



## **Agenda Commentary**

**Item Title/ Subject:** Telemetry Control System for the Neptune Pump Station and water towers on Neptune, 18<sup>th</sup> & Broadway, and 28<sup>th</sup> & I-40

**Staff Source:** Arnold Adams, Public Works Director

**History/Background Information:** Our current Telemetry System was installed in 1982. It has been in need of replacement for several years due to parts that can no longer be serviced. Electronic equipment at the Water Treatment Plant is also 30 years old.

**Item/Subject Summary:** Due to the recent chlorine leak at the Water Treatment Plant all the electronic equipment is in ruin and will be replaced. The replacement process will mean upgrading to newer versions which will in turn require replacement of equipment in town so the systems match. Matching systems will insure all pumps remain running to keep the water towers full of water.

**Price/Cost:** \$49, 159.00

**Recommendation:** After speaking with several equipment suppliers, I recommend Worth Hydrochem. We have good working relations with them and I believe they have equipment available to match the equipment at the Water Treatment Plant. In addition, they are local so if any issues should arise they would be immediately available for assistance.

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Water Treatment  
Chemicals  
Water Softeners/Salt  
Acid/Chemical Cleaning  
Service

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October 3, 2011

City of Clinton  
ATTN: Arnold Adams  
P.O. Box 1177  
Clinton, OK 73601

**RE: Updated Proposal for a Telemetry/Control System for the Clinton Water Treatment Plant and Other Locations**

Dear Mr. Adams:

We are please to submit this updated proposal for supplying a new telemetry/control system for the water treatment plant (WTP), 2 million gallon, Neptune and West High water towers and Neptune and 18<sup>th</sup> and Broadway pump stations. This proposal is an update to our original proposal dated September 13, 2010 and is based on our discussions at our meeting on September 23, 2011. There are no written specifications or requirements for this system, so this proposal is based on discussions about how the existing system works and what you want the new equipment to do. **The price for the system described herein would be \$49,159.00.** The option to modify the 2 million gallon tank's Clinton WTP inflow ClaVal so that its position can be controlled from the 18<sup>th</sup> & Broadway pump station or the WTP **would be an additional \$12,223.00.** Worth would supply and install all equipment described and do all programming needed and Clinton personnel would need to define all equipment operation and give input on control design and operation.

**General System Description:** The system will be based on RFScada Remote Telemetry Units (RTU's) made by Data Delivery Devices (DDD) in Bartlesville, OK and Allen-Bradley Programmable Logic Controllers (PLCs) interfaced with EZAutomation touchpanels for displaying readings and changing setpoints, etc. To make the systems independent there will be two types of telemetry radios – Digi XTend low powered spread-spectrums for communication from the water towers to the pump stations and Maxxon high powered 5 watt UHF radios for communication from the WTP to the pump stations. Both of these types of radios are non-proprietary and can be purchased on the open market so you won't be tied to a specific supplier. The price includes the cost of the FCC license needed for the UHF radios – Clinton will have to fill out the FCC paperwork for the license. Worth will supply and install all needed RFScada units, PLC's, touchpanels, antennas, coax cable, etc. to have a complete system to monitor and control the water towers and pump stations listed herein. It is assumed that all work can be done by Worth Hydrochem without having to climb any higher than 15 feet off of the ground for antenna work. It should be noted that the old telemetry system will be removed when the new system is installed and there may be a short amount of time after the old system has been removed and as the new system is being installed that the booster stations will have to be run by "hand" in manual mode. This will be the responsibility of Clinton to run the system in manual mode while this is going on but we will try and make this time as short as possible.

**Time for Work:** It should take four to six weeks from receipt of order to get equipment ordered, received, programmed, etc. Worth has included the following trips and time for the system: One trip to Clinton to work with operating personnel on defining exactly how the telemetry/control system is to be programmed, what inputs/outputs do at each location, plan how new PLC's are to be programmed and installed, etc. We will then have the PLC/touchpanel software programmed on the new equipment per Clinton's instructions at

our shop. We would then make up five additional trips to Clinton to deliver and install all equipment (one day for each location). We have included a follow-up trip after some time has passed to work with Clinton on any changes needed in programming and to do any follow-up training needed. The entire job should be done within a total of three months from receipt of order barring any scheduling delays due to Clinton's needs.

**Water Treatment Plant:** There has already been an Allen-Bradley MicroLogix 1400 PLC with the needed input and output modules installed at the WTP for other control work that we have been doing for Clinton. This proposal would add a 5-watt UHF radio to allow this PLC to communicate with the PLC's at the two pump stations. It is assumed that the existing radio antenna pole, coax, etc. can be used with this new system – we will include a new Yagi antenna. The WTP PLC communicates with the operators via an existing EZAutomation 8" color touchpanel mounted on the WTP master control panel. There will also be software from the touchpanel manufacturer provided to Clinton that can be used to remotely access the touchpanel from a computer over an Ethernet network (or the internet with a fixed-IP address internet connection at the WTP).

