DERAGGER MEMORANDUM

SUMMARY

Over the last several years, the City of Palestine Wastewater Plant has experienced, firsthand, the hazards presented by the use of popular flushable rags, as well as other un-flushable material and trash appearing in the City's sewer system. It is no secret that municipalities across the nation are having the same issues, leading some to litigation against baby wipe companies who market "safe for flushing" baby wipes. City of Palestine employees proactively sought a permanent solution, and, in their tireless research efforts, found what the City of Palestine believes to be a positive, permanent solution.

In September 2017, the City of Palestine became the first city in the State of Texas to partner with Clearwater Controls to install the DERAGGER, a retro-fit device capable of detecting and correcting clogs created by wipes and other trash *before* catastrophic machinery failure. Since its installation, the Wastewater Plant has had zero incidents, saving workplace injury, eliminating employee overtime and preventing future equipment failures. The cost of the DERAGGER paid for itself within one month!

The City of Palestine believes that other municipalities should follow suit in the installation of this critical equipment, effectively making taxpayer money and employee safety top priority.

PROJECT DESCRIPTION

A. STRESS ON EXPENSIVE CITY EQUIPMENT AND TAXPAYER MONEY

Wastewater personnel began noticing volume loss on the City's return-activated sludge (RAS) pumps, followed by the pumps tripping their overloads. The City was forced to begin cleaning hazardous materials, such as rags, razors, needles, from the pumps once to twice per month. Over a period of a few months, those cleanings increased to once or twice per week, and, ultimately, those cleanings were performed nearly every day of the week.

Maximum Breakdown:

- Pumps at Wastewater Plant   3
- Maximum Days Pumps Cleaned of Hazardous Materials   7
- Total Maximum Cleanings/Breakdown of Equipment Per Week   **21**
- Total Manpower Hours Required for Cleanings/Breakdown of Equipment
  at 2 employees per occurrence and up to 4 hours of labor (mostly overtime)   *168*
- **Estimate of maximum overtime cost to taxpayer per week $3024.00**

Not included in the above costs:

- The cost of normal day-to-day operations of the Plant
- "Call-out" overtime hours that accrue when pumps trip after hours

- TCEQ violation fines, which could occur if any of the three RAS pumps trip at night, and personnel cannot get to the plant fast enough to stop a non-compliant event
- The cost of replacing the expensive equipment itself due to the wear and tear from the rags and the process of removing them.

1. Safety Issues:

Most notably, each time a pump trips due to clogged rags, staff safety is at issue. More specifically, to unclog the rags, staff is forced to blindly reach around and behind a sharp impeller, creating hazardous conditions for staff (i.e. razor blades, sharps, etc. inadvertently discarded by residents). Minimizing pump shutdowns is critical to staff safety and overall Plant safety.

2. Wear and Tear on Machines:

Wear and tear on the expensive equipment is also at issue. Each time a pump encounters discarded rags, the pump sustains compounded damage, which could lead to catastrophic failure and expense to the taxpayer. Each shut down requires disassembly and reassembly in order to access the clog. This process certainly shortens the life of the equipment.

3. Reallocation of Manpower:

In addition to the wear and tear on the machines, each shut down costs the Plant manpower hours otherwise dedicated to the general operation of the Plant. For instance, each shut down requires no less than 2 employees to clear the clog, and that process takes approximately 2 to 4 hours, if no other problems are encountered. A total of 8 man hours per clog, at a maximum of 7 clogs per week, per pump, totals a maximum of 168 man hours per week.

4. Other Expenses Related to Pump Failure:

Plainly, each time a pump is shut down, a financial burden is cast upon the City. Manpower hours are wasted, including the accrual of overtime. The taxation on the pumps causes an increase in the Plant's cost of electricity. The constant take down and reassembly of the pumps shortens the pumps' efficiency and, ultimately, its lifespan, which in return could prove catastrophic to the Plant's budget. Safety hazards have the propensity to create costly injuries to staff. The remainder of the Plant also suffers due to the focused attention required to get the down pumps back online.

B. PUMP SOLUTIONS TRIAL PERIOD

1. Initial Trial Run

In September 2017, the City met with Kenneth Allen of Pump Solutions, Inc. concerning a product that could possibly help the City's RAS pumps ragging problem. After meeting with officials, a 90-day free trial of the DERAGGER on the City's most problematic RAS pump began. During the installation, the DERAGGER program monitored the amperage and voltage on RAS #2 after it was cleaned to get an accurate baseline for that specific pump. Company and Plant personnel worked together to develop a plan/program best suited to meet the needs of the Plant.

The installation was painless; there were no drastic modifications to the existing VFD control panel. (The hardware is small and does not take up much room inside the panel. The display/keypad is approximately 3" x 4" and can conveniently be mounted anywhere).

During the trial period, we closely watched the RAS pumps amperage and performance. We noticed when the amperage would start to slightly rise due to rags hanging on the impeller. The DERAGGER would catch the rise and go into a clean cycle. The clean cycle slowly stopped the pump, reversed the pump, and then restarted the pump forward, which brought the pump back to its base line amperage. The reverse cycle is the "magic" of the DeRagger. The DERAGGER slung the rags off of the impeller, which allowed the rags to run through the pump once it started back in its normal direction. We set our program to go through two (2) clean cycles per occurrence to ensure the rags completely moved through the pump.

2. 90-Day Assessment

During the free 90-day trial, we did *not* have to clean out the RAS #2 pump one single time. Kenneth contacted the Plant shortly after the trial period expired, and we informed him not only did the City want to purchase the product for RAS #2, but the City also wanted to install the DeRaggers on all RAS pumps.

3. Installation of DeRaggers on All RAS Pumps.

DeRaggers were installed 3 days later, and the City could not be more pleased. We have had the opportunity to play with the DERAGGER programs to fine tune the program to best suit the Plant's needs in a constantly changing wastewater environment. The software is easy to use by our operators with a laptop. We have also installed a DERAGGER configuration tool. This is a highly recommended product for any industry with pumps where rags and/or trash are a problem. We are currently in the works with Jimmy Giles, an associate with DeRagger, on the use of DeRaggers in all City lift stations with 3-phase power to better utilize the product's effectiveness.

C. CONCLUSION

Although it is difficult to place a dollar amount on the extensive savings value of the DERAGGER, the new equipment has certainly proven itself to be an invaluable asset to the City. Since installing the equipment on all three pumps, there have been zero clogs, zero injuries, and zero overtime hours committed to the unclogging of the RAS pumps. The cost of the DERAGGER has paid for itself in the savings.

The City of Palestine holds the privilege of being the State's pioneer in the placement of an incredible solution to an age-old problem. We believe that the continued use of the DERAGGER equipment is critical to the day-to-day efficiency, safety and operation of the Plant. The City of Palestine also believes that other municipalities should follow suit in the installation of this critical equipment, effectively making taxpayer money and employee safety top priority.