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# PROGRESS REPORT

To: James Golab, Work Order Project Manager, Texas Water Development Board

From: Van Kelley, Work Order Project Manager, INTERA

Date: April 14, 2021

**Re: TWDB Contract Number 2000012442 – Brackish Groundwater Commingling Work Order**

## Budget and Expenes

This report summarizes project activities and costs for the billing period of March 1 through March 31, 2021. The total billed expenses through March are $73,273.75. A budget breakdown by task is provided in Table 1 below. A copy of the progress report will be included in our monthly invoice being sent to the TWDB contracts department. The Work Order Notice of Proceed was signed on November 5th, 2020.

| TASK | DESCRIPTION | Budget | Invoices | | | Remaining Budget |
|---|---|---|---|---|---|---|
| | | | Current | Previous | Total | |
| 1 | Project Management | $ 9,880.00 | $ 2,250.00 | $ 6,498.75 | $ 8,748.75 | $ 1,131.25 |
| 2 | Stakeholder Communication | $ 11,465.00 | $ - | $ 7,177.50 | $ 7,177.50 | $ 4,287.50 |
| 3 | Review Statute Terminology Relevant to Comingling of Groundwater | $ 9,675.00 | $ 3,250.00 | $ 6,375.00 | $ 9,625.00 | $ 50.00 |
| 4 | Statewide Survey of Commingling Issues | $ 29,420.00 | $ 6,095.00 | $ 2,500.00 | $ 8,595.00 | $ 20,825.00 |
| 5 | Assessment of Commingling in Select Aquifers/Regions | $ 36,950.00 | $ 8,760.00 | $ 27,120.00 | $ 35,880.00 | $ 1,070.00 |
| 6 | Review of Findings | $ 4,500.00 | $ - | $ - | $ - | $ 4,500.00 |
| 7 | Recommendations and Need for Further Study | $ 10,700.00 | $ - | $ - | $ - | $ 10,700.00 |
| 8 | Reporting | $ 25,110.00 | $ 2,123.75 | $ 123.75 | $ 2,247.50 | $ 22,862.50 |
| **Total** | | **$ 137,700.00** | **$ 22,478.75** | **$ 49,795.00** | **$ 72,273.75** | **$ 65,426.25** |

**Table 1. Project Budget Versus Expenses**

## Work Completed

This report summarizes activities on project tasks for March of 2021 and is the fourth contract progress report. Tasks 1, 3, 4, 5 and Task 8 were active in the reporting period and had time billed to them. Progress on those tasks will be summarized below.

Task 1 Project Management

INTERA Project Management in March was routine and focused on making sure adequate resources were available for project tasks and oversight and review of ongoing work. Significant progress was made in February and March on Task 5, the assessment of comingling potential in selected aquifers. Attention also turned to the Task 4 statewide survey in March. The Project Manager drafted an approach and ranking method for the statewide survey which was discussed in the March 30 project manager meeting held with the TWDB Project Manager every two weeks. The next Project Manager meeting update is scheduled for April 13th.

Task 3 Review Statute Terminology Relevant to Comingling of Groundwater

Work on Task 3 progressed in March and culminated in the submittal of a draft chapter submitted to the TWDB for review on March 10. Comments were received on March 15th and INTERA dispositioned the comments and returned a revised draft to TWDB on March 24th. Activities are complete on this task until final draft report submittal in June.

Task 4 Statewide Survey of Commingling Issues

In March, the focus on Task 4 was on development of a draft ranking method and the associated metrics. To assess the potential for commingling of brackish groundwater, a series of metrics will be quantified for each aquifer. These metrics are generally based upon aquifer conditions important to the potential mixing of brackish groundwater in an aquifer through a well. The assessment is at the aquifer scale (regional). The statewide assessment will provide a hierarchical ranking of aquifers where aquifer conditions would be conducive to commingling through a well versus those that the potential would be considered less likely. Table 2 list the current draft hydrogeological suitability parameters chosen for this analysis. It is possible that the last metric, looking at the relative occurrence of cross-aquifer completions may not be ultimately part of the ranking.

Two of the metrics, Brackish Groundwater Availability and Brackish Groundwater Productivity will be sourced from the TWDB Brackish Groundwater Manual (LBG-Guyton, 2003). While more detailed and improved quantitative assessments of brackish resources have been performed for several Texas aquifers, the benefit of LBG-Guyton (2003) is that the report provides a consistent assessment of brackish availability and productivity for nearly all Texas aquifers. Because the statewide ranking is a relative ranking, the report provides a standardized approach applicable to such a statewide ranking.

The draft approach was presented to the TWDB Project Manager in the March 30th meeting. Based upon that discussion, in April the documentation for quantifying the metrics will be completed. It is also anticipated that the bulk of the report writing for this task will be drafted in April with a draft submittal date to the TWDB by the end of May. A review of progress will focus on this task in the end of April project manager meeting.

| Metric Name | Notes |
|---|---|
| Brackish Groundwater Availability | Relative metric defining the availability of brackish groundwater in the aquifer (after LBG-Guyton, 2003). |
| Brackish Groundwater Productivity | Relative metric defining the productivity of brackish groundwater in the aquifer. (after LBG-Guyton, 2003). |
| Range of Salinity Classes Present | Relative measure of range of salinity classes within the aquifer |
| Vertical Hydraulic Gradients | Relative metric of the presence of vertical hydraulic gradients in the aquifer. These gradients control mixing within a borehole in no-pumping and to a lesser degree during pumping. |
| Aquifer Composition | Relative metric describing whether the aquifer is composed of multiple formations. |
| Cross-Aquifer Completions | Relative metric describing whether the aquifer has documented cross-aquifer completions |

**Table 2. DRAFT Metrics for the Statewide Ranking**

Task 5 Assessment of Commingling in Select Aquifers/Regions

In March, INTERA moved ahead in completing the Task 5 workflow. The bulk of the data collection and interpretation has been completed for the three regional assessments. The focus has turned to documentation and case study development. Task 5 will develop one or more case study boreholes per region demonstrating the most common instances of borehole brackish groundwater commingling in each of the three regions. These case study boreholes will provide site specific analysis of commingling potential at representative well(s) in each select region. Case studies are being developed for each of the three select aquifers/regions. The best data exists for the Gulf Coast Aquifer and the Eagle Ford Region. The Trans Pecos case study(s) will utilize geophysical logs, well completion data and water quality samples where available.

Activities on Task 5 have moved into reporting and costs associated with completing the Task will primarily be performed under Task 8.

Task 8 Reporting

Activities on Task 8 were twofold. First, time was put into developing a full report table of contents which was shared with TWDB on the 30th of March in the Project Manager 1-2-1 meeting. Secondly, the chapters for Task 4 and Task 5 began development in March.

## Problems Encountered to Date

To date no problems or issues have been encountered affecting execution of the scope of work.

## References:

LBG-Guyton and Associates and NRS Consulting, 2003. Brackish Groundwater Manual for Texas Regional Water Planning Groups, prepared for the Texas Water Development Board, 199 p.