



A. W. SCHULTZ, INC

6861 Martindale, SHAWNEE, KS 66218

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Anthony Dahl

City of Independence Water Department

Operations Supervisor

adah1@indepmo.org

14700 East Cement City Road

Independence, MO 64058

RE: Courtney Bend WTP Radio Infrastructure and SCADA Improvement Project

Dear Mr. Dahl,

Recently, A.W. Schultz was tasked by your office to review existing SCADA and SCADA communications infrastructure and develop a proposed design to upgrade and modernize the system to ensure improved functionality. A.W. Schultz was contacted as a result of being the contracted installation contractor for the 2016-17 SCADA upgrade at the Courtney Bend WTP. A.W. Schultz identified several areas of recommended improvement and ultimately provided a custom proposal addressing all identified areas. It is our belief that all sections of this proposal provide value added services and components that are unique and may be unmatched in either specifications or service from similar components from competitors in industry. We offer the following demonstration of the features and benefits that may be realized in pursuing the proposed upgrade design:

XetaWave Wireless Communications

The existing well fields have the SCADA signals hardwired back to the plant. In general, this is a reliable way of communicating the data, however, this infrastructure is aging and there are a number of signals that are unreliably communicating back to the plant or not communicating at all. The customer's request was to install wireless communications between the well fields and the plant to improve data acquisition for these assets. AWS proposed using XetaWave spread-spectrum radios on an unlicensed band. While there is no shortage of products that operate in this space, XetaWave's offering is unique and superior to those others.

- XetaWave offers backwards compatibility, so upgrades or component replacement over time is seamless and ensures no lost operations time. Competitor products do not offer this feature.
- All XetaWave products are fully designed and built domestically in the United States. This is not true of most competitors' products.
- XetaWave and A.W. Schultz both have robust stock and integrated supply chain, ensuring replacement parts to be readily available.
- XetaWave offers dual radio configurations that enable repeater stations within one device, saving cost, space, and installation. Most competitors do not offer this feature.
- XetaWave operates on Advanced Encryption Standard (AES) for secure systems. This operates on blocks of data using a 256-bit key. Competitor products max out at 128-bit keys.
- The AES-256 encryption is the highest bit key available and is included in the U.S. Government's FIPS Publication 197 as approved to protect up to TOP SECRET. Additionally, A.W. Schultz has received approval for XetaWave for all three primary DFARS contract requirements with the government for use in military facilities. The DFARS are associated with safeguarding defense information controls (48 CFR § 252.204-7008), cyber incident reporting (48 CFR § 252.204-7012), and regulations on cloud-based computing services (48 CFR § 252.204-7010). We have this product in operation at no fewer than 200 installations at seven military bases.
- Further, XetaWave offers no cloud-based hosting solutions or services. While this can offer convenience for certain customers, it is more susceptible to hacking via vulnerabilities in cloud infrastructure.
- The radios, in most cases, offer data throughput at quicker rates than most competitors, ensuring more up-to-date and quality data acquisition.

SCADA Application Development

There are necessary updates required to the existing application developed for plant control. There are update requests to the existing control screens and some updates associated with additional plant work that are a part of the scope within this proposed upgrade.

- A.W. Schultz and our consultants were the original integrators contracted and present for the 2016-17 SCADA upgrade and our intimate knowledge and experience with the system enables us to offer a quicker structured development on the upgrade.
-

- A.W. Schultz and our consultants have been involved in plant maintenance on the SCADA systems since the original upgrade and this continued presence further supplements familiarity and development quality and service. This knowledge allows for quicker development with less down time and operations interruptions.

It is our steadfast credence that our proposal offering is superior in specification and service to any potential competitive offerings. The uniqueness of hardware components and superiority of software development services lends A.W. Schultz's proposal offering as one that may be unparalleled.

We sincerely appreciate your time and review of our initial proposal and all supporting documentation and entertain any additional inquiries either specific or general as they may relate to the proposal and all sections.

Thank you.

Best Regards,



Steve P. McGhee



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INDEPENDENCE
★ FINANCE & ADMINISTRATION ★

**PROCUREMENT
LIMITED SOURCE JUSTIFICATION
Purchases Above \$5,000**

A Limited source is defined as:

A purchase that is clearly and legitimately limited to a single source or supply.

- A. If more than one company can respond to your specifications, it is not a Limited source.
- B. The use of Limited source purchases shall be limited only to specific instances, which are totally justified to satisfy compatibility or technical performance needs.

All Limited source purchases shall follow the City of Independence Procurement Policy Section 13.A - B.

I REQUEST THAT THE REFERENCED PURCHASE BE DECLARED A LIMITED SOURCE PURCHASE.

A.W. Schultz, Inc
6861 Martindale Rd
Shawnee, KS 66218
913-307-0399

Estimated cost: \$496,780.00

Purchase Requisition #:

Munis Vendor ID #
Or attach Supplier's W-9 Form

This is a Limited or Limited source purchase because (Check all that apply):

- Licensed or patented – supplier has a license or patent that makes them the Limited provider.
- One-of-a-kind – there are no competitive alternatives available on the market.
- Limited Distributor – Supplier is the Limited distributor for the region or municipality
- Compatibility – must match existing brand or equipment for compatibility.
- Warranty/Replacement part – for a specific brand or factory authorized warranty services.
- Grant – Requirements for specific goods/services established in the grant language. Attach grant for support.
- Unique design – must meet physical design or quality standards.
- Public Utility Services – Necessary adjustment of utility facilities
- Other - _____

- If the justification for Limited source is "Standardization" then additional supporting documentation must be provided. *
- Procurements of items which the City has established a standard of designating a brand name or manufacturer or by pre-approving via testing shall be competitively bid if there is more than one supplier for the item.

Describe the proposed goods or services.

Fiber and PLC upgrades for existing communications system. Well Field radio technology to transmit data via radios. Distribution pump station fiber upgrades at (5) Sites. Lime slaking networking upgrades.

What are the specific necessary features that this supplier provides that are not available from other suppliers?

XetaWave (radio) technology along with their PLC components that they installed in 2015 during the first PLC upgrade. Their SCADA tech is who created our current SCADA system. He is the only technician that can work on our SCADA program and perform the work that is being proposed.

Describe your efforts to identify other potential sources and how similar goods or services are unable to meet the required objective.

AW Schultz upgraded our PLC system in 2016. They have the radio technology expertise to transition to our current system. They also have the SCADA technician expertise to minimize disruptions to our operating system while the new work is being completed.

*Testing and Evaluations performed to support standardization.

They have the knowledge to keep our current system uniform throughout the project and able to implement the new with the old without any obstacles.

