



# Santa Clara Valley Water District

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**File No.:** 16-0565

**Agenda Date:** 9/13/2016

**Item No.:** 5.1.

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## BOARD AGENDA MEMORANDUM

### **SUBJECT:**

Purchase of Condition Assessment Services for the Pacheco Conduit and On-Call Inspection Services for Pre-Stressed Concrete Cylinder Pipe Under a Sole Source Agreement with Pure Technologies U.S., Inc.

### **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 Pacheco Conduit; and for on-call electromagnetic inspection services for a not-to-exceed total amount of \$3,500,000 over a four year period; 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 on-call electromagnetic inspection services.

### **SUMMARY:**

On April 15, 2016, the Board held a special meeting to discuss the major pipeline failure on a section of the Santa Clara Conduit that had occurred in August 2015. This conduit forms a portion of the 30 mile Federal San Felipe System pipeline, which transports Central Valley Project water from San Luis Reservoir to District facilities.

The failure of this section of the pipe highlighted durability issues inherent in the use of the Pre-stressed Concrete Cylinder Pipe (PCCP). The potential of this pipe to experience failure has become increasingly acute. District staff analysis of the problem provided recommendations to increase frequency of inspections to identify structurally-distressed pipe sections; undertake proactive monitoring of PCCP in the Pacheco Conduit and other PCCP pipelines; and the need for prompt repair of severely distressed pipe sections that were 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, assessing the baseline structural integrity of approximately 62 miles District-managed PCCP since. The assessment efforts from 2002 through 2010 utilized a competitive procurement process between two vendors (Pure Technologies and Pressure Pipe Inspection Company (PPIC)). Pure Technologies purchased PPIC in 2010 and since then the District has relied upon a sole/single source on-call electromagnetic inspection services agreement with Pure Technologies.

The Pacheco Conduit, which is composed of 7.9 miles of 120 inch diameter PCCP, constructed in 1985 (see Attachment 1), is scheduled to be shut down in January 2017, for approximately 12 weeks, for internal visual and electromagnetic inspection, and the work will include the replacement of line valves, air release valves, and other miscellaneous appurtenance rehabilitation.

The proposed agreement supports full inspection of the Pacheco Conduit and proactive management of the risk to operations through on-ongoing monitoring of the pipeline; and allows staff to utilize electromagnetic inspection technology for on-call inspection services in the event of the need of rapid response to inspect other PCCP pipelines.

### ***Electromagnetic Inspection establishes a baseline for PCCP conditions***

PCCP fails due to loss of structural integrity as a result of accumulated broken 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. Even at lower strength limit states, damage to the pipe external mortar lining and the concrete core can occur. The maximum pressure experienced by the pipe is more critical than the pressure at the time of failure because the pipe can fail at a lower pressure due to loss of strength caused by previous high pressure operation 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. Other technologies for detection of wire breaks in PCCP use pipe-wall stiffness as an inferred method to determine wire breaks in PCCP, but do not provide a direct measure and location of wire breaks. Electromagnetic inspections provide a direct means to detect the number and location of broken wires in a PCCP pipe section. 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, in areas with high consequence of failure or where significant repairs are anticipated; it is also important to perform verification analysis by digging up pipe sections and directly verifying mortar condition, as well as using other evidence (corrosion monitoring data).

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

The results from the electromagnetic inspection provide an assessment of the PCCP condition and the baseline condition of the PCCP. This information is useful, but does not provide information about the rate of deterioration of the PCCP between inspections for ongoing risk analysis and improved asset management. A proactive monitoring system for the PCCP was recommended by Reclamation to monitor wire break activity in PCCP between inspections. Acoustic Fiber Optic (AFO) monitoring technology enables continuous monitoring of PCCP to detect acoustic events associated with the location and direct measure of PCCP wire breaks in a given pipe section. 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. Once the system is installed, AFO

monitoring technology reports the time and location of wire breaks. The best practice is to install the AFO monitoring system following electromagnetic inspection to avoid an additional dewatering and stressing to the pipeline. This allows tracking of pipeline deterioration from the baseline case to support proactive management.

Once the system is in place, wire break information are classified as such and located as the breaks occur. Email notifications are sent automatically to District staff as soon as the event has been located and classified by the Pure Technologies processing team. Data is classified and stored on a web-based management site where more detail on the event can be determined 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 there is an applicable policy exemption in the Board Governance Policy is applicable. There are no applicable policy exemptions for sole/single source procurements greater than \$50,000; procurements larger than this amount are subject to Board approval. The recommended procurement is estimated to be \$3,500,000 over a 4-year period. The Financial Impact section later in this memo outlines the breakdown in costs.

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 pipe section for PCCP and correlate the broken wires to remaining lifespan of the pipeline. Pure Technologies is the only firm capable of conducting these very specialized non-destructive EM 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 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, Inc.'s 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. Some 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.

**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 7.9 miles of the Pacheco Conduit and plans to come to the Board in end of September 2016 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 Pacheco Conduit is \$2,500,000, over a four year period. This funds mobilization, safety services, electromagnetic inspections, leak detection services, sounding and data collection, AFO fiber optic cables and hardware, installation services, and analysis and reporting in District specified formats. The agreement also includes \$1,000,000 to fund unanticipated electromagnetic inspections of PCCP over the next four years, if the need arises. The estimated costs of these services are shown below:

**Budget Information**

Pacheco Conduit	
Leak Detection, Visual and Electromagnetic Inspections	\$550,000
AFO Hardware and Data Acquisition System	\$800,000
AFO Cable Installation	\$400,000
AFO Set-up and Commissioning	\$250,000
AFO monitoring and support services	\$500,000
<b>SUBTOTAL FOR PACHECO CONDUIT</b>	<b>\$2,500,000</b>
On-call contract to conduct electromagnetic inspections of PCCP to support pipeline emergency response as needed.	\$1,000,000
<b>PROCUREMENT TOTAL</b>	<b>\$3,500,000</b>

**Funding Source**

The funds for the recommended procurement have been allocated in the Board's approved FY2017 budget for the Pacheco Conduit and the 5-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.

In addition, since the Pacheco Conduit is a federally owned facility, it is also subject to National Environmental Policy Act (NEPA) review. As a result, the District has applied with the Bureau for an Environmental Assessment (EA) for the Project and has applied for a Biological Opinion with the US Fish & Wildlife Service on permitting under the Endangered Species Act-Section 7. Pure Technologies will receive the District's authorization to proceed with each inspection once all necessary permits to perform the work have been received.

**ATTACHMENTS:**

Attachment 1: Location Map

Attachment 2: Sole Source Letter

**UNCLASSIFIED MANAGER:**

James Fiedler, 408-630-2736