



Santa Clara Valley Water District

File No.: 17-0296

Agenda Date: 6/13/2017

Item No.: 5.4.

BOARD AGENDA MEMORANDUM

SUBJECT:

Purchase of Pre-Stressed Concrete Cylinder Pipe Condition Assessment and Monitoring Services for the Almaden Valley Pipeline Under a Sole Source Agreement with Pure Technologies U.S., Inc. for a Total Not-to-Exceed \$2,500,000.

RECOMMENDATION:

- A. Approve a sole/single source purchase of services from Pure Technologies U.S., Inc. (Pure Technologies), to provide electromagnetic inspection and an acoustic fiber optic monitoring system for the Almaden Valley Pipeline for a not-to-exceed total amount of \$2,500,000; and
- B. Authorize the Interim Chief Executive Officer (CEO) or her designee/successor to negotiate and execute an agreement with Pure Technologies for these condition assessment and monitoring services.

SUMMARY:

On April 15, 2016, the Board held a special meeting to discuss a major pipeline failure on a section of the Santa Clara Conduit that had occurred in August 2015. The failure of the section of the Santa Clara Conduit highlighted durability issues inherent in the use of the Pre-Stressed Concrete Cylinder Pipe (PCCP). The potential of this type pipe to experience failure has become increasingly acute. Based on analysis of the problem, Staff provided the following recommendations:

- increase frequency of inspections to identify structurally-distressed pipe sections;
- undertake proactive monitoring of PCCP; and
- promptly repair severely distressed pipe sections discovered during previous inspections.

Approximately 77 miles of the 145 miles of pipelines and tunnels managed by the District, are PCCP. The District first began using specialized electromagnetic inspection technology in 2002 and has assessed the baseline structural integrity of approximately 62 miles District-managed PCCP since that time. The assessment efforts from 2002 through 2010 utilized a competitive procurement process between two vendors, Pure Technologies and Pressure Pipe Inspection Company (PPIC). In 2010, Pure Technologies purchased PPIC. From that point forward, the District has relied upon a sole/single source on-call electromagnetic inspection services agreement with Pure Technologies for PCCP condition assessment.

The Almaden Valley Pipeline, which is composed of 12.3 miles of 72-inch and 78-inch diameter PCCP (see Attachment 1), is scheduled to be shut down in October 2017, as part of the Almaden Valley Pipeline Inspection and Rehabilitation Project (Project). The Project would be the first pipeline rehabilitation work performed under the 10-year Pipeline Inspection and Rehabilitation Program (Program). Future projects under the Program would include work on the Cross Valley and Calero Pipelines (FY19), Central Pipeline (FY20), and Santa Clara Conduit (FY21). The Program funds inspection and rehabilitation work along the pipelines listed above, as well as various other District pipelines and tunnels to accomplish the following objectives:

- Perform dewatering and internal inspections of District's pipelines and tunnels.
- Renew distressed pipe sections as required. (Renewal encompasses the actions of repair, rehabilitation, and replacement.)
- Perform maintenance and repair activities as required.
- Replace old valves, flow meters, pipeline appurtenance assemblies, and piping as appropriate.
- Modify failure prone pipeline appurtenance connections.

The Project will consist of internal visual and electromagnetic inspections, and rehabilitation activities on the pipeline such as replacement of line valves, air release valves, and other miscellaneous appurtenance rehabilitation.

The proposed agreement supports inspection and on-going monitoring of the Almaden Valley Pipeline, resulting in proactive risk management of pipeline operations.

Electromagnetic Inspection establishes a baseline for PCCP conditions

In general, PCCP fails due to loss of structural integrity due to the breakage of the pre-stressing wires. As wires in a PCCP section break, pipe strength is reduced until the strength limit reaches the pipeline operating pressure, causing that pipe section to fail catastrophically. High pressure operations or pressure surges can also cause damage the internal and external mortar lining of the pipe. Damage to the lining allows water from the pipeline and surrounding area to infiltrate through the lining and corrode the pre-stressing wires, which can affect their integrity. When this occurs, the pipe can fail at lower pressures due to loss of strength in the pre-stressing wires caused by previous high pressure operations or pressure surges. For this reason, assessment and monitoring of prestressing wire breaks is a critical component to analyzing failure risk in PCCP.

Condition assessment of PCCP is primarily accomplished with electromagnetic inspections, which provides a direct means to detect the number and location of broken wires within a PCCP section. Other technologies exist, such as utilizing pipe-wall stiffness as an inferred method to for detection of wire breaks in PCCP, but do not provide a direct measure and location of wire breaks. Results of an electromagnetic inspection are used to assess the current condition of a pipeline section and to obtain a measure of the remaining service life of the pipeline. Although these inspections provide a good basis for risk assessment, it is also important to perform verification analysis in areas with high consequence of failure or where significant repairs are anticipated. Verification analysis is

accomplished by excavating and exposing pipe sections to directly verify mortar condition, and by interpreting other evidence, such as corrosion monitoring data.

Acoustic Fiber Optic Monitoring provides real-time information on wire breaks

The results from the electromagnetic inspections provide an assessment, and establishes the baseline condition, of the PCCP. Although useful, these results do not provide information about the rate of deterioration of the PCCP between inspections, which could be utilized for ongoing risk analysis and improved asset management. Acoustic Fiber Optic (AFO) monitoring technology, on the other hand, continuously detects and monitors acoustic events within a pipeline, as well as report their time and location. This data can provide a direct measure of wire breaks within a given section of PCCP. Other available technologies use an approach that provides an indication of the general condition of a pipe segment, but not the location and quantity of wire breaks in a pipe section.

