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September 12, 2017

Ms. Michelle Hatcher, P.E.
Director, Water Management Department
City of Franklin
124 Lumber Drive
Franklin, Tennessee 37064

Subject: Sole-Source Equipment and Services Justification Letter
Franklin WRF Modifications & Expansion Project
COF Contract No. 2015-0163

Dear Ms. Hatcher:

This letter refers to the following sole-source equipment and services recommended to be included as part of the above-referenced City project.

- Specification Section 13311 – Programmable Logic Controllers (PLCs)
- Specification Section 13315 – Human-Machine Interface (HMI)
- Specification Section 13340 – Instruments
- Drawings M-48 and M-49 – Modifications to the Existing Scum Pumps

CDM Smith recommends that these products, materials, systems, and services associated with the Franklin WRF Modifications and Expansion Project each be obtained from a single named manufacturer or services supplier because they are of an indispensable nature, there are no other viable alternatives, or only these particular equipment and services fulfill the functions for which they are intended. The rationale for each recommendation follows.

Specification Section 13311 – Programmable Logic Controllers (PLCs)

The City decided to standardize on the manufacturer and model for PLCs because of the inherent advantages of a standardized control system. Specifically, using the same type of PLCs throughout the water and wastewater systems results in having standard spare parts, common operation and maintenance knowledge across the system, and the ability of PLCs to communicate “peer to peer” without special programming.



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PLCs are needed not only for control of new and replacement treatment systems at the Franklin WRF, but also as replacements for older PLCs throughout the plant. The existing PLCs were manufactured by Allen-Bradley, a division of Rockwell Automation, Inc.

The City, CDM Smith and SSR Incorporated evaluated various potential PLC manufacturers/models to identify a manufacturer/model to standardize around. The group settled on Allen-Bradley is the selected PLC manufacturer for new and replacement PLCs to be installed as part of this project. The selected PLC is the CompactLogix L35E. This PLC was selected because it is a very common PLC that is supported by all system integrators, because it allows for Ethernet connection; because it has a comparatively low cost of installation and maintenance; because it is a standard offering among treatment equipment vendors; and because of the user-friendly features of the PLC programming software.

Specification Section 13315 – Human-Machine Interface (HMI)

A new HMI software package is needed to replace the City's outdated Wonderware InTouch HMI software. The City, CDM Smith, and Smith Seckman Reid (SSR, the City's water consultant) engaged in a competitive evaluation process that included workshops and presentations by Rockwell Automation, Wonderware, and Trihedral. The three vendors' HMI packages were scored according to factors including ease of maintenance, technical support, and capital cost. Each factor was weighted to reflect its relative importance to the City. Trihedral's VTScada software scored the most points, indicating that it was most aligned with the City's goals for the new HMI package.

Based on this scoring, CDM Smith recommended that the City select Trihedral's VTScada HMI software as the standard for the City's SCADA system. A copy of the HMI vendor scoring memo is attached to this letter.

Specification Section 13340 – Instruments

Co-digestion with FOG is an integral part of the Franklin WRF's new biosolids facilities. The FOG is injected into a pre-dewatered waste activated sludge (WAS) pipe directly upstream of the Cambi B-2 THP skid. The exact range of percent solids the FOG will be delivered to the Franklin WRF is not well understood. In order to capture the data on the percent solids of FOG being injected into THP for co-digestion in real time, a microwave total solids analyzer is necessary. Understanding the fluctuations and range of FOG percent solids being added to the digestion process provides key data for optimizing co-digestion.

Valmet total solids analyzers is the only manufacturer that has municipal wastewater plant installations of total analyzers using microwave technology. The microwave technology provides accurate percent solids measurement of high percent solids flows (above 3 percent solids), with minimal maintenance, calibration and ancillary systems. Analyzers based on optical sensing are not as appropriate for high percent solids flows due to less accuracy and significant maintenance





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required to keep the sensors clean. CDM Smith recommends sole sourcing Valmet's total solids analyzers for this project.

Drawings M-48 and M-49 – Modifications to the Existing Scum Pumps

Scum from the final clarifiers is currently pumped to the Belt Filter Press Feed Tank, where it is blended with the thickened WAS before being dewatered and disposed. Because the existing dewatering process will be demolished as part of this project, the project also includes the construction of new holding tanks to store and decant water from the scum before it is disposed.

The four existing Gorman Rupp T3 centrifugal scum pumps at the Return Sludge Pump Station and the RAS/WAS Pump Station are all in good working condition, but the construction of the new holding tanks and the modifications to the pump discharge piping are expected to alter the system head conditions. These modifications will reduce the total head and thus raise the flow rate of the pumps. The higher flow rates could result in accelerated wear inside the existing 4-inch scum piping inside and outside the pump stations. In order to counteract this change of conditions, it is necessary to replace the belt and sheave system on each pump so that it operates at a lower rotational speed.

Southern Sales Company of Nashville, Tennessee, is the authorized representative of Gorman Rupp pumps in Franklin and has provided a quote to perform the modifications to the scum pumps. CDM Smith recommends including this work as a line item in the Bid Form, with Southern Sales' quote included in the appendices to the specifications.