*How will standardization support the department/agency?	
Is this a one-time procurement? <input type="checkbox"/> No* <input checked="" type="checkbox"/> Yes	*On-going Limited Source procurement requires justification to be renewed every two years.
PRICE REASONABLENESS (Check all that apply and attach back-up documentation)	
<input type="checkbox"/> I reviewed the proposed price to current published catalog, price lists, or market prices as documented in the attachments and the proposed price is similar or less. Attach relevant documentation. <input checked="" type="checkbox"/> Based on my knowledge of the market, my experience of prior similar proposals, or knowledge imparted by technical experts. <input type="checkbox"/> The price is set by law or regulations. <input type="checkbox"/> Other: _____ <input checked="" type="checkbox"/> Back-up documentation is attached.	
STATEMENT OF NEED AND CERTIFICATION: My department's recommendation for Limited source is based upon an objective review of the product/service required and appears to be in the best interest of the City of Independence. I know of no conflict of interest on my part or personal involvement in any way with this request. No gratuities, favors or compromising action have taken place. Neither has my personal familiarity with particular brands, types of equipment, materials or firms been a deciding influence on my request to Limited source this purchase when there are other known suppliers to exist. By submitting this form to Munis, I hereby certify that this justification for Limited source procurement is accurate and complete to the best of my knowledge and belief.	
Printed/Typed Name: <i>Matthew L. McLaughlin / Matthew L. M. Laughlin</i>	Title: <i>Deputy Director</i>

Note: If additional space is required, attach additional sheets of paper and submit with this completed form.



INDEPENDENCE

* WATER DEPARTMENT *

MEMORANDUM

DATE: January 17, 2024

TO: Richelieu Sese, Finance & Administration Dept. Procurement Specialist

FROM: Anthony Dahl Water Production Operations Supervisor

SUBJECT: Municipal Services Water Production Courtney Bend Water Treatment Plant Fiber/PLC Capital Project Background Information

This project consists of replacing aging PLC components along with programming the components to work with our existing SCADA system. The current PLCs at each reservoir are twenty plus years old and the infrastructure is failing. This project will upgrade the PLCs at each reservoir. The reservoirs are relied upon to maintain sufficient water to the distribution system and to run those reservoirs we need constant communication via SCADA.

The other portion of this project is updating our communication to our existing well fields. Right now, the well fields communicate with hard wire components, but we are limited to what data can be transmitted via SCADA due to the aging infrastructure. There will be a radio system installed at each well field that will communicate back to the water treatment plant. This allows us to transmit more data that can be useful to the operations of the treatment plant. This will limit downtime and keep sufficient raw water coming into the plant to meet system demands.

The last portion of the project is tying in our current slakers to our plant PLC via ethernet. This will allow more info to be streamlined to our SCADA system to where we can diagnose slaker issues sooner. SCADA HMI's will be updated to represent live data instantly to the operations booth for timely troubleshooting.

Technology is constantly changing, and we are trying to stay ahead of the changes. Our infrastructure is getting to the point where parts and components are getting harder to find. This project should help alleviate some of those issues in the future.

The fiscal impact to the City is \$496,780.00. Funding for the Municipal Services Water Production Courtney Bend Water Treatment Plant Fiber/PLC Capital Project is included in the fiscal year 2023-2024 capital budget, page 262, account number 70402401.

Courtney Bend WTP

Wellfields Radio Infrastructure and SCADA Improvements Recommendations

Submitted: June 23, 2023

Revision 1



A. W. Schultz, Inc

6861 Martindale Rd
Shawnee, KS 66218
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Courtney Bend WTP Wellfields Radio Infrastructure and SCADA Improvement Recommendations

Section 1: General Introduction to A. W. Schultz, Inc

General Introduction

A.W. Schultz (AWS) has provided quality control solutions to municipalities and natural gas facilities, as well as other industrial applications since 1977. We partner and contract with engineering firms, general contractors, vendors, and project managers to provide the best design and product options for each unique project.

We are proud to be certified by Rockwell Automation as a 'Recognized Systems Integrator'. AWS is also designated as a UL508A certified panel shop and a certified member of the Control System Integrators Association. We provide full-service PLC programming and specialize in the development and programming of control systems with Allen-Bradley and also a wide variety of other PLCs.

We have a long history of satisfied customers that received custom SCADA packages with instrumentation and control systems for numerous water/waste water treatment facilities throughout the U.S. and Canada. We work closely with our customers to provide systems integration and technical support and can offer on-site engineering and field start up when applicable.

All of our senior engineers have over fifteen years of experience providing control and telemetry systems and a majority of them have more than one degree in engineering or related fields. Since most of our engineers have worked at AWS for over ten years, our team brings solid experience and a strong commitment to success on every project.

A.W. Schultz been providing SCADA to various municipal and private treatment facilities since 1996. We have experience in large radio-based telemetry systems for many municipalities and military bases.

Requested Proposed Design

We understand there have been many problems with the existing hardwired connections to the wellfields. From our experience on the last SCADA upgrade in ~2017, we can point out some issues we see that contributed to issues with this system's reliability. A radio system must be reliable. Our proposal includes providing providing a spread-spectrum radio system using XetaWave 900 MHz radios. We have found these radios to be incredibly reliable, robust, and fast. We have systems using XetaWave currently installed for > ten locations with individual sites within the individual networks numbering from as few as sixteen remote sites to up to 65. The system we are proposing has 120k/s total throughput.

With our design, we anticipate a complete polling of all of the sites in less than 20 seconds. Currently, for our site located in Ft Sill, OK we poll 26 sites in approximately 20 seconds; Ft A. P Hill, VA for 65 sites in 72 seconds and Wright-Patterson AFB (Dayton, OH) with multiple networks about 1.3 second per site,



multiplied by the number of sites. Ft Belvoir, VA is currently on a serial radio system with 40 sites with a complete polling time of 55 seconds.

AWS will provide a bid using the system at 900Mhz frequency.

Section 2: A W Schultz's Proposed Design

With IT permission, we can enable the system such that it has remote access so AWS can provide online troubleshooting of the computer system and PLCs. AWS would work with the City of Independence's IT group to provide the necessary firewalls, and with the local plant on security issues. This also requires the radio system to have enough bandwidth and reliability to go online with and allow technicians to troubleshoot the PLCs if necessary. We understand this may not be an option. At minimum, we believe with meet our core requirements with our proposal for this project.

Computer Hardware

Fundamentally, the system currently installed for SCADA is appropriate for the application. No changes to hardware are to be considered as a part of this scope. If changes are deemed necessary throughout the course of the project, AWS will work closely with the IT group to resolve.

HMI System

AWS is assuming that the current Aveva/Wonderware System Platform with Archestra application can be fully retained for the existing system(s) with updates and therefore be reused to develop changes to the remote sites and SCADA as proposed.

We do not anticipate changes being required to the existing application software suite. However, modifications within the existing HMI will be required to ensure that the data passed via the radio system will be received and displayed properly within the current application. AWS will subcontract and retain the services of independent contractor, Michael Graeber, who developed the original application and provided PLC programming at the plant level.

