteriors post sand blast



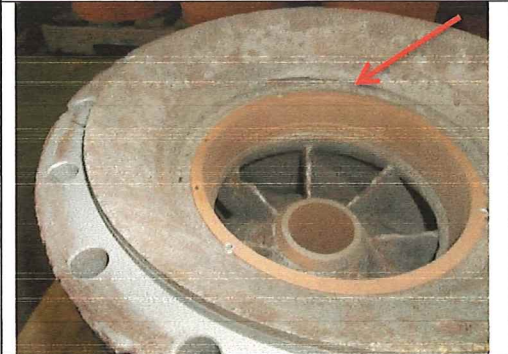
Bowl exteriors post sand blast



Wear ring and bushing clearance tolerances exceed acceptable



Moderate vein erosion (Typ.)



Undercutting above wear rings (Typ.)



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Impeller shaft is lightly worn in bushing areas and has one area of heavy pitting

Stainless screen in good condition

Motor adapter bracket erosion

Bowl Assembly Observations

The bowl assembly exteriors have light erosion throughout. Throughout, the bowl assembly interior has moderate vein erosion and undercutting in the throat above the wear ring. The motor adapter bracket has localized heavy erosion. All erosion to the casting bodies are in locations of thick material construction.

All bushing and wear ring clearance tolerances exceed specification. The impeller shaft has light wear in the bushing areas and heavy pitting in one localized area. The stainless screen is in good condition. The carbon fittings are in very poor condition.

Reference attached Bowl Inspection Report.

Bowl Assembly Recommendations

Rebuild bowl with new custom wear rings, bushings, and impeller shaft. Ceramic coat bowl interior. Install stainless fittings.

COLUMN PIPE



10", Sch 60 8RND T&C Line Pipe racked at Aurora Well 18 site. Large hole in 41st joint from top, four joints above bowl

Significant deposition on pipe interiors.

Lower surge control "locked" in closed position.

Pipe Observations

The entire string of pipe has significant buildup of deposits on its interior, particularly below static water level. Large hole in the middle of the fourth joint above bowl and just below lower surge control valve which appears to be wedged in the closed position. Prior to pipe clean up, it appears that at least



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eleven joints of pipe will require replacement.

Pipe Recommendations

Bring entire string to Layne yard for inspection sand blast.

DISCHARGE HEAD

The surface discharge elbow remains on the site.

It appears to be in good condition.

Recommend bringing the elbow to Layne yard for clean up and inspection.

CABLE

There was no excess cable at the surface prior to pump removal. The motor megged higher (680) than the motor/cable assembly (350) on a very humid day. The cable jacket appears to be in good condition but there is a wear spot at the location of the hole in the Line Pipe.

Recommend inspect the wear spot closely and Hi-Potential test of motor/flat cable assembly.

BYRON JACKSON MOTOR INSPECTION - TYPE H

Inspected By Jim Gilchrist Date 09/11/18

Job Name Aurora 18 Job # 50711

HP 350 Size 16" Voltage 2300

Motor Serial # 16-251-4-2RB

Meg 1892,2064,2164

Shaft Projection Spec 8 7/8

Shaft Projection Measured 8 31/32

Rotation Good

Float Good

Condition of Stator Can A couple of moderate pits

Condition of Lower Can Good

Condition of O-Ring Joint Good

Condition of Balance Tube Crimped - Replace

Balance Tube Clear? Yes

Comments Put new electrical gasket in cap. Put on new baffle gasket.

Is Motor Field Service Eligible? Yes

Recommendations: Perform standard field motor service. Epoxy fill staor pits. Replace balance tube.



BOWL ASSEMBLY INSPECTION REPORT

Project		Aurora		Well No.	18	Date	9/6/2018
Project No.		50711		Inspected by		Jeff Poppen	
Serial No.				Bowl Assembly		13/12 MQH	
Stage No.	Wear Ring	Impeller Skirt	Clearance	Bearing ID	Impeller Shaft	Clearance	
1 (suction)	6.554	6.479	.075"	1.950	1.935	.015	
2	6.541	6.479	.062"	1.953	1.935	.018	
3	6.548	6.479	.069"	1.953	1.935	.018	
4	6.542	6.478	.064"	1.954	1.935	.019	
5	6.540	6.478	.062"	1.954	1.935	.019	
6	6.563	6.477	.086"	1.955	1.935	.020	
7	6.544	6.477	.067"	1.955	1.935	.020	
8	6.540	6.476	.064"	1.956	1.935	.021	
9	6.535	6.477	.058"	1.956	1.935	.021	
10	6.535	6.477	.058"	1.956	1.935	.021	
11	6.527	6.478	.049"	1.955	1.935	.020	
12	6.537	6.478	.059"	1.955	1.935	.020	
13			Top Bowl	1.954	1.935	.019	
14			Port Body	1.950	1.935	.015	
15							
16							
17							
Impeller Shaft	1 1/16 x 187 9/16 – Lightly worn bushing areas. Area of heavy pitting.						
Fasteners	Carbon Steel fasteners in very poor condition.						
Strainer	SST. - O.K. to reuse						
Collets	SST. - O.K. to reuse						

COMMENTS: Impellers in good condition. Pump casting have heavy-medium pitting and erosion.

WATER RESOURCES