ITEM # ___36__
DATE: 11-25-14

COUNCIL ACTION FORM

SUBJECT: ENGINEERING SERVICES CONTRACT CHANGE ORDER – CONVERSION OF POWER PLANT FROM COAL TO NATURAL GAS

BACKGROUND:

In November 2013, the City Council voted to convert the City's Power Plant from coal to natural gas. On May 27, 2014, City Council awarded a contract to Sargent & Lundy, LLC, Chicago, IL, for Engineering Services required to convert the Power Plant to natural gas. That contract was in the not-to-exceed amount of $1,995,000.

As part of Sargent & Lundy's (S&L) original scope of work, they were tasked to review and evaluate the Power Plant's existing Emerson Ovation Distributed Control System. The Distributed Control System (DCS) is the dedicated control system used for boiler controls and power plant systems. S&L's contract included an assessment of whether the current DCS could handle the conversion to natural gas. In addition, that contract required S&L to develop plans and specifications for new DCS hardware and software. That task would occur whether the new hardware and software augmented or replaced the current DCS. This task has now been completed within the amount approved for S&L's engineering contract.

City staff received S&L's DCS report in September. This report confirmed that the pre-2000 era Emerson Ovation system is no longer supported by the manufacturer. This includes both the hardware and software of the existing system. More recent equipment shipped to the Power Plant in 2007 for a previous upgrade project was also found to be no longer supported, since it is based on a Windows XP operating system.

The initial evaluation of the DCS system was included in S&L's initial contract in order to verify whether replacement was truly needed. Based upon S&L's evaluation, staff has confirmed that it is clearly in the City's interest to incorporate replacement of the existing DCS system into the larger gas conversion project.

Standard specifications for the purchase of the DCS system were already developed by S&L as part of their original contract. With a decision to move forward in replacing the DCS, S&L must next design how the DCS inputs and outputs will be tied into the Power Plant's turbine, generator, boiler, auxiliary system fans, etc. Under Change Order No. 1, S&L will complete a detailed design and provide detailed installation specifications for the new DCS components

With the replacement of the DCS two additional challenges are created. First, additional climate- and dust-controlled space is needed to house the additional equipment control

cabinets required for the new DCS. Second, the DCS would need to be tied into the existing Main Control Board (MCB) and the Auxiliary Control Board.

The existing control boards are of 1980's vintage and need updating to digital operation. To connect the new DCS and update the existing control boards would require an extended outage of the entire plant. The result would be an inability to burn refuse-derived-fuel and the need to secure alternative heating in the Power Plant during the conversion to prevent freezing.

A viable alternative to address both of these challenges is to design and construct a new control/cabinet room next to the existing plant control room. Space can be created for the new cabinets and the new DCS can be installed **without disrupting the ongoing plant operations being controlled by the current DCS.** The Power Plant will then be down for a day or two, rather than for months.

As part of the DCS report, S&L provided cost estimates to include the incorporation of the functions of the existing Main Control Board and the Auxiliary Control board into the new DCS. They also prepared estimates for a new, two-story Control Room/DCS Cabinet room. The installation of the new DCS provides an opportunity to accomplish this integration at the same time as the Power Plant fuel conversion project, thereby maximizing the safe and efficient operation of the Plant.

It is staff's recommendation that a new DCS be procured for the Boiler Natural Gas Conversion Project, and that all functions of the Main and Auxiliary Control Boards be integrated into the new DCS. Change Order 1 includes engineering and design dollars for those elements, as well as for a new Control/DCS cabinet room.

In total, this change order will add an additional $2,395,000 to the existing S&L engineering services agreement, and will bring S&L's total not-to-exceed contract amount to $4,390,000. Fortunately, funding to cover this change order, as well as to purchase and install the new DCS, is available from savings in the overall fuel conversion project budget.

Significant savings are now projected from the $36,880,000 originally budgeted for the fuel conversion project. That budget was based on the engineer's estimate from the February 2013 study done by Black & Veatch (B&V), which compared the cost of several alternatives for powering the plant with coal and natural gas. Those estimates included general cost assumptions that were used to compare the varuiys retrofit options evaluated in the study.

Three major reductions have now been made to Black & Veatch's cost projection for the natural gas conversion project. First, B&V's estimates for the various alternatives included an ash handling system for $2,500,000. At the time of the B&V study, a pending federal rule would have required each of the alternatives to include a new ash handling system to dispose of RDF ash. However, that proposed rule was never enacted, so the new ash handling system is not presently needed.

Second, B&V's budget estimate included a contingency fund of nearly $5,000,000, since it had an accuracy level of plus or minus 30 percent. With the much more detailed evaluation Sargent & Lundy has now performed, this contingency amount is no longer needed.

Third, B&V's budget estimate included $3,000,000 for an engineering procurement construction margin. That margin was also included in each alternative evaluated by B&V. However, Sargent & Lundy's much more refined engineer's estimate has confirmed that we no longer need that $3,000,000 margin.

In summary, after spending considerable time on-site evaluating the City's Power Plant, S&L has developed a much more precise engineer's estimate for the overall plant conversion project. Their updated cost estimate is $24,061,300, which is over $12 million less than the Black & Veatch estimate.

The approved FY 2014/15 Capital Improvements Plan included $36,880,000 for the Unit #7 and #8 Fuel Conversion. With inclusion of this change order and the DCS project described above, the project budget can be updated as follows:

$36,880,000	FY 2014/15 CIP amount budgeted for project
$ 1,995,000	Encumbered not-to-exceed amount for Engineering Services
$ 3,355,300	Actual cost for Natural Gas Conversion Equipment
$ 5,350,300	Total committed to date
$ 2,395,000	**Engineering Services Contract Change Order No. 1 in a not-to-exceed amount (pending Council approval of this agenda item)**
$ 1,161,000	Estimated cost for Distributed Control System equipment (see Distributed Control System Council Action Form on this Council meeting agenda)
$27,973,700*	Remaining balance available for Burner Installation, Natural Gas piping from the gate, Turbine Generator controls upgrade, DCS Installation, new Control/DCS room, and other miscellaneous equipment needed for the fuel conversion

* S&L's updated cost estimate for these remaining items is now $15,155,000. Subject to actual bids, this should allow the overall project budget to be reduced by over $12,000,000.

ALTERNATIVES:

1. Approve contract Change Order No. 1 to the engineering services agreement with Sargent & Lundy, LLC, Chicago, IL, to design the installation of the DCS,

design the control room and DCS cabinet room, and integrate the main and auxiliary control boards into the DCS, at a not-to-exceed cost of $2,395,000.

2. Reject contract Change Order No. 1 and delay the needed DCS upgrades.

MANAGER'S RECOMMENDED ACTION:

The fuel conversion project presents a timely opportunity to also replace the Power Plant's outdated and unsupported control system. With the additional work proposed above, all functions of the Main and Auxiliary Control Boards can also be integrated into the new DCS. This will significantly enhance the safe and efficient operation of the Plant well into the future. To minimize down time at the Power Plant, a new control/DCS cabinet room will also be completed at the same time.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1 as described above.