If you have any questions or comments regarding this letter, please do not hesitate to contact me at (404) 720-1400.

Sincerely,

Robert P. Huguenard
Senior Project Manager
CDM Smith Inc.

Enclosure

cc: Mark Hilty, City of Franklin
Zack Daniel, CDM Smith
Project File (14915-96594-WRF)



Memorandum

TO: *Meeting Attendees*

FROM: *Jonathan Mitchell*

DATE: *June 18, 2013*

SUBJECT: *SCADA Standardization Workshop #2 – HMI Vendor Scoring Memo
Franklin Wastewater Reclamation Facility Expansion Project*

A workshop was held including the City of Franklin, CDM Smith and SSR on May 24, 2013 at the Franklin City Hall. The purpose of the workshop was to hear presentations from the previously short listed HMI software manufacturers and to discuss which would best achieve the necessary requirements for the newly designed SCADA systems for the water reclamation facility (WRF), the wastewater collection system, the water treatment plant, and the water distribution system.

Attendees:

David Parker – City of Franklin
Mark Hilty – City of Franklin
Jason Whitehouse – SSR
Mike Bernard – SSR
Sam Harrison – SSR
Bob Huguenard – CDM Smith
Jonathan Mitchell – CDM Smith
Scott Whitmore – CDM Smith
Zack Daniel – CDM Smith

Presentations:

The following software packages were presented:

- Rockwell Automation FactoryTalk View SE by Kip Dodson
- Wonderware InTouch by Rodney Waterman
- Trihedral VTScada by Bryan Sinkler

After these presentations the decision was made to create a table with predefined key features in order to rate each software package and to aid in selection. Each of the features would include weighting of the relative importance of that feature. SCADA personnel from CDM Smith and SSR would fill out the table and CDM Smith would compile the results and present the ratings to the City.



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The following key features were identified:

- Ease of Initial Installation/Development
- Ease of Maintenance/Expansion
- Trends/Data Collection without a Historian package
- Integration/Communication with Allen-Bradley CompactLogix Series PLCs
- Integration of Dial-Out Alarming and Reporting software
- Security
- Redundancy
- Version Control
- Systems Integrator Channel (or Certified SIs) within 250 mile radius
- Technical Support, including version upgrades
- Addition of other systems (EIS, SmartMeters)
- Capital Cost Ranking
- Support Cost Ranking



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Final HMI Vendor Rating Table

CDM Smith and SSR coordinated to establish draft importance weighting and scoring for each feature. The table below presents the draft results of that exercise. Following the table is commentary explaining the scoring for each feature.

| Key Features | HMI Rating 1 = Poor to 5 = Excellent | | | Importance Weighting 1 = Low to 5 = High |
|---|---|-----------------------|----------------------|---|
| | Rockwell FTView SE | Wonderware InTouch | Trihedral VTScada | |
| Ease of Initial Installation/Development | 5 | 4 | 4 | 2 |
| Ease of Maintenance/Expansion | 4 | 3.5 | 3 | 3 |
| Trends/Data Collection without a Historian package | 3.5 | 2.5 | 4.5 | 4 |
| Integration/Communication with Allen-Bradley CompactLogix Series PLCs | 5 | 3.5 | 3.5 | 5 |
| Integration of Dial-Out Alarming and Reporting software | 3.5 | 3.5 | 3.5 | 2 |
| Security | 3 | 3 | 3 | 3 |
| Redundancy | 3 | 3 | 4.5 | 5 |
| Version Control | 1.5 | 2.5 | 5 | 4 |
| Systems Integrator Channel (or Certified SIs) | 5 | 5 | 2.5 | 5 |
| Technical Support, including version upgrades | 4 | 3 | 2 | 3 |
| Addition of other systems (EIS, SmartMeters) | 3 | 3 | 4 | 1 |
| Capital Cost Ranking | 2 | 3 | 4 | 5 |
| Support Cost Ranking | 2 | 3 | 4 | 5 |
| Total Score | 158 | 154 | 173.5 | Max Score = 325 |



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Ease of Initial Installation/Development

Both Wonderware InTouch and Trihedral VTScada are single-disc installations. Rockwell FTView SE requires multiple discs and multiple programs to become operational. However, because Allen-Bradley PLCs will be used, Rockwell FTView SE would make development easier and faster when using the PlantPAx library. It contains Allen-Bradley specific PLC function blocks for equipment (eliminating the amount of ladder logic) as well as symbols and operator faceplates pre-built for the HMI. This feature was not weighted high because we assume that a Systems Integrator (SI) will be performing the work, not City personnel.

Ease of Maintenance/Expansion

The use of Rockwell FTView SE with the PlantPAx library would ease maintenance and expansion, as there is less ladder logic to troubleshoot, and adding new equipment is simple, as stated in the installation/development feature above. Wonderware InTouch seems to be more intuitive, but since the Owner's personnel have no previous experience and will be trained on whichever software package is selected, they should be able to use any of the three effectively. The weighting of this feature was ranked a 3 as City personnel indicated they will eventually be performing programming when it comes to troubleshooting issues and providing some of the additions and modifications as the sites are upgraded. It was not ranked higher because when larger programming efforts are needed, an SI will most likely perform the work.