Distribution Remote Sites SCADA Panel Replacements

Typical of the following sites: 35th Street Reservoir Pump Station, 39th Street Reservoir Pump Station, Van Horn Pump Station, Chrysler Booster Pump Station, North Main, Dodgion

- AWS will remove the existing control panel and install a complete functional replacement.
- PLC will be a new Allen-Bradley 1769-L24ER-QBFC1B PLC.
- A local OIT will be installed in the new panel. OIT to be Allen-Bradley PanelView Plus 7 Standard model, 7" screen.
- Unmanaged Ethernet switch.
- AWS will program the PLC to match the function of the existing controller.

- AWS will remove and reinstall/reconnect the existing communication equipment associated with the SBC Frame Relay Network. NOTE: This network may have been replaced with fiber optics since we last worked on the stations. In this event, the appropriate fiber patch and connections will be installed in the new control panel.
- AWS will install the above components
- An alternate to this proposal is provided to include a cellular backup for each of the distribution sites.

Wellfields Radio and SCADA System Upgrades

The overall footprint of the system is relatively small, about 1.25 x 1.25 miles. By comparison, other sites we have designed feature a much larger geographical footprint. For example, Fort Sill, OK is approximately the 4.5 x 4 miles and Ft. AP Hill, VA stretches 10.5 x 8 miles. All of our installations use XetaWave radios. Therefore, there are spare parts readily available at our facility. AWS is proposing in essence one radio network that will bring in the data from the remote well sites. All components of the network will be Ethernet-based radio communication.

1. 908-928MHz spread-spectrum radio system. Each of the sites used as part of the system will provide communication for its local sites. The topography for the system will feature two primary areas representing each of the well fields with a radio repeater at each field and with a master radio with a new PLC/data concentrator at the plant.
 - a. The North Well Field will have Wells #42-45 and Wells #47-49 transmitted to a repeater station at Well #46. This site will then repeat the collected data back to the master radio located at the plant.
 - b. The East Well Field will have Wells #35, 36, 38, and 39 transmit to a repeater station at Well #40, repeating data back to the master at the plant. Wells #33 and 34 will transmit directly back to the master at the plant.
2. Install new Wellfield SCADA panels. AWS will provide a lower cost SCADA package design with an Allen-Bradley Micro820 controller. This complete package includes: PLC, NEMA 4X poly enclosure, power supply, 4hr battery backup, and radio. This package is very suitable for well sites and water towers. These are not "power" locations. Currently, AWS is using this package at many remote sites, with over 300 sites in service using this SCADA panel design. This design will result in less expensive repairs, more reliable system, and more overall control. The new PLCs would have a minimum estimated life of 10 years.

NOTE: It is expected and assumed that each of these well sites has available existing AC power to provide connection for the new SCADA control panel.

AWS will guarantee our radio system will be highly reliable with the capability to troubleshoot the system remotely.

Following are similar radio/SCADA systems, we have supplied for in the last 4-5 years.

American Water Enterprise – Ft Sill, total - 40 sites – XetaWave radios - Ethernet
American Water Enterprise – Ft A. P. Hill, - 65 sites - XetaWave radios - Ethernet
American Water Enterprise – Ft Belvoir, total 40 sites – FreeWave radios - serial
American Water Enterprise – Wright Patterson AFB, - 24 sites - XetaWave radios - Ethernet
Missouri American Water – St Louis County, MO - 35 sites - XetaWave and microwave radios - Ethernet
Missouri American Water – St Joseph, MO – 15 sites - XetaWave and microwave radios - Ethernet
Missouri American Water – Joplin, MO - 19 sites - XetaWave radios - Ethernet
Missouri American Water – Warrensburg, MO 9 sites – XetaWave radios - Ethernet
Missouri American Water – Parkville, MO 15 sites - XetaWave radios – Ethernet

AWS does have additional locations where we have implemented these radio systems.

Lime Slakers SCADA Updates

Currently, the Lime Slakers are being included in a phased update. Lime Slakers 2 & 3 have already been upgraded and are Ethernet capable and already available to integrate within the current Wonderware HMI screens. Slakers 5 & 6 have been awarded and will be rehabbed in ~6 months and these will have Ethernet capability. Slaker 6 will get updated in 2026 with the same proposed upgrades. Lime Slaker 4 will stay the same, but is already Ethernet capable with a MicroLogix 1400. In all, all the Slaker data that is available and requested by plant personnel will be worked into a Lime system HMI screens redesign, which will be undergoing some changes anyway with the addition of a new RDP Lime silo addition. The slakers will require an unmanaged Ethernet switch to integrate to the plant communications network in a star configuration. No additional electrical, conduit, or Ethernet cable installation is included. It is assumed this was all provided in the Slaker upgrades.

Spare Parts

Our recommendation would be for the plant to pursue a strategy that includes maintaining spare parts for both PLC and radio parts. Our recommendation for spares, based upon our project recommendations is as follows: (1) complete (Micro820) SCADA panel to mirror the wellfield sites' design, (1) additional Micro 820 PLC, (1) 2080 series AI expansion, (1) Xeta radio of each type supplied, (1) 1769-L24ER controller, Ethernet switch.

Section 3: Installation Approach

AWS is aware of the concern for keeping the existing controls system operational while the new system is to be implemented. AWS's approach is simple. We build the new system alongside the existing system, prepare the sites, and quickly move from old to new. The new radio system will be established and will run parallel to the existing hardwired system. Leaving the existing hardwired signals in place and functional until they may be retired and a site switched over is the approach. Therefore, the existing service will not be disturbed until it completely retired. AWS will prep the remote sites, correcting any cable issues, and installing new equipment for surge protection and antennas. During the prep, AWS may take individual sites out of service for a short period and place it back in service using the new radio

system. Once the prep work is complete, AWS can quickly start moving the remote sites from the old system to the new system, installing the new SCADA/radio panels at each site. At this point, AWS desires to work extended hours. We would request working hours be allowed from 7:00a to 7:00p. In our experience, that will be take approximately ten to twelve working days to transition the 16 sites plus master to the new system. We will have multiple 2-man crews in the field to transition the stations and one 2-man crew to test and confirm the data as it comes in.

As side note, we plan, prep, and fully test before we are onsite. When we start to transition the system, we know the tested system will work properly. We estimate that one hour of testing in the shop saves four hours in the field.

AWS feels communication is very important when we are onsite. We assign one person from AWS to communicate to someone assigned from the plant to have a morning meeting, every morning we are onsite, to discuss the schedule, issues, and expectations. We find this very effective; this simple task keeps everyone coordinated at the operational level and helps to eliminate problems before they occur.

Section 4: References

The following are references and questions you may wish to direct to each.

Valerie Snow – Ft Sill, OK – AWE

Contract Manager

c: 580.471.5488

valerie.snow@amwater.com

A W Schultz recently had replaced your SCADA system. Were they able keep the old system in place and operational when moving from the old system to the new?

