



Town of Castle Rock

Agenda Memorandum

Agenda Date: 6/16/2020

Item #: File #: TMP 2020-376

To: Honorable Mayor and Members of Town Council

From: Mark Marlowe, P.E. Director Castle Rock Water
Tim Friday, P.E. Assistant Director Castle Rock Water
Jeanne Stevens, Engineering Manager

Resolution Approving an Equipment and Services Acquisition Agreement between the Town of Castle Rock and Garney Construction to Construct the Plum Creek Water Purification Facility (PCWPF) Ammonia Conversion Project [1929 Liggett Rd.]

Executive Summary

Castle Rock Water (CRW) staff request approval of a Resolution (**Attachment A**) approving an Equipment and Services Acquisition Agreement (**Exhibit 1**) with Garney Construction (Garney) for constructing the Plum Creek Water Purification Facility (PCWPF) Ammonia Conversion Project, at a contract amount of \$354,353. The purpose of this project is to reduce annual chemical costs and improve the safety of the PCWPF for both staff and the public. While the simple payback on the project is about 14.5 years, it is difficult to put a value on the safety. In 2013, an ammonia leak resulted in the Castle Rock Fire Department having to respond to the PCWPF facility. No injuries occurred, but ammonia concentrations in the air were approximately 5,600 parts per million (ppm) and the immediate dangers to life limit is 300 ppm. Fire Department staff required appropriate suits with self-contained breathing apparatus to enter the facility and when cleared for access, a specialized hazardous materials handling service was required to cleanup and remove the leaked ammonia.

Part of the PCWPF water treatment process includes adding ammonia to chlorinated potable water to form chloramines. Chloramines are used to maintain a disinfectant residual in the water distribution system. The form of ammonia currently used at PCWPF is ammonium hydroxide. Ammonium hydroxide is an unstable solution with a high tendency to off-gas ammonia, making it a hazardous chemical to store and work with at PCWPF. CRW is planning to convert to Liquid Ammonium Sulfate (LAS), which is a more stable, less toxic, and less costly form of ammonia.

Staff recommends sole-sourcing (**Attachment B**) a services and acquisition agreement with Garney in the amount of \$354,353. Staff requests approval of an additional \$24,800 (7% contingency) for additional services that may be needed during construction. A detailed scope of work is included as Exhibit 1 to the Agreement. Garney shall undertake the work upon execution of the agreement and shall complete the work within five months thereafter.

Discussion

Burns & McDonnell Engineering (B&McD) were the design engineers for the PCWPF Project and the PCWPF Advanced Treatment (AT) Project. A reason Ammonia Hydroxide was specified for use with the original PCWPF Project completed in 2013, was because there was not a reliable local source of supply for liquid ammonium sulfate (LAS). There is now a local supplier of LAS and two other local Front Range water providers, Broomfield and Thornton, also recently converted to LAS for reasons similar to Castle Rock Water.

As requested by CRW, B&McD completed an Evaluation of Ammonium Hydroxide Conversion to LAS study, dated

January 8, 2020. B&McD evaluated items such as existing chemical feed systems, storage tank options, and other process considerations associated with a change in the form of ammonia used. The evaluation study included a cost estimate of approximately \$287,000 based on conceptual level planning completed during the study. Since the study, B&McD developed detailed drawings and specifications that Garney used to prepare their cost proposal for all detailed work tasks actually required. B&McD and CRW staff have reviewed the proposed scope of work and cost proposal submitted by Garney, and agree that the scope and fee are fair and representative for a project of this complexity. Work items associated with the Ammonia Conversion Project will include removal and replacement of existing precast concrete exterior wall panels at the PCWPF. Removal of the wall panels are required to remove the existing two metal chemical storage tanks and replace these tanks with two new fiberglass tanks. LAS is not compatible with the current metal tanks.

Based on current chemical delivery costs, B&McD calculated in the evaluation study that changing to LAS will save CRW approximately \$15,550 per year on chemical costs alone. A benefit realized when changing to LAS is a safer operating environment. The potential ammonia off-gas from ammonium hydroxide is a significant safety concern when transferring chemical, performing maintenance on the chemical feed system, or should a leak occur. While staff is trained for potential hazardous working environments associated with ammonium hydroxide and self-contained breathing apparatus equipment is available, there have been 15 leaks over the last seven years that are dangerous and costly to respond to. The first leak in 2013 required the Castle Rock Fire Department to respond. Total costs of responding to that single event were in excess of \$50,000. In the year following that event, Castle Rock Water invested another \$50,000 in additional valving, pipe and pump replacements, and safety equipment and training to respond to chemical releases. Still, we have roughly two leaks per year that cost money for response and repair. Ongoing replacement of leak detectors costs roughly \$3,000 per year, and annual hazardous operations training is about \$6,000. Several years ago, due to ongoing concerns with chemical leaks, Castle Rock Water switched to a less-concentrated solution of the ammonium hydroxide, but even that is much more hazardous than the LAS. Accounting for these potential savings and reduced chemical costs results in a payback period of 14.5 years. Switching to LAS will save Castle Rock Water over \$15,000 in just stainless steel piping on the Advanced Treatment upgrades at PCWPF. LAS does not off-gas and creates an all-around safer working environment. LAS is currently used at the Founders and Miller Water Treatment plants, though in lesser quantities. Castle Rock Water plant operations staff are experienced using the chemical.

A permitting process with the Colorado Department of Public Health & Environment (CDPHE) will be part of this project to request approval for a change in treatment chemical usage. CRW has submitted a permit application with all supporting documentation to CDPHE. This project has been assigned to a CDPHE reviewer and CRW will be working with CDPHE as needed.

CRW worked through a public process to short list qualified contracting firms to bid on the PCWPF AT Project. Subsequently, through a competitive bidding process, Garney was awarded a construction agreement for the PCWPF AT Project. They are currently on schedule and budget with this project and working efficiently with CRW and the rest of the project team to resolve field related issues when they develop.

Garney used labor and equipment rates established with the PCWPF AT Project when preparing the cost proposal for this proposed Ammonia Conversion Project. Garney is onsite and able to complete the Ammonia Conversion scope of work within the same schedule needed for completing the PCWPF AT Project. No additional fees for project bonds or mobilization were added to the new Ammonia Conversion cost proposal. A sole source contract is recommended and a sole source justification form is included (**Attachment B**).

Budget Impact

Funding to complete the PCWPF Ammonia Conversion Project will be from the 2020 budget line item "Advanced Oxidation Facility" (account no. 211-4375-443.77-75). There is a balance remaining in account 211-4375-443.77-75 of approximately \$1,210,000. There are sufficient funds available in this account for this project.

Staff Recommendation

Staff recommends approval of an agreement with Garney Construction for \$354,353 to complete the PCWPF Ammonia Conversion Project. Staff requests approval of an additional \$24,800 (7% contingency) for a total project authorization of

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\$379,153.

Proposed Motion

"I move to approve the Resolution as introduced by title."

Attachments

Attachment A: Resolution
Exhibit 1: Agreement
Attachment B: Sole Source