Water Smart: Water Marketing Strategy Grants for FY 2017

Funding Opportunity Announcement No. BOR-DO-17-F011

Water marketing/planning strategy to analyze feasibility of delivering reclaimed water for industrial and agricultural use

Application for Federal Assistance (SF-424)

14. Areas affected by Project (Cities, Counties, States, etc.)

Buckeye, and Goodyear Arizona and unincorporated Maricopa County.

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16. b Additional Congressional Districts of Program/Project:

AZ-003

WaterSmart Grants: Small Scale Water Efficiency Projects for FY2017

White Tank Supervisory Control and Data Acquisition (SCADA) Water Efficiency Project

Applicant: Arizona Water Company, 3805 N. Black Canyon Freeway, Phoenix, AZ 85015

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Technical Proposal and Evaluation Criteria

1.0 Executive Summary

Date: May 15, 2017

Applicant: Arizona Water Company

City, County, State: Phoenix, Maricopa, Arizona

Arizona Water Company ("AWC") seeks funding to automate control of the daily operations of its White Tank Blue Horizons Distribution Facility. A System Optimization Review ("SOR") conducted by an outside engineering firm identified two integral technological components within an overall water management efficiency "master plan" that could save water and energy. The focus of this proposal is to integrate Supervisory Control and Data Acquisition ("SCADA") combined with automated programming for the Blue Horizons Facility. Water managers and operations staff need timely information and the tools necessary to implement changes to distribution processes. AWC proposes to: 1) Purchase and install SCADA and automated programming equipment on production wells and storage tanks, and 2) install automation programming to regulate temperature control of cooling tower process water. The hardware and software changes proposed will increase the reliability of the water supply and improve efficiency of the White Tank water supply. These automated control installations will be completed within a year of project award. This project is not located on a Federal Facility. AWC's system optimization and resulting improved water management is clearly aligned with the goals of Funding Opportunity Announcement No. BOR-DO-17-FO11.

2.0 Background Data

AWC has over 60 years of experience in providing water utility service to residents throughout 8 counties in Arizona. Stewardship of groundwater resources and effective use of alternative water supplies are part of AWC's comprehensive water management policy. AWC provides both groundwater and Central Arizona Project ("CAP") water to its municipal, industrial and agricultural customers. AWC holds a CAP water allocation totaling 968 acre-feet per year in its White Tank service area and in the future plans to construct its White Tank Recharge and Recovery Facility in the northeastern part of its White Tank service area.

AWC's White Tank Water System is located west of the Phoenix metropolitan area in the West Salt River Valley sub-basin of the Phoenix Active Management Area ("AMA"). This sub-basin includes most of western Maricopa County. The Phoenix AMA and its sub-basins, including the West Salt River Valley sub-basin, are depicted in Figure 2-1.[1]

[1] Arizona Department of Water Resources, *Third Management Plan for Phoenix Active Management Area*, 1999, Phoenix, 1-2.