Orville Davis – Wright Patterson Air Force Base – AWE

Water supervisor

c: 937.660.0597

orville.davis@amwater.com

Can you describe what level of service A. W. Schultz provides?

Ray Elliot – Joplin, MO – Missouri American Water

Superintendent

o: 417.529.9787

Ray.Elliot@amwater.com

How was your experience with A. W. Schultz compared to other system integrators that may have provided the radio system for you?

Neil Amiri – Missouri American – St Louis, MO

SCADA Manager for Missouri American

o: 314.996.2441

neil.amiri@amwater.com

Have A. W. Schultz and IES provide quality radio systems to meet your expectations?

Roger Sparks – Missouri American – St. Joseph, MO

Engineering Manager

o: 816.233.3317

roger.w.sparks@amwater.com

In your experience, would you describe A. W. Schultz as more of a subcontractor or more of a partner when you work with them on your projects?

Section 5: Experience on Similar Projects

The following is a summary of recent similar AWS projects:

Project: Ft Sill SCADA Improvements

Customer: American Water Enterprises

Date: November 2019

Contact: Valerie Snow
Kenny Simpson

Type: Design-Build

Project Description:

- Upgraded the existing serial-based radio system for the remote locations, consisted of the updating 26 remote sites consisting of 6 water towers, 4 pumps, and 16 lift stations, by installing Allen-Bradley PLCs and XetaWave Ethernet radios.
- Add additional secondary in-plant radio system for equalization basin, digester, generators, plant site lift stations, and water quality stations.
- Provide two remote locations approximately 9 miles away Communications to distant remote sites small water plants via cell modems.
- Automating existing 1990s-era filter control system while keeping the filter system in service.
- Add solar panel system PLC package for lagoons.
- Retiring Intellution HMI system and installing FactoryTalk SE while keeping the HMI system in service.
- Automating various minor processes; equalization basin, digester, generators, lift stations, air compressors and water quality stations. Most of the primary plant equipment had been already automated.

Project: Wright-Patterson AFB SCADA project

Customer: American Water Enterprise

Date: December 2018 and March 2019

Contact: Lance Lively
Orville Davis

Type: Design-Build

Project Description:

- Since this was a transition project, this project was completed in two phases; the transition phase and final implementation.
 - Phase 1: The military was using a base-wide Johnson Controls system to control three different small water plants and accumulating lift station along with their base wide HVAC system. AWE was required to remove the control from the Johnson Control system on December 1, 2018, same day AWE contract was to start. AWS removed the old equipment and installed a new control system, provided a new server, reconfigured the fiber optic drop, developed the alarming system in four working days. This allowed AWE to control their pumps remotely.
 - Phase2: The old hardwired control system to the various remote stations was abandoned and a new Ethernet radio system was installed.
 - Provide and install instrumentation (pressure, level, analytical) at many sites.

Project: Ft A. P. Hill

Customer: American Water Enterprises

Date: Phase 1 2015 | Phase 2 2016

Contact: Gary Manville

Type: Design-Build

Project Description:

- Upgraded the existing hybrid 900MHz serial/400MHz/200MHz radio system for the remote locations by updating 65 remote sites including water towers, wells, booster stations, lift stations, and lagoons. Installed Allen-Bradley PLCs and XetaWave Ethernet radios. System currently polling all 65 remotes and master sites in ~72 seconds.
- Redeveloped the existing Wonderware HMI application with complete graphics overhaul.
- Provide and install instrumentation (pressure, level, analytical) at many sites.

Project: St Louis County SCADA Radio Communications

Customer: Missouri American Water

Date: 2018/19

Contact: Neil Amiri

Type: Design-Build

Project Description:

- Upgraded the existing GE MDS iNet and iNet II Ethernet radio system consisting of 35 sites, by replacing the system with a hybrid 5.8Ghz microwave and Ethernet radio system at 900MHz. The network was a hub and spoke network, divided into five geographical regions.

- Design required system-wide performance of minimum 10 Mbps throughput for backhaul links and 500 kbps throughput for local links.

Project: St Joseph MO SCADA Radio Communications

Customer: Missouri American Water

Date: 2017

Contact: Ron Abernethy

Type: Design-Build

Project Description:

- Upgraded the existing GE MDS iNet and iNet II Ethernet radio system consisting of 12 sites, by replacing the system with a hybrid 5.8Ghz microwave and Ethernet radio system at 900MHz.
- Design required system-wide performance of minimum 10 Mbps throughput for backhaul links and 500 kbps throughput for local links.

Project: St Joseph MO SCADA PLC Replacement

Customer: Missouri American Water

Date: Phase 1 2017 (Well field) | Phase 2 2018 (Remotes) | Phase 3 2019 (Plant)

Contact: Ron Abernethy

Type: Design-Build

Project Description:

- Replaced all existing ControlWave Micro PLCs with Allen-Bradley PLCs from the CompactLogix family.
- Redeveloped graphics and tagging to communicate with new PLCs and Ethernet-based radio system installed in 2017.

Project: Joplin MO – Missouri American Water

Customer: Missouri American Water

Date: 2018

Contact: Tim Gentry

Type: Design-Build

Project Description:

- Upgraded the existing GE MDS Ethernet radio system consisting of 19 sites, by replacing the system with a hybrid 5.8Ghz microwave and Ethernet radio system at 900MHz. The network was a hub and spoke network, divided into five geographical regions.
- Design required system-wide performance of minimum 10 Mbps throughput for backhaul links and 500 kbps throughput for local links.

Section 5: Financial stability

AWS has a bonding capability of \$3M for multiple concurrent projects and up to \$2M for a single project.

Section 6: Project management plan/QA past performance

AWS takes an open approach to project management that includes daily on-site meetings with the client during installation activities. The approach allows the customer to have a continued design influence on project proceedings, without having to assume any additional responsibilities. This communication also allows constant progress evaluation by the customer and helps to improve quality assurance. This model has worked for us in the past with design-build projects. We invite you to contact our included list of references about our approach to project design and planning.

Section 7: Project schedule

Rough Draft Installation Schedule

With the Task Order issued on TBD

Jan 2, 2024*	Receive Task Order
Jan 9	Kick-Off meeting
Jan 9 - 23	Reconnaissance of existing system including: Gathering existing PLC programs, HMI, alarm configuration Gathering any additional wiring diagrams Performing additional site survey of well sites, including tower heights.
Feb 1	Send submittal documentation for the approval by plant personnel
Feb 12-13	Order PLCs, radios, panel equipment, etc.
Feb 1 – Apr 15	Develop PLC programs, construct SCADA panels, prep HMI changes, program local OITs
Apr 15-Apr 29	First crew site prep work. Replacement of antennas, installation of Well SCADA panel and radio network
May 3-May 10	Second crew site prep work. Installation of distribution remote sites SCADA panel
Throughout	Full test of complete system, HMI, PLCs, hardware, and radio system.
May 10 – Jun 10	Punchlist items
Jun 15	Project completion
Oct 11- 14	Scheduled Return visit

*arbitrary start date, subject to change

Small business designation

AWS is a small business by definition, but holds no specific certifications with the Small Business Administration or other agencies. In the past, we have held such certifications.

