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M E M O R A N D U M

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele, P.E., Chief Engineer-Secretary
SUBJECT: NAWS – Contract 7-1B Award and NAWS 2017-2019 Biennium Funding
DATE: January 16, 2018

Project:
NAWS Contract 7-1B Minot Water Treatment Plant Phase II Improvements generally consists of construction of a new primary treatment building at the Minot water treatment facility to enable treatment of current and future groundwater and surface water sources. The building addition will house two 9 million gallon per day (MGD) solids contact basins with recarbonation, new chemical feed facilities and storage for lime, coagulant, polymer, and chlorine as well as a new laboratory, break room, and IT facilities. The purpose of this project is to replace the aging existing solids contact basins which date to the 50's and 60's and associated chemical feeds. The original plan had been to rehabilitate the existing basins in situ, rehabbing the existing 12 MGD basin while operating on the existing 6 MGD over the winter months and rehabbing the 6 MGD basin while operating on the new 12 MGD basin. This has not been an option for several years due to increased winter base flow demands in the area.

Bid Opening:
Bids were opened December 21, 1017. The bid package consisted of four bid contracts (general, mechanical, electrical, and combined) with two possible combinations of multiple primes or one combined bid prime bid. Since there was no prime bid submitted for bid contract 2 – mechanical, the contract will be awarded based on bid schedule 4 – combined prime bid. Four bids were received for contract 4 and are summarized below and in the attached memoranda from Houston Engineering. The bid from Swanberg Construction is considered non-responsive but is included here for comparison.

Contractor	Total Contract Cost (with alternates)	Percent Greater than OPCC
PKG Contracting, Inc.	$26,868,000.00	4.4%
Rice Lake Construction	$28,603,978.05	11.2%
Swanberg Construction	$29,916,876.00	16.3%
John T. Jones Construction	$33,698,100.00	31.0%
Engineer's OPCC	$25,725,555.00	

Bid Alternates:
Eight bid alternates were included in the contract primarily to promote competition for multiple project components which might otherwise have been essentially sole-sourced. Bid alternates A-1 and A-4 were additive alternates for sod instead of hydro-seeding and a protective

coating/insulation for process piping versus conventional pipe coating and adhesive insulation in the base bids. Neither alternate provides adequate advantage over the base bid to justify the additional expense and are therefore not recommended for award.

Bid alternates A-2 and A-3 were for a urethane insulated carbon dioxide storage tank and a vacuum-jacketed insulated carbon dioxide storage tank, respectively. Bid alternate A-3 was $52,000 higher than A-2, but a life cycle analysis shows a lower overall cost for the vacuum jacketed alternate. There will also likely be additional savings available for the vacuum jacketed tank. The vacuum jacketed tank will likely require less refrigeration capacity and can utilize a lesser pipe schedule for the stainless-steel piping which is enclosed in the vacuum jacket and exposed on a urethane insulated tank. We anticipate savings which could all but eliminate the cost difference between these two alternates which would make the life cycle costs much better for bid alternate A-3. For these reasons, the recommendation is to award the contract with bid alternate A-3.

Bid alternates A-5 and A-6 were for Reaction turbines and Francis turbines, respectively to dissipate excess pressure from the Sundre/NAWS supply line and recover electricity in the process. The supply line from the Sundre aquifer is being rerouted from the original fiberglass pipeline through the city of Minot to a line that ties into the NAWS raw water line south of Minot along highway 83 to avoid impacts from the enhanced Mouse River flood protection and to replace aging/high maintenance infrastructure. The point of the tie-in is at an elevation of roughly 1795 ft msl, whereas the treatment plant sits at about 1580 ft msl. This results in excess pressure that needs to be bled off, and rather than using a pressure reducing valve, our plan is to utilize the excess pressure to turn turbines to reduce electrical costs. The payback period on this is 10 to 11 years after which we are money ahead. We anticipated the Francis turbines having a higher capital cost and a lower operating and programming costs. The Reaction turbines can produce a higher efficiency, but only for a very narrow flow range. The Francis turbines handle variable flow much better and therefore provide a higher overall efficiency, simpler piping, and programming. The water treatment facility will be roughly energy neutral based on historic electrical use and project water demands and will result in lower overall water cost to our users. For these reasons, the recommendation is to award the contract with bid alternate A-6.

Bid alternates A-7 and A-8 were for RDP and Merrick lime slakers, respectively. Lime slaking is the process in which calcium oxide (CaO), referred to as quick lime or pebble lime, is converted into calcium hydroxide ($Ca(OH)_2$) which is referred to as hydrated lime and is the useful application for water treatment. The original design for this project was based on the RDP Tekken® lime slaker. This style of lime slaker is very popular as it offers greatly improved reliability and operational simplicity over traditional paste or detention style lime slakers. Merrick has introduced a competitor with similar specifications, so we bid them as alternates. We didn't feel we could bid them as equals as they aren't equal products. Both systems have advantages and disadvantages, but RDP has numerous installations of this specific type of slaker whereas this would be one of Merrick's first installations for this product. The City of Minot has a significant preference for the RDP system. Considering the pluses and minuses, for a critical component of critical infrastructure, we feel the additional expense for the RDP system is justified and the recommendation is to award the contract with bid alternate A-7.

Bid Cost Analysis:
Bids were higher than the engineer's opinion of probable construction cost and early total project cost estimates. Numerous factors contributed to this aside from the general variability in bidding construction projects. Several features were modified or added to the project throughout the evolution of the design and after advertising through addenda. Laboratory, IT, restroom, and breakroom facilities were added to Phase II improvements to accommodate later Phase III improvements. This project adds significantly to the footprint of the facility, and the existing infrastructure will be rehabbed in Phase III and subject to considerable disruption during said efforts. The lab, IT, offices, etc. will need to be utilized for continued operation during Phase III, and it made more sense for construction sequencing and economically to incorporate these efforts into Phase II. We also changed the clarifier hardware from coated carbon steel to stainless through addenda, as it results in a lower life cycle cost despite a higher capital cost. The engineer's estimate also neglected a full load of chemicals for start-up and commissioning of the process equipment.

Additional Equipment Needed:
We removed the recarbonation equipment from this contract at the 90 percent design review and will procure it through a separate procurement contract. This is being done to promote competitive bids rather than effectively sole-sourcing the equipment which would have resulted from including it in the bid. It will be a side-stream recarbonation system instead of having a recarb basin with baffles and diffusers.

Biennium Funding:
We carried over roughly $12.5 million on NAWS from the previous biennium. The total projected project cost for Contract 7-1B is between $28.5 million and $29 million. Including roughly $5.5 million for the Biota Water Treatment plant design, agency operating costs, and legal costs associated with the NAWS appeal yields a biennium total of ~$35 million. Less the City of Minot's 35 percent share leaves a State and Federal share of $22.5 to $23 million. We will therefore need a $10 million appropriation for the NAWS project from the 2017-2019 biennium funding.

I recommend the State Water Commission authorize the award of NAWS Contract 7-1B to PKG Contracting, Inc. based on their Contract 4 bid in the amount of $26,868,000 including bid alternates A-3, A-6, and A-7, upon review of the bid documents by legal counsel and concurrence from the Garrison Diversion Conservancy District and the US Bureau of Reclamation. I also recommend the State Water Commission obligate $10 million from the 2017-2019 State Water Commission budget to the Northwest Area Water Supply project.

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