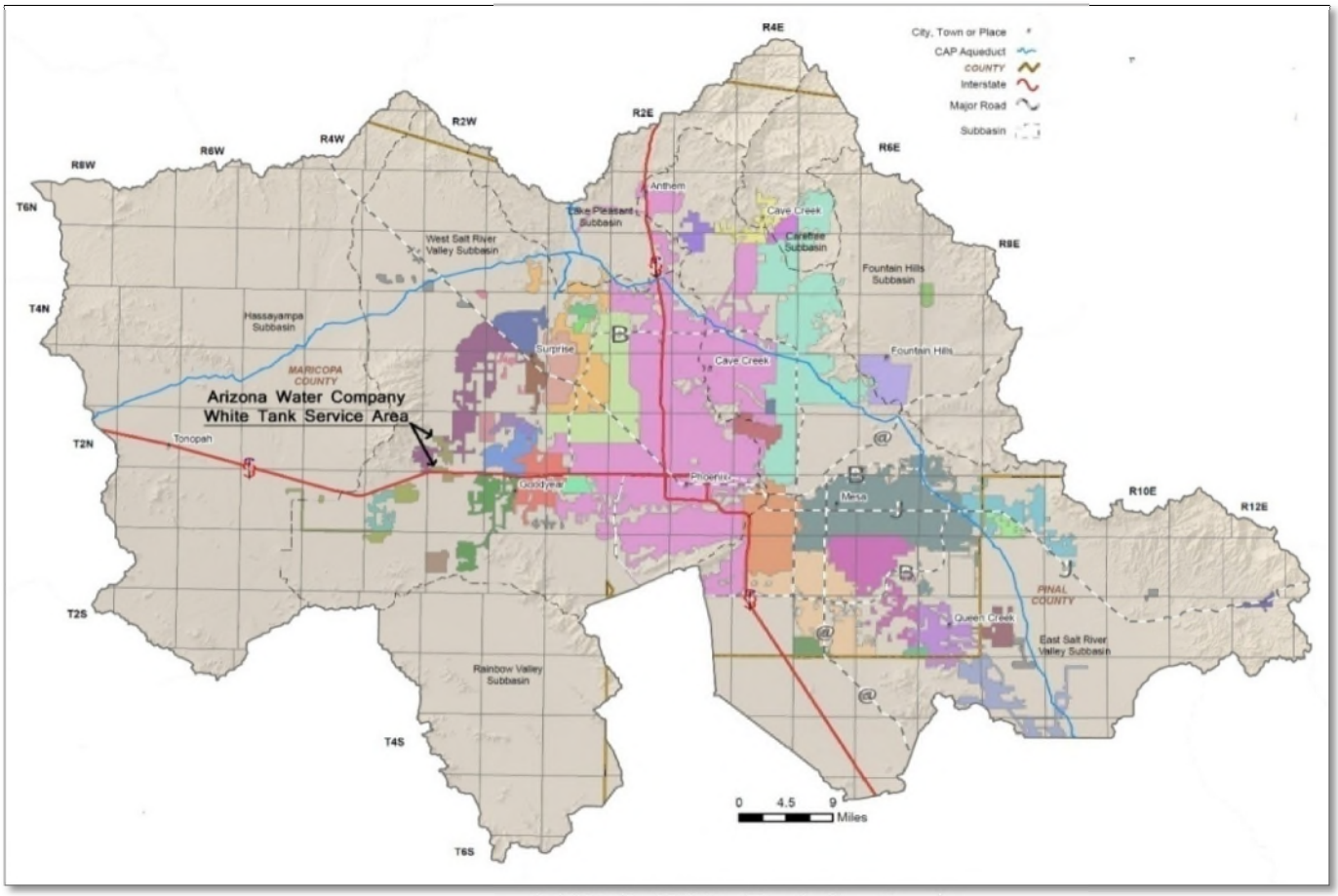

Figure 2-1 Phoenix AMA and location of AWC's White Tank Service Area

The White Tank Water System is composed of the Blue Horizons, Beautiful AZ Estates and Monte Vista Storage Tank locations. Each location has its own production wells, pressure reducing stations, treatment facilities and booster pump stations. The operation of the White Tank System is overseen by AWC's Casa Grande office which is 75 miles away. The distance between the two locations and the lack of automated water production and pumping controls create water management challenges. Engineering studies conducted by outside consultants identified opportunities for improving daily operations and production and pumping efficiency through use of automated control systems.

3.0 Technical Project Description

Blue Horizons is one of 3 facilities in the White Tank Water System and is the focus of this grant application. The water system consists of two deep production wells, cooling tower, arsenic removal facility, storage tank, booster pump station and distribution water mains (Fig. 3-1).