Risk to owner

AWS maintains the insurance levels required by many larger municipalities for work performed as a general contractor. This includes \$9M umbrella and \$5M professional liability policies.

Safety program, OSHA compliance record and EMR rating

AWS has a robust safety program and record. We currently hold an 'A' rating on ISN for the evaluation of our safety programs.

We feature a fully OSHA-trained staff, with all employees in field technician, programming, or engineering roles required to have completed a course to be 10-hour OSHA certified in either general industry or in construction industry. A majority of such employees are further 30-hour OSHA certified.

Section 8: A W Schultz’s Proposal Bid Form

Spec Sections: N/A

Addenda Received: N/A

Bid bond, performance bond, sales taxes are not included.

<i>Task 1 – Project Administration, Management, and Quality</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	LOT	Project plan, schedule, and project “look-ahead” documentation	
2	LOT	Coordination Meetings and project management	
3	LOT	Monthly progress meetings through project close	
4	LOT	Daily site meetings through project close for those days AWS has installation activity	

<i>Task 2 – Kickoff Meeting and SCADA System Requirements Workshop</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	Project Kickoff Meeting	
2	1	Graphical Standards and Conventions Discussion, submittal, and review meetings with programming team	

<i>Task 3 – Site Visits/Field Investigation</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	LOT	Pre-design field visits, as necessary	
2	1	Radio site survey and path study	

<i>Task 4 – Detailed Design</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	50% design deliverable, includes all specifications, drawings, and equipment sheets required for design of the SCADA system	

2	1	90% design deliverable, includes all specifications, drawings, and equipment sheets required for design of the SCADA system	
3	1	Final design deliverable, final copy of the above documents	

<i>Task 5 - Permitting</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	LOT	Relevant dig and electrical permits – N/A	

<i>Task 6 – Integration and Installation Services – SCADA System</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	Training – 16 hours of scheduled instruction (Operator, Maintenance, Programming, Manager, and Supervisor Training)	
2	1	Included one-year warranty/maintenance period	
3	LOT	Coordination of installation and outages with plant personnel	

<i>Task 7 – Integration and Installation Services - PLCs</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	PLC cards, racks, wiring as required by those PLC-based control panels listed herein. NOTE: I/O list developed for 50% design stage.	
2	1	PLC programming of I/O described herein and following the guidelines for control loops set forth in future operation narrative.	
3	1	Copies of the documented ladder logic will be supplied to the owner at the conclusion of the project (if applicable).	
4	1	Project Testing	
5	1	Unwitnessed Factory Acceptance Test for those panels listed in appropriate section.	
6	1	Factory Acceptance Test	
7	1	Site Acceptance Test and commissioning	
8	1	Spare parts: reference page 7 of this proposal	
9	LOT	Run CAT6 cable to existing network switch to bring the Lime Slakers onto the network via Ethernet and abandoning the existing hardwired I/O. Add in additional slaker data not currently available (usage, alarms, etc.) via the hardwired signals Update PLC programming and HMI programming to reflect these changes.	Lime Slakers

<i>Task 8 – Remote Site Communication</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	Initial radio path study	

2	1	Radio performance documentation	
3	1	Plant Radio Communication Panel. Fiber Optic Ethernet switch. Ethernet. Roof mounted antenna, mast, and accessories.	
4	16	Wellfield remote sites radio equipment. Radio, antenna, connectors, cable, and surge devices as required to achieve radio communications. 35-foot push pole antenna mount. Grounding. Ethernet switch.	Well #33-36, 38-40, 42-49
		NOTE: AWS reserves the right to recommend a switch for any planned radio sites to the cellular network in the event that communications and polling to the site would be improved.	

<i>Task 9 - Control panels</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	LOT	Relays, terminal blocks, power supplies, digital panel indicators, switches, pushbuttons, and lights, and accessories to make complete those panels listed in this section.	
2	LOT	All included panels will conform to the UL508A standard for Industrial Control Panels [non-listed panels].	
3	LOT	PLC cards, racks, wiring as required by those PLC-based control panels listed in here and the I/O described in the supplement.	
4	16	Remote Well Site RTU Control panel. NEMA 4X wall-mounted enclosure. PLC with associated I/O cards, terminal blocks, power supplies and accessories to make a complete panel. UPS. Radio, antenna, connectors and cabling.	Well #33-36, 38-40, 42-49
6	6	Remote Booster Station Site RTU Control panel. NEMA 4X wall-mounted enclosure. PLC with associated I/O cards, terminal blocks, power supplies and accessories to make a complete panel. OIT (10" PanelView). UPS. Unmanaged Ethernet switch. Existing communications infrastructure to be utilized, existing components will remain. Alternate pricing includes pricing to add a cellular backup for communications redundancy.	35 th Street Reservoir Booster PS, 39 th Street Reservoir Booster PS, Van Horn Booster PS, Chrysler Booster PS, North Main, Dogion

<i>Task 10 - Software HMI</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	AVEVA Wonderware System Platform Software package: As existing, no required changes planned for the software suite.	
2	1	Modifications of screens and HMI programming per the customer's standards and the control loop descriptions in future operational narrative	

<i>Task 11 - Drawings/Submittals/Shop Drawings</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	Submittals and panel shop drawings	
2	1	Operation and Maintenance Manuals	

3	1	Detailed network drawings	
4	1	Graphical and Programming Standards and Conventions Document	
5	1	Written control narrative description	

		<i>Task 12 - Process Control Descriptions</i>	
	QTY	DESCRIPTION	DESIGNATION
1	2	Process control coordination meetings: <ul style="list-style-type: none"> • initial design meeting with city • final review meeting 	

		<i>Task 13 - Electrical</i>	
	QTY	DESCRIPTION	DESIGNATION
1	1	Miscellaneous electrical including signal wiring terminations. Site power assumed to be available at all sites.	

		<i>Task 14 - Demolition</i>	
	QTY	DESCRIPTION	DESIGNATION
1	1	Removal of existing control panels, radios and associated wiring and hardware. Hardware salvaged to be returned to city for use or resale.	