The WTP PLC and touchpanel will be programmed to have a graphic display of the water system and show the status of all locations with things like Hand-Off-Auto (HOA) switches to manually override the normal control logic. Worth Hydrochem will include all PLC/touchpanel software programming, setup and training of its use. To accomplish this, Clinton will need to work with Worth to define how all included systems work and how they want the control/touchpanel program to be designed – graphics, logic of pump station operation, water tank levels, etc. We have included all time necessary for this coordination as well as a trip to Clinton to setup, startup and train operators in the use of the control/touchpanel system.

**Water Towers:** There are three water tower locations to be included – Neptune, West High and 2-Million Gallon. The Neptune and West High towers would each have a 4-channel RFScada unit with low powered spread spectrum radios installed at the tower's base. These RFScada units would be equipped with an internal battery backup so they can operate for up to 12 hours or so without AC power. It is assumed that the existing antennas, mountings, coax cable and pressure transducers at these towers can be used by the new system – if any of these are not operational it would be additional monies to replace. The pressure transducer for the 2-Million Gallon tank will be read directly by the PLC system installed in the 18<sup>th</sup> & Broadway pump station, so no radio unit is needed for it. The tank levels would be sensed by the pressure transducers and their water levels displayed on the touchpanels at the pump stations and WTP (but NOT at the towers themselves). Clinton will have to define to us exactly how these tank levels will operate other items in the system so this can be programmed into the PLC software.

**Booster Pump Stations:** These two systems would consist of an Allen-Bradley MicroLogix 1400 PLC with the necessary input and output cards to interface with all of the needed equipment in the pump station. There would be an 8" EZAutomation touchpanel at each pump station for operator interface. Each pump station would communicate with its respective water tower using a low power spread spectrum radio and with the WTP using a separate high powered 5-watt UHF radio. **This will allow each pump station and water tower system to be "stand alone" and will operate even if the WTP is down or communication with the WTP is lost.** All equipment will be mounted in the existing control cabinet in the pump station – all existing controls in this cabinet will be removed and "blanked" out. There will be new H-O-A switches installed for each booster pump to be wired so that the pumps can be run in "hand" with these switches if there is a failure of the telemetry/control system. Because the antennas and mounting poles at these locations are in pretty bad shape, new antenna mounting poles (20 ft. max height), antennas and coax will be included. One digital output relay (10 amps at 230 volts rated) per pump will be used to send the signal to turn each of the two or three (depending on which pump station they are in) existing booster pumps on and off. We have assumed that the existing pump motor starters can be used without modification by just wiring in a new 10 amp relay. The pulse signal from the existing flowmeters will be wired into an input module of

the PLC so this flow/totalizer information is available on the PLC network. This assumes that the signal given by the flowmeters is a "standard" pulse-type signal – if they are different will have to include different equipment that might be more money.

The PLC systems included can be expanded by adding input and output modules. This would allow additional equipment such as variable frequency drives (VFDs) for the three booster pumps, variable output bleach pumps, etc. be controlled in the future. Additional input channels can be added that can be used for future equipment that could include chlorine analyzers, pressure transmitters, etc.

**OPTIONAL Clinton WTP 2 million gallon tank inlet valve control:** There currently is a 16" ClaVal brand altitude valve on the 24" water line from the Clinton WTP to the 2 million gallon storage tank on the north side of the tank. This valve would be converted into one that can be controlled from 0 to 100% opened via the PLC control system to control the rate of flow from the WTP to the 2 million gallon tank with this option. The valve position can be set at either the 18 & Broadway pump station or from the WTP touchscreen by entering the percent open number. Worth will supply the ClaVal pilot kit, electronic valve position transmitter and 131VC-1 electronic control module for this valve and will install and program it. The PLC control system will be programmed to display current valve position and allow the operator to enter a new percent open value for the valve. Worth has assumed the following for this option: Clinton to run two ¾" electrical conduits from the 18<sup>th</sup> and Broadway pump station to the valve vault for 110 volt power and control wiring, the existing "internals" of the ClaVal (diaphragm, stem, seat, etc.) are all functional and the isolation valves ahead of and behind this valve hold so the valve can be isolated to install the needed hardware. If the valve needs any internal repairs or if the isolation valves don't hold there would be additional charges to correct.

**SCADA computer note:** The system proposed here would be easily incorporated into a SCADA computer system at the WTP, but this is NOT included in this proposal. The PLC at the WTP could easily be interfaced with a SCADA computer that would give the SCADA computer access to all registers (numbers and on/off statuses) in the entire system. The SCADA software could be written to be able to monitor all of these registers and control and change setpoints for anything in the system. The SCADA computer could then be used to log, graph, display, alarm, etc. any of these registers and be accessed over the internet by anyone needing access from any computer. Worth could provide you with a proposal to supply and program this SCADA computer system if you desire.

Thank you for the chance to submit this proposal and I hope we can be of service. Feel free to call us if you have any questions or need any additional information. This proposal is good for 30 days.

Sincerely,



Mike Girdner, P.E.

MG/tbm  
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