Figure 3-1 Schematic of Blue Horizons Treatment Facility

To maximize operational efficiency, AWC contracted with engineering firms to complete a System Optimization Review. Two key improvements were identified that could increase the overall efficiency of Blue Horizons:

Installation and integration of SCADA and automatic programming controls on the two deep production wells and storage tanks

Implementing this technology will allow operators to remotely monitor the water system and optimize pump scheduling and storage tank levels. Effective integration of SCADA into an existing system involves hardware instrumentation, electrical control panels and sensors, software programming, data communication and field instrumentation. There are many intangible benefits of integrating SCADA into a water supply network, including more efficient operation of the infrastructure, fewer interruptions of supply and increased customer satisfaction.

SCADA and automated programming tasks:

1. Programming (system integration including radio configuration, wiring and field instrumentation),
2. Engineering (main control panel electrical and instrumentation drawings),
3. Construction (main control panel installation),
4. Updating programming controls for the two wells

Automated programming controls for cooling tower operation.

The housing developments served by Blue Horizons water production facility were constructed in 2006. The two-combined capacity 2,800 gallons per minute ("gpm") wells yielded water at a temperature of 110 to 116 degrees. Even though some temperature modification occurred during the treatment process, customers were receiving water supplies above 106 degrees. To solve this issue and improve customer satisfaction, engineering consultants were hired to evaluate options that would cool water to a target temperature, minimize water losses and minimize impacts to water quality. The best recommendation was to install two closed circuit (Figure 3-1) cooling towers each producing 1,400 gpm to achieve a target temperature of 93 degrees (worst case scenario during summer months). AWC implemented this recommendation and the cooling towers are performing as designed but could benefit operationally with improved programming and stabilized temperature control.

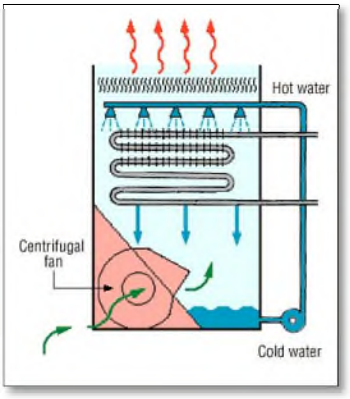

Figure 3-1 Closed Loop Cooling Tower Schematic

AWC plans to automate the cooling towers process to achieve a consistent output temperature. Currently, the cooling towers are manually adjusted once per day resulting in varied output temperature. Depending on the evaporative efficiency throughout the day/night, output temperatures can vary by 20 degrees or more. By modifying the fan speed based on effluent temperature and programming modifications should achieve a more consistent water temperature, reduce cooling tower evaporative losses and reduce energy consumption.

Cooling Tower automated programming tasks:

1) Minimize water loss and power consumption through a Programmable Logic Controller ("PLC") that will communicate and interface with SCADA to regulate temperature control

AWC's System Optimization Program is envisioned to improve its capability to provide a reliable source of water while improving water and power management efficiency. The combination of SCADA and automated programming will allow for real time monitoring of the water system and remote control of system processes. While these improvements are a priority for AWC, funding is needed to implement the changes to the distribution system.

4.0 Evaluation Criteria

Evaluation Criterion A—Planning Efforts Supporting the Project (35 points)

Up to **35 points** may be awarded based on the extent to which the proposed on-the-ground project is supported by an applicant's existing water management plan, water conservation plan, System Optimization Review (SOR), or identified as part of another planning effort led by the applicant. Describe how your project is supported by an existing planning effort.

- Does the proposed project implement a goal or address a need or problem identified in the existing planning effort?

  Yes, this project addresses two issues identified in the Blue Horizon's System Optimization Review. AWC employed the services of two engineering firms to evaluate the benefits of installing SCADA to address potential issues with manual control of the Blue Horizons System (potential for water loss due to tank overflow, pump operations, etc.) and temperature fluctuation of wellhead groundwater supplies.

Cooling towers were needed to regulate the temperature of water provided to customers, however, the towers exhibited a large electrical load and potential for energy savings could be realized by installing effluent temperature programming logic for the existing variable frequency drives on the blower motors. Additional savings is achievable through automated control of the cooling tower process. Remote monitoring possible through SCADA will benefit operators and Division Management.

- Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to other potential projects/measures.

  Water providers must operate their systems as efficiently and effectively as possible which means optimizing operations and minimizing losses (time management, water and energy losses). Equipment failure anywhere between the production wells and the distribution lines could result in catastrophic damage to the system and water loss if not realized and remedied in a timely manner. SCADA minimizes the potential for equipment failure and water loss. Should a breakdown in communication occur, wells would be shut down before storage tanks would overflow thus minimizing damage and water loss.

  AWC received customer feedback on the elevated temperature of water reaching their homes. A solution to this problem was critical to meeting the needs of their customers and providing a reliable and useable source of water.

Evaluation Criterion B—Project Benefits (35 points)

- Describe the expected benefits and outcomes of implementing the proposed project.

  It is anticipated that both water and energy savings will be realized through automated control, increased communication between software and hardware and improved operational efficiency. This is achieved primarily by 1) Increased operational efficiency of the Blue Horizons Facility through Automated Control and Programming efforts to include system integration and monitoring of the communications links in the system, 2) Reduced possibility of equipment failure due to improved supervisory control of the delivery system, 3) Reduced possibility of catastrophic water loss, 4) Increased energy savings through regulating water temperature and reducing electrical load on cooling towers by installing effluent temperature programming logic for the existing variable frequency drives on the blower motors.

  - **If other benefits are expected explain those as well. Consider the following:**
    - **Extent to which the proposed project improves overall water supply reliability**
      This project allows for remote access to control local processes over the large distance between the Casa Grande Office and the actual production facility. Operating costs could be significantly reduced and improve the performance and reliability of the distribution system.
    - **The expected scope of positive impact from the proposed project (e.g., local, sub-basin, basin):** Positive impact to local customer base, water savings for the sub-basin.
    - **Extent to which the proposed project will increase collaboration and information sharing among water managers in the region:** There is wide acceptance of the benefit of SCADA technology but actual implementation by a private water company will be readily transferable.

- **Any anticipated positive impacts/benefits to local sectors and economies (e.g., agriculture, environment, recreation, tourism):** Direct benefit to customers in White Tank Service area due to improved reliability of water service and increased operational efficiency for AWC.

Evaluation Criterion C—Project Implementation (15 points)

- Describe the implementation plan for the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

  1) Install SCADA (system integration and radio configuration): Programming (30 days), Engineering (30 days), Construction (34 days)
  2) Programming and system integration for two production wells: Programming (7 days), Engineering (14 days), Construction (10 days)

- **Describe any permits that will be required, along with the process for obtaining such permits.**

  N/A

- **Identify and describe any engineering or design work performed specifically in support of the proposed project.**

  Staff engineers have outlined software and hardware implementation schedules that include working with electrical contractors, identifying engineering needs for electrical and instrumentation drawings, control panel fabrication and all other requirements for system functionality.

- **Describe any new policies or administrative actions required to implement the project.**

  None necessary. Project is ready to proceed upon successful grant award notification.

Evaluation Criterion D—Nexus to Reclamation (15 points)

Describe the nexus between the proposed project and a Reclamation project or activity, including:

- **How is the proposed project connected to a Reclamation project or activity?**

  AWC has a series of CAP Water Use Plans that delineate its goal of providing sustainable water service to its customers. The White Tank CAP Water Use Plan describes AWC's plans to put its full CAP allocation to use for water service to customers, AWC plans to construct its White Tank Recharge and Recovery Facility in the northeastern part of its White Tank service area. AWC may initially recover stored CAP water from any of its seven existing wells located throughout its White Tank service area pursuant to recovery well permits issued by ADWR. AWC may also recover stored CAP water from one or more recovery wells constructed at or near the White Tank Recharge and Recovery Facility site and deliver it to the White Tank service area distribution system through a 12-inch water transmission main.

  Any recovery of recharged CAP water in effect, offsets groundwater pumping where no recharge is occurring.