		<i>Task 15 - Substantial Completion and Close-out</i>	
	QTY	DESCRIPTION	DESIGNATION
1	1	Final Operations & Maintenance Manuals	
2	1	Final shop drawing as-builts	
3	1	Final walk-through and punch list generated	
4	1	Completion of punch list items within 30 days of substantial completion	

		<i>Task 16 - Bid Alternate 1 - Cellular backup modems and configuration for (6) distribution remotes</i>	
	QTY	DESCRIPTION	DESIGNATION

1	1	Cellular backups Provide and configure (1) cellular modem at each remote distribution site and one at the plant to tie into the SCADA network. The cellular modems would act as a backup communications system to the existing communications. Cellular data plan and SIM cards not included.	
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<i>Task 17 - Bid Alternate 2 - Service Contract Extension</i>			
	<i>QTY</i>	<i>DESCRIPTION</i>	<i>DESIGNATION</i>
1	1	Prepaid 3-year Maintenance Agreement A 3-year prepaid maintenance agreement is provided. The maintenance includes 10 onsite service calls, 270 hours onsite, and 120 hours of phone support. Onsite service calls include travel to and from the site, and per diem for meals and hotel expenses. This agreement does not include any materials outside of the parts covered by warranty or spare parts provided in this proposal. Materials will be charged on a basis of cost plus 15%. A service report will be supplied three days after service has been provided with of list of work performed and any materials provided.	

Notes

The above pricing does **not** include any:

- If loop drawings are required, engineer approved operations manual for all new and existing equipment and electrical schematics showing wiring connections must be provided to AWS before loop drawings are completed. Loop drawings to be submitted under separate cover from controls and instrumentation submittal.
- Security surveillance system
- Additional J-Box for DO system or other field analyzers.
- Telephone lines or jacks
- Computer or software O&M manuals in excess of that which initially supplied or copyright protected.
- Pressure taps or valves of any kind.
- Tubing between taps and associated control panels
- Stilling wells of any kind.
- Interconnecting fiber optic cable, breakout panel, fiber optic cable.
- Motor starters or circuit breakers.
- Flange bolts, nuts, gaskets, or pipe spacers.
- Setting of or mounting of equipment of devices not contained in this scope.
- Concrete work of any kind including, but not limited to housekeeping pads, equipment supports, etc.
- HVAC equipment or controls of any kind.
- Motors of any kind.
- Building interior or exterior light fixtures wall switches, or receptacles of any kind, unless identified.
- Field instrumentation/device mounting brackets, plates anchor bolts, stands or hardware (unless specifically noted in this Scope Letter.)
- Separate mounted disconnect switches.
- Wire or specialized cables between primary elements.
- Grounding of equipment or associated ground rods or conductors.
- Specialty electrical testing of any kind i.e. resistance, insulation, etc.
- PLC or Operator interface software unless specifically noted in this Scope Letter.
- Power company metering or transformers of any kind.
- Sales tax

Section 9: Terms and Conditions

A. W. Schultz anticipates delivery of approval drawing and material/equipment in accordance with periods stated in this proposal. Material suppliers/manufacturers have been extending delivery schedules without prior notice. A. W. Schultz cannot assume any responsibility for delays due to the unavailability of material or equipment, which is beyond our control.

The warranty period for mechanical and/or electrical equipment covered by this quotation shall be as stated in the specifications. Extended warranties are available and will be quoted on request. The warranty period included in the above sell prices for mechanical and/or electrical equipment expressly excludes those items normally consumed in service. Example: seals, packing, oil, grease, light bulbs, fuses, etc.

Section 10: Base Proposal and Alternate Cost

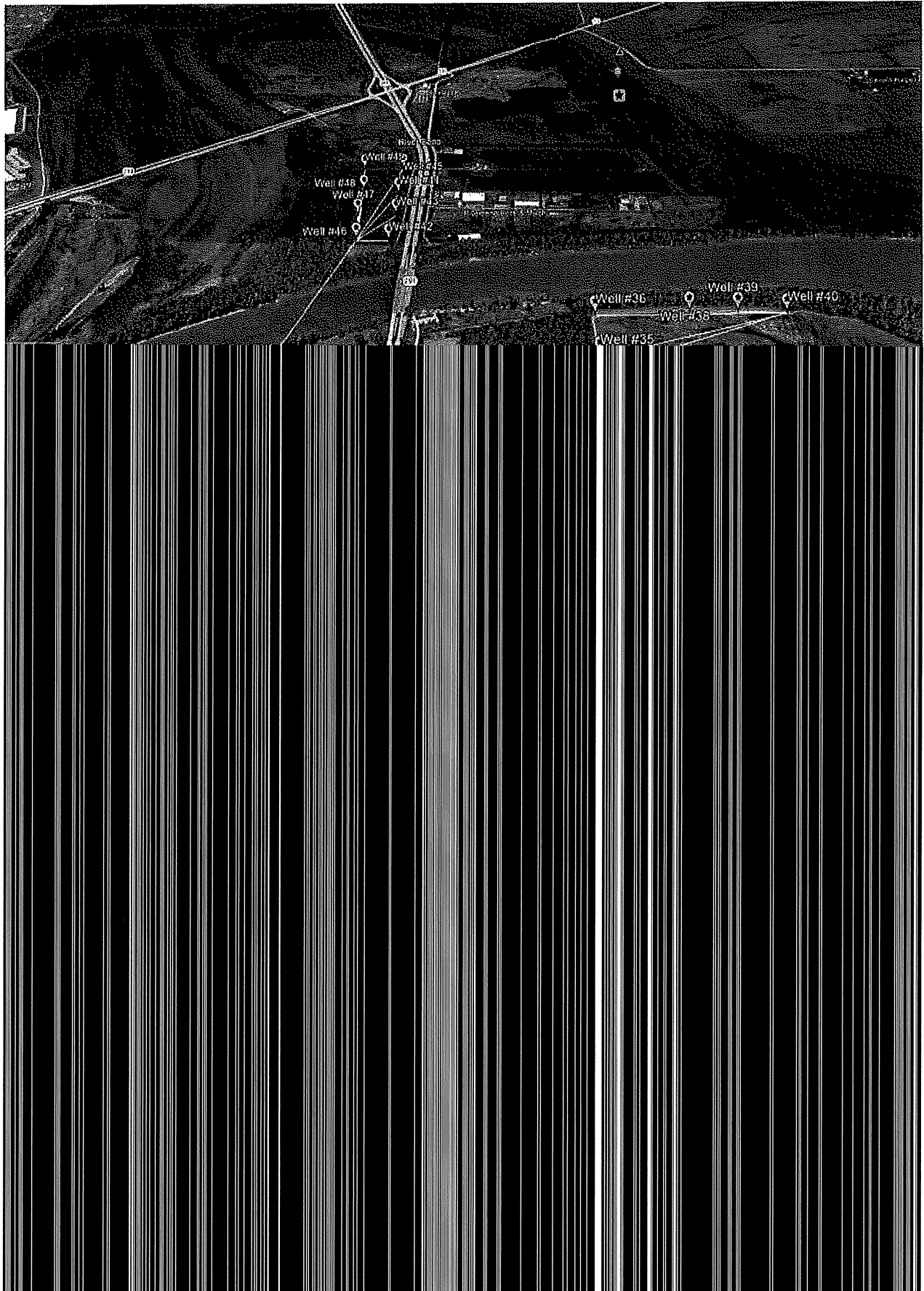
The Proposal Cost for those Tasks 1-15 is \$451,280.00.

