



February 9, 2024

Coleman Hale
Vice President/Sr. Petroleum Engineer
Lonquist & Co. LLC
1415 Louisiana St., Suite 3800
Houston, TX 77002

Dear Coleman:

RE: Phase 3 of the Geomechanical Evaluation of Hypothetical Low-Pressure Conditions in Westlake Caverns PPG 6 and PPG 7 at the Sulphur Mines Salt Dome in Calcasieu Parish, Louisiana (Revision 2)

This letter provides RESPEC Company, LLC's (RESPEC's) revised scope of work for Phase 3 of the geomechanical study outlined in our proposal to Lonquist & Co. LLC (Lonquist) dated September 29, 2023 [Heiberger and Nieland, 2023]¹. The proposed scope of work, estimated time-and-materials cost, and schedule outlined herein shall supersede the Phase 3 scope and budget provided in the previous proposal [Heiberger and Nieland, 2023]. The labor cost for completing Phase 2 of the study has also exceeded the estimated cost provided within the September 2023 proposal; therefore, the adjusted costs for Phases 2 and 3 are provided in the enclosed Change Notice form for your review and approval.

The primary focus of Phase 3 is to assess the near-term impact of a single hypothetical low-pressure condition in Westlake PPG 6, Louisiana Serial Number (S.N.) 57788, and Westlake PPG 7, S.N. 67270, within the Sulphur Mines salt dome. An estimate of the in situ salt dilation strength in the web between PPG 7 and the dome flank was determined in Phase 2 of the study. This estimated in situ salt dilation strength will be used in Phase 3 to evaluate the hypothetical low-pressure condition in PPG 6 and PPG 7, which will be determined based on the approximate depth of the minimum web thickness between PPG 7 and the edge of the salt dome. The updated 3D model developed in Phase 2 will be employed in Phase 3, which incorporates the conservative gross-volume representations of PPG 6 and PPG 7 based on all available historical sonar surveys.

In the baseline modeling phase, PPG 6 was assumed to maintain a 100 pounds per square inch (psi) pressure differential with PPG 7. The elevated pressure in PPG 6 provided slightly better conditions (i.e., higher factor of safety values) compared to PPG 7. RESPEC will represent PPG 6 and PPG 7 at the same pressure conditions in the Phase 3 modeling to provide a more conservative assessment of the low-pressure conditions. PPG 6 and PPG 7 depressurization will be simulated at a single rate of 25 pounds per square inch per day (psi/day), to represent a controlled depressurization scenario.

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¹ **Heiberger, K. J. and J. D. Nieland, 2023.** *Geomechanical Evaluation of Hypothetical Low-Pressure Conditions in Westlake Caverns 6 and 7 at the Sulphur Mines Salt Dome in Calcasieu Parish, Louisiana (RSI/P-8942)*, RSI(RAP)-996/9-23/16, prepared by RESPEC, Rapid City, SD, for C. Hale, Lonquist & Co. LLC, Houston, TX, September 29.



The originally proposed task for re-evaluating a pressure drawdown in PPG 6 from the approximate present-day 190 to 0 psi wellhead pressure over a 7-day duration will be postponed and no longer included in Phase 3 of the study.

Phase 3 will focus on the near-term stability of PPG 6 and PPG 7 and the immediately surrounding salt webs. Therefore, the 3D model used in Phase 3 will exclude the distant caverns in the salt dome that do not affect the stresses immediately surrounding PPG 6 and PPG 7.

The high-level tasks proposed for Phase 3 of the study are:

- / **Task 3.1:** Simulate a Controlled Depressurization of PPG 6 and PPG 7
- / **Task 3.2:** Evaluate the Near-Term Effects of Low-Pressure Conditions in PPG 6 and PPG 7
- / **Task 3.3:** Document and Present Results

RESPEC recommends holding a review meeting with the Louisiana Department of Natural Resources (LADNR) after Phase 3 to present and discuss the findings of the geomechanical modeling through this phase. RESPEC will coordinate with Lonquist and Westlake to prepare a technical presentation for Phases 2 and 3 to support the LADNR meeting, and we anticipate follow-up efforts to support action item resolution from this meeting. RESPEC will also prepare a summary technical memorandum at the conclusion of Phase 3, which will initially be delivered in draft form for review. After the project stakeholders have reviewed the draft memorandum, a final memorandum incorporating revisions in response to the review comments will be submitted.

Based on current personnel availability, we expect that Phase 3 of the study can be completed within approximately 4 weeks, including delivery of the draft technical memorandum. A time-and-materials structure is proposed, and the estimated cost to complete the scope of work outlined in this proposal is \$[REDACTED].

Thank you for the opportunity to develop this proposal. If you have questions or comments, please contact us by telephone (605.394.6447; 605.394.6400) or email (kevin.heiberger@respec.com; joel.nieland@respec.com).

Sincerely,

Kevin J. Heiberger
Manager, Cavern Geomechanics

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