- **Will the project help Reclamation meet trust responsibilities to any tribe(s)?**
  No, it will not.
- **Does the applicant receive Reclamation project water?**
  Yes. AWC has a CAP water allocation totaling 968 acre-feet per year in its White Tank Service Area.
- **Is the project on Reclamation project lands or involving Reclamation facilities?**
  No, it is not.
- **Is the project in the same basin as a Reclamation project or activity?**
  Yes, the CAP, a Reclamation Project, is in the same basin.
- **Will the proposed work contribute water to a basin where a Reclamation project is located?**
  No, however, the project will contribute to reducing water loss in a critical drought stricken basin.

Environmental and Cultural Resources Compliance

To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why.

The application should include the answers to:

- **Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.**

  No, this project involves installation of equipment to existing facilities, minor trenching for wiring and conduit installation will be kept to a minimum.

- **Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?**

  No, this project does not have any environmental impacts and is tied to hardware and software integration into a current control system.

- **Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.**

  No, this project does not include any wetlands or surface waterways in the project boundary.

- **When was the water delivery system constructed?**

  The White Tank System is 50 years old and the Blue Horizon Facility is 10 years old.

- **Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.**

  No irrigation system modification is involved in this project.

- **Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.**
  No, there are not.

- **Are there any known archeological sites in the proposed project area?**

  None known.

- **Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?**

  No, it will not.

- **Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?**

  No, it will not.

- **Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?**

  No, it will not.

Required Permits or Approvals

No permits or special approvals are required for this project.

Official Resolution

ARIZONA WATER COMPANY

RESOLUTION OF THE BOARD OF DIRECTORS
ADOPTED March 23, 2017

WHEREAS, the Board of Directors of Arizona Water Company (the "company") has reviewed and supports the company's WaterSMART Grant applications for: (i) White Tanks System Control and Data Acquisition (SCADA) Water Efficiency Project, and (ii) Water Marketing/Planning Strategy to Analyze Feasibility of Delivering Reclaimed Water for Industrial and Agricultural Use; and

WHEREAS, the company is capable of providing the amount of funding and/or in-kind contributions specified in the WaterSMART Grant applications; and

WHEREAS, if selected for a WaterSMART Grant, the company will work with the United States Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.

NOW THEREFORE BE IT RESOLVED, That the Board of Directors supports and approves the company's submission of the WaterSMART Grant applications; and

RESOLVED FURTHER, That the officers of the company are hereby authorized to prepare, execute, and deliver such cooperative agreements, contracts, instruments, and documents as they may deem necessary and appropriate in connection with the WaterSMART Grant applications.

I, J. R. Craig, Assistant Secretary of Arizona Water Company, do hereby certify that the foregoing resolution is a full, true, and correct copy of a resolution adopted at the meeting of the Board of Directors of said company held on March 23, 2017.

Dated: May 15, 2017

J. R. Craig
Assistant Secretary

Project Budget

1) How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

AWC will make its monetary contribution through internally generated funds; AWC will make its in-kind contribution by using company personnel and equipment.

2) Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs. Include:

No costs incurred prior to the projected start date are anticipated or included.

3) What project expenses have been incurred?

None.

a) How they benefitted the project
N/A

b) The amount of the expense

N/A

c) The date of cost incurrence

N/A

4) Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

AWC is not relying on outside funding partners to fund this Project. All matching funds will be provided by Arizona Water. Commitment letters are not applicable.

5) Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards your 50 percent cost share unless otherwise allowed by statute.

None.

d. Contractual

PLC Programming - Consultants will be hired to develop the system integration, radio configuration, sensors, and field instrumentation, $31,000.

Electrical Engineering Design – Electrical engineers will be hired to design the wiring, electrical panels, and instrumentation, $41,000.

Construction – Electrical contractors and SCADA consultants will be hired to construct the main electrical panel, install the wiring, sensors and other instrumentation, $93,000.

Cooling Tower PLC – Consultants will be hired to develop PLC programming to control the cooling tower fans, $11,000.