Proposal Section	
HMI System Updates - General	\$25,500.00
Distribution Remote Sites SCADA Panel Replacement	\$136,500.00
Radio Infrastructure and Wellfield SCADA	\$238,500.00
Lime Slakers SCADA Updates	\$31,500.00
Spare Parts	\$19,280.00

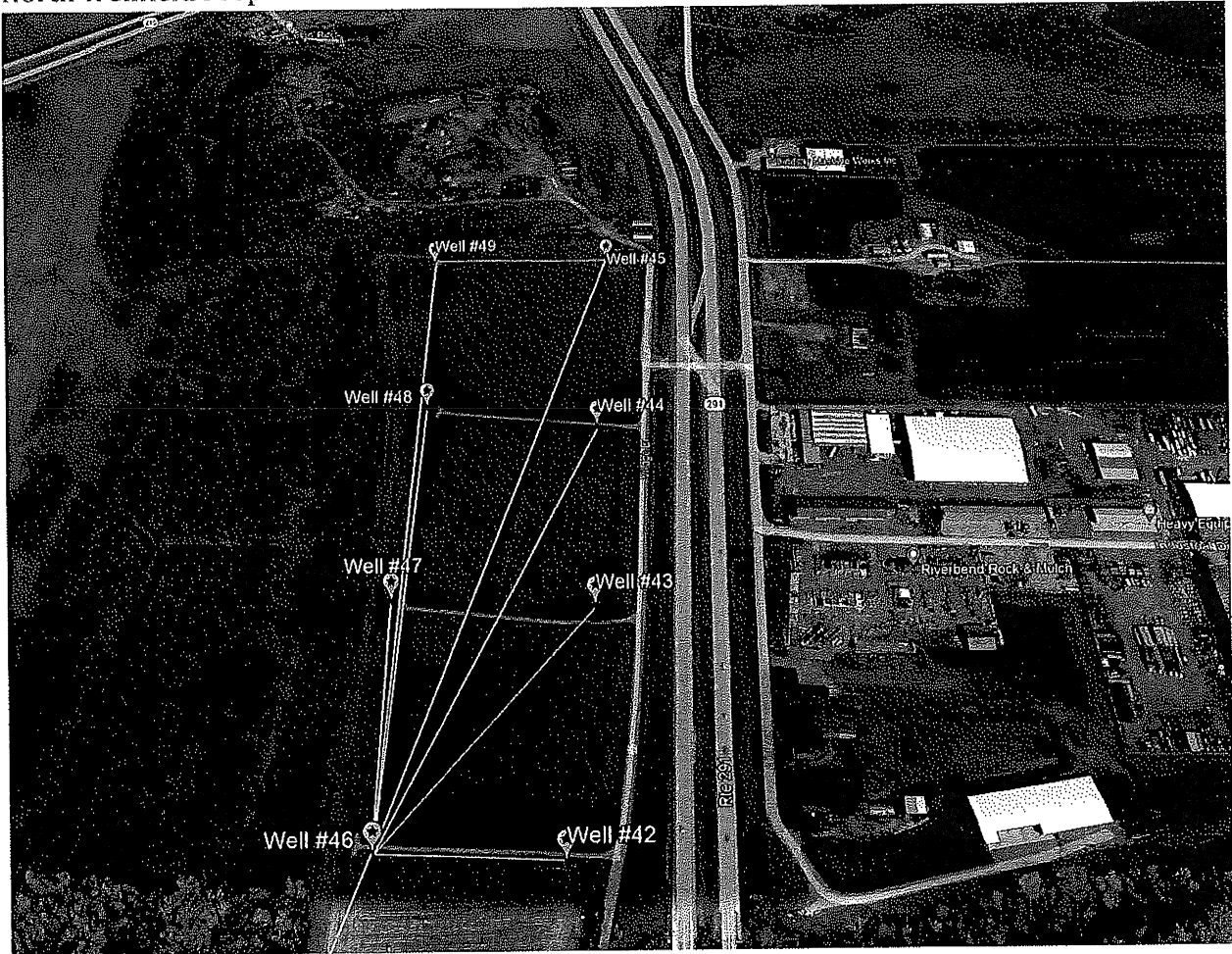
The Proposal Cost for Task 16 – Bid Alternate 1 is \$26,000.00.

The Proposal Cost for Task 17 – Bid Alternate 2 is \$45,500.00.

Appendix A: Complete Wellfields Proposed Network



North Wellfield Proposed Network



Picture 2 –North Wellfield area radio network

The North Well Field will have Wells #42-45 and Wells #47-49 transmitted to a repeater station at Well #46. This site will then repeat the collected data back to the master radio located at the plant.