Trends/Data Collection without a Historian package

Without a Historian, Rockwell FTView SE and Trihedral VTScada rise above Wonderware InTouch when creating and manipulating trends. Trihedral VTScada has an added ability to quickly add tags to a trend simply by double-clicking its analog display. The trends for the other software packages have to be pre-configured or the operator has to go through a multi-click database tag selection process. The weighting of this feature was ranked high because the ability to provide operator usable trends is very important to plant operation. Proper data collection is also a must in order to provide the reports desired by plant operators.

Integration/Communication with Allen-Bradley CompactLogix Series PLCs

Rockwell FTView SE with the PlantPAx library integrates by far the best with CompactLogix Series PLCs, for reasons stated in the installation/development and maintenance/expansion sections above. However, after installing compatible drivers in Wonderware InTouch or Trihedral VTScada, integrating these devices is not burdensome. The weighting of this feature was ranked the highest possible due to the fact all the City SCADA systems will be standardized and contain Allen-Bradley CompactLogix PLCs for interface to plant instruments and equipment.



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Integration of Dial-Out Alarming and Reporting software

Dial-Out Alarming and reporting functionality can be accomplished with any of these software packages. The weighting of this feature was low as we believe that whether these functions are part of the HMI software or third-party software is really of little concern.

Security

Implementing user-level security can be accomplished without any great difficulty for any of these software packages. The weighting of this feature is mid-level as security is important to keep different plant personnel from controlling equipment and acknowledging alarms not associated with their plant. All the software packages can perform this.

Redundancy

Server redundancy can be accomplished without any great difficulty in any of these software packages. However, Trihedral VTScada allows for any workstation on the network to be a backup workstation to any other workstation, while the other two packages require a second workstation at each site. Trihedral VTScada will require less hardware to achieve the same degree of redundancy as the other two packages. The weighting of this feature is high as redundancy in this particular system is very important. With the small number of operator workstations and I/O servers at each site it is important to have other workstations that can provide monitoring and control in case of a workstation failure.

Version Control

Trihedral VTScada's ability to track changes, revert back to any past state, and pinpoint changes in time, surpasses Rockwell's FTView SE and Wonderware's InTouch version control capabilities. Wonderware InTouch does have some version control through a separate manufacturer program installation, while Rockwell FTView SE has no version control. The weighting of this feature is high because this system will be one application that monitors and controls three separate plants/systems. Each of the three will have its own personnel that will be able to make changes to the system, from each location. Version control will allow the management of changes, determination of who made a change and what was changed, and the ability to undo a mistake or unauthorized modification.

Systems Integrator Channel (or Certified SIs) within 250 mile radius

System Integrators in the area are familiar with Rockwell FTView SE and Wonderware InTouch. Although Trihedral VTScada is used less frequently in the Franklin area, the two SIs that the City currently uses, Revere Control Systems and Southern Sales, are both familiar with Trihedral VTScada. The weighting of this feature is the highest possible, since City personnel indicated it is imperative they have access to multiple SIs for support.



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Technical Support, including version upgrades

All three manufacturers provide telephone support during normal business hours. Rockwell FTView SE and Wonderware InTouch also provide 24/7 technical support as a standard feature, while Trihedral VTScada only has 24/7 "emergency support" (where an "emergency" means repairing the system if it is down, not developing or testing other modifications). Because Allen-Bradley PLCs will be used, Rockwell technical support would encompass both hardware and software issues. The weighting of this feature was ranked a 3. Technical support is important, especially if City personnel will be performing future programming efforts. However, it was not ranked higher since all the software packages supply this level of support.

Addition of other systems (EIS, SmartMeters)

Each manufacturer has the ability to integrate third-party systems through the use of drivers. However, Trihedral VTScada's polling management enables the addition of radio systems without the need for master polling PLCs, providing the ability to schedule, set poll rates, and enable/disable separate drivers, groups and sites. This feature was ranked low as there is currently no need for this feature.

Capital Cost Ranking

Trihedral VTScada is the least expensive of the three packages. The weighting of this feature was ranked high since cost is always a concern.

Support Cost Ranking

Since support costs are based on percentage of capital cost, Trihedral VTScada is the least expensive of the three. However, if technical support for the PLCs is also desired, then Rockwell FTView SE would be the least expensive, as a single support agreement would cover both hardware and software. The weighting of this feature was ranked high since cost is always a concern.

Conclusions

Based on the draft scoring and weighting presented above it appears that Trihedral VTScada would be the best HMI software package to implement as a standard for the City of Franklin SCADA system. However, if the City desires to have a single support agreement covering the Rockwell FTView SE and the PLCs, the ranking for Trihedral VTScada and the Rockwell FTView SE would be essentially equal.