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PUBLIC WORKS COMMISSION
OF THE CITY OF FAYETTEVILLE

ELECTRIC & WATER UTILITIES
January 9, 1997

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To: Mick Noland
Through: Kevin Christmas
From: Vernon Madrid w\ 
SUBJECT: SUMMARY OF HP PUMP #5 RECONDITIONING AND COATING

On June 21, 1994 a test was conducted involving #5 High Pressure Pump at the Hoffer Water Plant. The purpose of the test was to evaluate its efficiency and capacity comparing it to the original factory curve. The test concluded that efficiency was down 14% * and capacity was down 1,387 gallons/minute. ** I met with Kevin Christmas to make him aware of the test results. We agreed that because of our experience dealing with inaccuracies of factory tests, the pump operating smoothly, and lack of budgeted funds, no action would be taken at that time.

On April 2, 1996 the pump developed an unusual noise which we felt deserved immediate attention. Acting on the recommendation of Kevin Christmas I gathered the test data from the 1994 test and met with Victor Ganjehsani for his review and professional opinion. After careful review Victor Ganjehsani agreed with our conclusions of the above mentioned test. We agreed that now was the time to have this pump reconditioned and prove or disprove the original factory curve.

Previously I had been contacted by Logan Porter with Belzona Carolina Inc. concerning an internal pump coating called Belzona Supermetalgilde. He claimed this product had been proven to increase pump efficiency by 7%. In our major pump applications this could mean a savings of thousands of dollars per year in electrical costs depending on the size of the pump. I requested the actual test data of this coating which was provided. I again met with Victor Ganjehsani to show him the information I had received concerning this coating. We agreed that in this application a 1% increase in pump actual efficiency translated to nearly \$1,000/year in electrical savings. (Average daily operation of 8 hours/day). The cost of coating this pump was less than \$2,500.00. We agreed that an increase of as little as 2% would make the coating cost-effective and therefore decided to use the product.

Johnston Pump Company was contracted to completely recondition the pump using Belzona Supermetalgilde. The total cost of the repair was \$20,646.00. I asked Johnston Pump



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Company to evaluate the condition of the pump after initial inspection and estimate how much of an increase in efficiency we could expect. Their comments were as follows.

1. Wear rings were out of tolerance.
2. Minor impeller work was needed.
3. Estimated efficiency increase expected 5-8%.

The pump was completed and reinstalled on May 5, 1996. The results after reconditioning are as follows:

1. Pump efficiency is up 17% *** which translates to an annual electrical cost savings of \$15,683.00.
2. Pump capacity is up 905 gallons/minute. ****

There is a question of how much of this increase in efficiency was due to the actual pump work and how much because of the coating used. After reviewing all the data with Victor Ganjehsani we agree that the use of this coating is responsible for at least 5% to 8% of the increase.*

I personally want to thank Kevin Christmas and Victor Ganjehsani for their support and guidance. This project stands to save Public Works Commission a substantial amount of money over the life of this pump.

VM/sr

CC: Kevin Christmas
Victor Ganjehsani
Tom Speight
Amy Ratliff

enclosures

Reasons for the increase - Key

Comparison between 1994 field test and field test after recondition

Pump total head in feet	Efficiency	
	Field test June 1994	Field test after reconditioning
276	71%	81%
295	68%	83%
313	63%	83%
333	59%	81%
average	65%	82%

*** 82% - 65% = efficiency up 17%

Pump total head in feet	Capacity	
	Field test June 1994 gallons/minute	Field test after reconditioning gallons/minute
276	5507	6007
295	4806	5688
313	4306	5382
333	3813	5042
average	4625	5530

**** 5530 - 4625 = capacity up 905 gallons/minute

#5 High Pressure Pump (Hoffer Water Plant)
600 HP

Normal operating range is between 276 feet and 333 feet (depending on distribution system conditions and operating in conjunction with other pumps). Four operating points were selected within this range. Using these four points an average is obtained.

Comparison between 1976 factory test and 1994 field test

Pump total head in feet	Efficiency	
	Factory test January 1976	Field test June 1994
276	85%	71%
295	81%	68%
313	77%	63%
333	72%	59%
average	79%	65%

* 79% - 65% = efficiency down 14%

Pump total head in feet	Capacity	
	Factory test January 1976 gallons/minute	Field test June 1994 gallons/minute
276	6500	5507
295	6100	4875
313	5850	4306
333	5600	3813
average	6012	4625

** 6012 - 4625 = capacity down 1387 gallons/minute