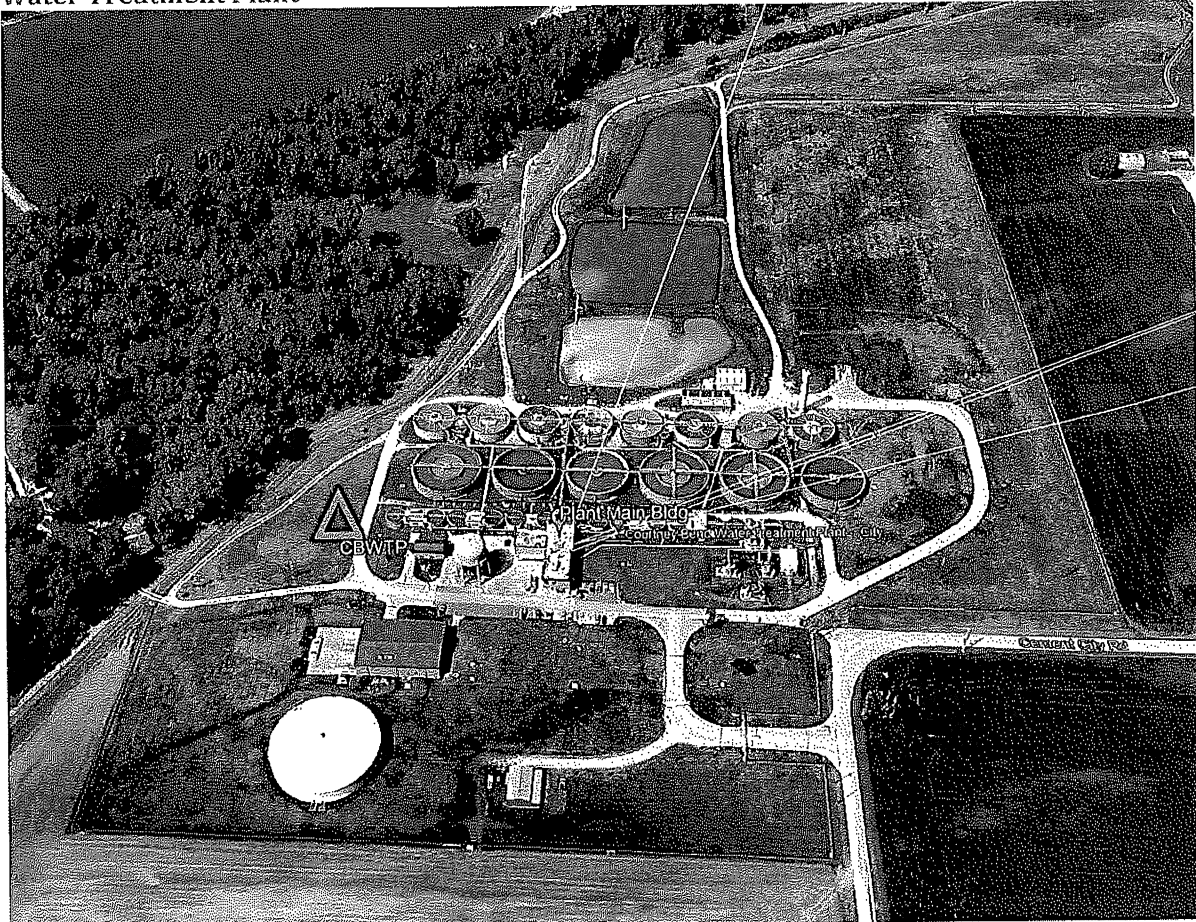
East Wellfield Proposed Network



Picture 3 –East Wellfield area radio network

The East Well Field will have Wells #35, 36, 38, and 39 transmit to a repeater station at Well #40, repeating data back to the master at the plant. Wells #33 and 34 will transmit directly back to the master at the plant.

Water Treatment Plant



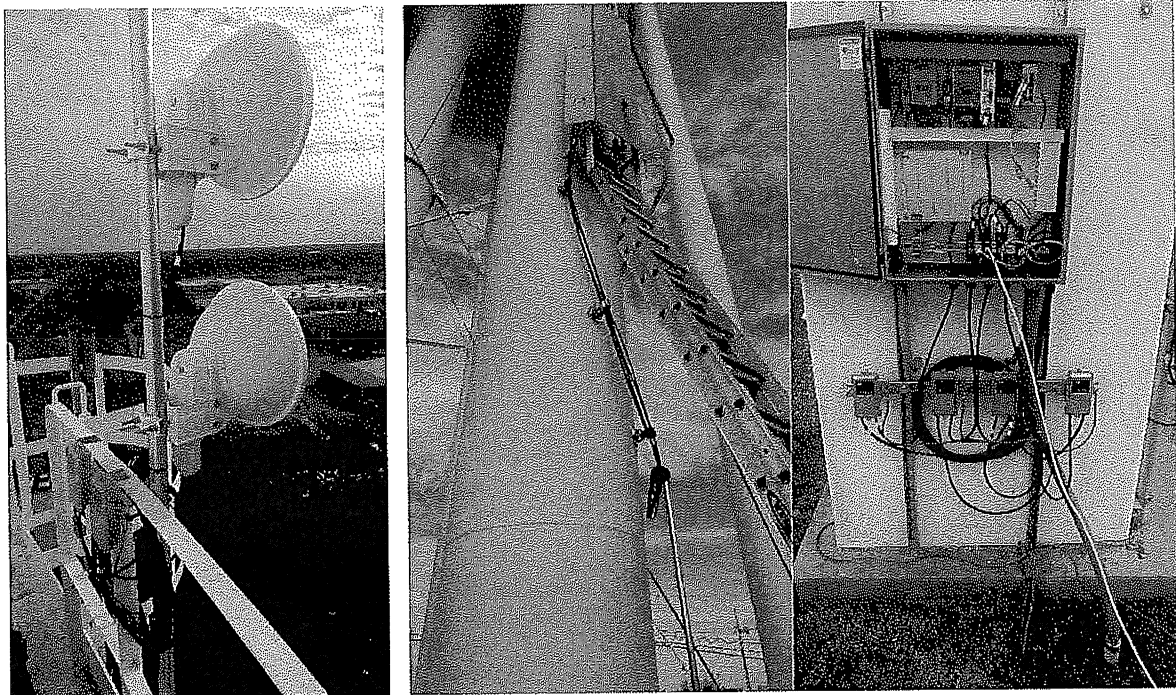
Picture 4 -WTP and Antenna Location

At the WTP, AWS will provide a tower for mounting an antenna at a maximum mounting height of 55 feet above surface level. The tower will either mount on a suitable pad and secured to the side of the building. Or, the tower/mast will mount to the top of the roof structure. The master radio will be mounted at the base of the tower. By mounting near the antenna, this eliminates costly radio cables and the dB drop is far lower, allowing the ability to increase the output power to the maximum limit. A PoE (power-over-Ethernet) cable will be pulled to the WTP Main PLC where it will be connected to the network. By PoE, no additional power will need to be installed for the radio enclosure. Surge protection will be provided on both ends to protect against any stray current.

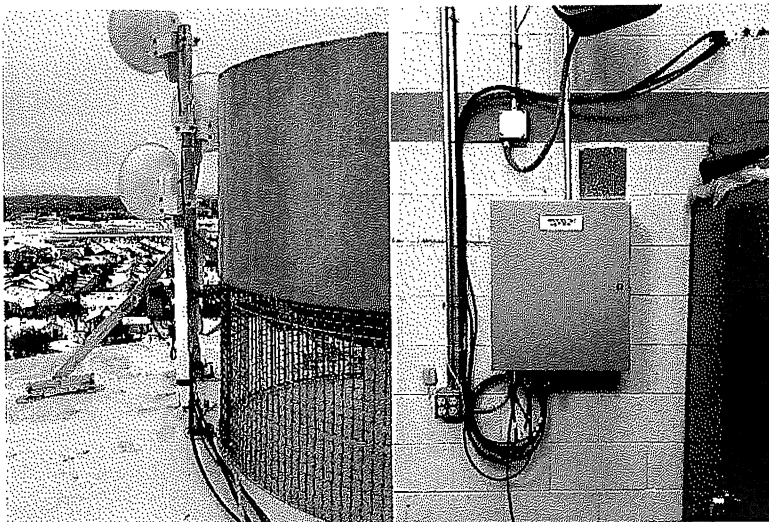
Appendix B: Wellfield SCADA Panel Design (typical)

Picture 5- Micro820 control panel as proposed for typical well site panel design

Appendix C: Installation Photos from Other Projects



Picture 2- High-Speed Backbone Missouri American - Joplin MO



Picture 8 - High-Speed Backbone Missouri American - St Louis County



Picture 3 -High-Speed Radio Missouri American - St Joseph Plant