The best practice is to install the AFO monitoring system following electromagnetic inspection to avoid additional dewatering and stressing of the pipeline. Installation of AFO allows tracking of pipeline deterioration from the baseline condition to support proactive management. Once the system is in place, wire break information is recorded as breaks occur. Email notifications are automatically sent to District staff as soon as the event has been located and classified by the Pure Technologies processing team. Data will be stored on a web-based management site where more detail on the event can be accessed, and analyses can be prepared to determine the need for further action, including whether a pipeline shutdown is warranted.

Sole/Single Source Justification

Per Board Policy No. EL-5.2, a purchase of greater than \$50,000 that is completed without a competitive recruitment process is subject to approval by the Board, unless an exemption in the Board Governance Policy is applicable. The recommended procurement is estimated to be \$2,500,000, and there are no applicable policy exemptions for this sole/single source procurements process. As a result, this sole source purchase agreement is being brought to the Board for approval. A breakdown of the anticipated costs associated with this agreement is included in the Financial Impact section of this memorandum.

A sole/single source is necessary for this procurement because the firm utilizes proprietary inspection and monitoring equipment. The District has conducted background research on companies that possess technology to assess and report on the number of broken wires along a section for PCCP, and correlate the number of broken wires to the remaining lifespan of the pipeline. Pure Technologies is the only firm capable of conducting these very specialized non-destructive electromagnetic inspections (Remote Field Eddy Current/Transformer Coupling (RFEC/TC) Method), as the firm utilizes propriety electromagnetic inspection and AFO monitoring equipment. Other available technologies use an approach that provides an indication of the general condition of the pipeline segment, by measuring the deterioration of the pipe wall stiffness, but do not provide a direct location and measure of wire breaks in the PCCP. Pure Technologies has developed, patented

and/or purchased the proprietary rights for the equipment, methodology and technology required to conduct coordinated electromagnetic inspections and AFO monitoring of PCCP (see Attachment 2). Patent rights prohibit other firms from utilizing this technology.

Pure Technologies' technology is the only American Water Works Association (AWWA) Research Foundation validated non-destructive condition assessment technique for evaluating pre-stressed wire breaks in PCCP. Prior to 2010, the two main providers of electromagnetic inspection services for PCCP were Pure Technologies and PPIC, and a competitive selection was used by the District to procure inspection services. In 2010, Pure Technologies acquired PPIC. In addition, Pure Technologies provides AFO monitoring to more than 366 miles of PCCP in North America, and more than 335 miles in Libya. Pure Technologies possesses the only known database of spontaneous wire breaks in operating pipelines as detected by distributed fiber optic wire sensors. A portion of the pipelines monitored by fiber optic wire sensors over past years have been excavated and inspected, allowing a comparison of the condition of those pipelines with the number of wire breaks that were previously detected in real-time by the fiber optic wire sensors.

Previous Related Board Actions

On August 27, 2013, the Board approved a sole/single source purchase of electromagnetic inspection services from Pure Technologies and authorized the CEO to negotiate and execute an agreement for a not to exceed total of \$650,000 over a three-year period, for the electromagnetic inspection of PCCP on an on-call basis. Under this agreement Pure Technologies satisfactorily performed electromagnetic inspection services during the Santa Clara Conduit pipe failure in August 2015 and during the Snell Pipeline Rehabilitation Project, Project No. 95084001, Contract No. C0608, in 2016. This agreement with Pure Technologies ended in 2016.

On September 13, 2016, the Board approved a sole/single source purchase of services from Pure Technologies and authorized the CEO to negotiate and execute an agreement for a not to exceed total of \$3,500,000 over a four-year period, for the condition assessment of the Pacheco Conduit (\$2,500,000) and electromagnetic inspection of PCCP on an on-call basis (\$1,000,000).

Next Steps

If the Board approves the recommendations, the District will proceed with negotiating and executing an agreement with Pure Technologies to acquire the electromagnetic inspection and AFO monitoring solution.

In addition, staff is developing plans and specifications for the rehabilitation of 12.3 miles of the Almaden Valley Pipeline and plans to come to the Board in July 2017 for authorization to advertise the project.

FINANCIAL IMPACT:

Costs of the Recommendation

The estimated cost of the electromagnetic inspection and AFO monitoring services for the Almaden Valley Pipeline is \$2,500,000. This includes mobilization, safety services, electromagnetic inspections, sounding and data collection, AFO fiber optic cables and hardware, installation services, and analysis and reporting in District specified formats. The estimated costs of these services are shown below:

Budget Information

Item	Cost
Visual, Sounding, and Electromagnetic Inspections	\$400,000
AFO Hardware and Data Acquisition System	\$1,050,000
AFO Cable Installation	\$450,000
AFO Set-up and Commissioning	\$425,000
AFO monitoring and support services	\$175,000
PROCUREMENT TOTAL	\$2,500,000

Funding Source

The funds for the recommended procurement have been allocated in the Board's approved FY2018 budget for the 10-year Pipeline Rehabilitation Capital Project.

CEQA:

As the lead agency under the California Environmental Quality Act (CEQA), the District approved and adopted the Pipeline Maintenance Project (PMP) Environmental Impact Report (EIR) in November 2007. The PMP provides for the maintenance of the District's 14 raw water pipelines and nine treated water pipelines. Potential impacts related to all components of the Project have been evaluated and mitigated in the final EIR. The District and the Pure Technologies will comply with applicable BMPs and mitigation developed in the final EIR during Project implementation.

ATTACHMENTS:

Attachment 1: Map

Attachment 2: Sole Source Letter

UNCLASSIFIED MANAGER:

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