



County of Los Alamos

Los Alamos, NM 87544
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Council Meeting Staff Report

May 15, 2019

Agenda No.:	7.A
Indexes (Council Goals):	BCC - N/A
Presenters:	James Alarid
Legislative File:	AGR0625-19

Title

Consideration of Change Order No. 6 to Services Agreement AGR17-30 for the Otowi Well #2 Design, Drilling and Development Project

Recommended Action

I move that the Board of Public Utilities approve Change Order No. 6 to AGR 17-30 for the Otowi Well #2 Design, Drilling and Development Project in the amount of \$399,587.64 and forward to Council for approval.

Staff Recommendation

Staff recommends approval of the motion as presented.

Body

The drilling of Otowi Well #2 began on January 16, 2018. The drilling operation was originally scheduled to take 60 days to complete the drilling and install the screen and casing. The original construction schedule is provided as Attachment A. The driller was using the reverse rotary mud drilling method and encountered a fissured basalt geological formation at about 50 feet below ground level. The fissures in the basalt caused the drilling mud to be lost into the formation and drilling was stopped since the cuttings could not be removed from the bore hole due to the loss of circulation. Through February and March 2018 the contractor and the DPU negotiated the project's first change order that modified the drilling equipment to change the drilling technique to a dual pipe rotary air drilling methodology. This was a high cost change due to the need to custom fabricate some equipment, re-tool the drilling rig and increase the number of air compressors to drive the air circulation process. Beginning on April 1, 2018 work continued using a combination of the dual pipe rotary air and reverse rotary mud methodologies. Drilling fluid and recirculated air continued to be lost to the formation. The contractor proceeded to use a number of additives to the drilling fluids to attempt to re-establish circulation, but the only effective solution was to install cement into the bore hole to attempt to seal up the fractures in the formation, then drill through the cement. Several iterations of cementing the bore hole and re-drilling through the cement were performed between April and August 2018. The cost for applying the cement, re-drilling through the cement and the time to perform this work through this 300 foot layer of fissured basalt were the subject of Change Orders 2 and 3. On August 9, 2018 a 28" steel surface casing was successfully installed to a depth of 700 feet below ground surface. This stabilized the bore hole through this problematic basalt layer. Another fractured basalt layer was encountered from 740 feet to 880 feet below ground level. This 140 foot layer of fissured basalt caused similar difficulties but the hole was stabilized with cement. The costs associated with stabilizing this second 140 foot layer of basalt is the subject of Change Order No. 4. Change Order No. 5 included additional payment for the costs of labor, fuel and equipment from April 1, 2018 to August 2, 2018 which period represents the timeframe where drilling occurred in the fractured basalt. The fissured basalt geological formations encountered in drilling of the well was an unforeseen condition and the justification for executing Change Orders 1 through 5.

On February 11, 2019 the well construction was completed and the final testing of the well took place on May 2, 2019. Change Order 6 includes payment for adjustment of final as-constructed quantities,

additional work to meet unforeseen regulatory requirements, additional engineering services and payment for difficult drilling conditions associated with fractured basalt. A description of the additional costs included in Change Order No. 6 are as follows:

\$117,303.00 payment for adjustment of final quantities. The major cost overrun is for payment of per diem for the well drillers crews for 189 days above the scheduled 60 days onsite. The additional days are due to complications due to the unforeseen fractured basalt. The second major overrun was in the number of loads of heavy fluids that were produced and required to be collected and disposed of offsite. 19 additional loads were produced due to the large amount of lost circulation material (LCM) required to stabilize the bore hole. LCM includes various additives that are added to the drilling fluids to prevent drilling fluid loss to the formation.

\$138,641.65 payment for difficult drilling through basalt. As the drilling progressed through the fractured basalt, the drill string began to veer out of alignment at 500 feet depth. Corrective actions could not be made immediately to correct the alignment due to the loss of drilling mud circulation at depths between 500 feet to 700 feet depth. Once the bore hole was stabilized the driller spent three weeks performing corrective actions to keep the bore hole within the alignment specifications. Correcting the alignment deviation would have taken minimal effort if the corrective actions could have been made when the deviation was first detected.

\$60,478.73 payment for 10 day period where drilling mud circulation was lost in January 2019. The cost incurred included were labor, fuel and LCM to stabilize the bore hole.

\$21,020.00 payment for reconciliation of final quantity of dual tube rotary air drilling.

\$20,000.00 payment for construction of erosion control measures required by LANL/DOE in preparation of discharging water produced from pump testing of well. The work included installation of rock berms and lining 150 feet of channel.

\$24,068.00 payment for demobilizing and remobilizing test pump equipment and rental of two 22,000 gallon storage units. Just days before the pump testing was scheduled to be completed we were notified by the New Mexico Environment Department, Ground Water Quality Bureau that we could not discharge water until we demonstrated the water was free of contaminants. This required rental of storage tanks to purge the well prior to sampling and the contractor demobilize the crew until approval was granted.

\$18,076.26 payment for additional engineering services to administer the project for a year beyond the scheduled completion.

Change Order #6 is presented as Attachment B. A summary of all change orders is provided below, including proposed Change Order No. 6.

Original Contract	\$2,583,694.07
Change Order #1	\$345,660.70
Change Order #2	\$87,000.00
Change Order #3	\$252,632.79
Change Order #4	\$61,351.44
Change Order #5	\$446,490.16
Change Order #6	\$399,587.64

Total Project	\$4,176,416.80
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Preliminary data from the well testing indicate the well will produce over 1,000 gallons per minute. The final engineering report is pending, which will provide the final well production. The next step will be to issue a request for proposals to design the well house, pump and associated equipment. We are scheduled to place the well into production by the summer of 2020.

Alternatives

If Council does not approve Change Order No. 6 the contractor will likely pursue payment through the dispute resolution provisions in the contract.

Fiscal and Staff Impact

Total costs of change orders to date is \$1,193,135.09. If Change Order No. 6 is approved, the cost of total change orders will be \$1,592,722.73. The additional monies to fund Change Order No. 6 will be from approved FY20 water production capital funds.

Attachments

A - Original Construction Schedule January 9, 2018

B - Change Order No. 6