

August 28, 2019

Via Electronic Mail

Mr. Scott R. Williamson
Program Manager, Waterways & Wetlands Program
Pennsylvania Department of Environmental Protection
Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110-8200

**Re: Item 2 Supplement
Response to DEP Request for Additional Information
Hydrogeological HDD Re-Evaluation Report – Interstate 81 Crossing 16"
Horizontal Directional Drill Location (S2-0220-16)
Permit No. E21-449
Middlesex Township, Cumberland County**

Dear Mr. Williamson:

In compliance with the Corrected Stipulated Order (Order) dated August 10, 2017, a Re-Evaluation Report for the above-referenced horizontal directional drill (HDD) was submitted to the Pennsylvania Department of Environmental Protection (Department) on February 26, 2019. In a letter dated April 11, 2019, the Department requested further information. On June 17, 2019, Sunoco Pipeline, LP (SPLP) submitted a letter responding to each item in the Department's letter and a Revised Re-Evaluation Report. In response to an August 15, 2019 conference call discussing the responses and Revised Re-Evaluation Report, SPLP submits the following supplement to the response for Item 2 of the Department's letter.

- 2. Once the items discussed above are developed by using the geophysical profiles, please attempt to predict where any operational provisions or changes may be necessary for the intervals where the previous LOCs or IRs occurred. Also, discuss any drilling intervals along the proposed 16-inch drill path where increased vigilance may be warranted, i.e.: the P.G. working in concert with the HDD contractor as sensitive geologic zones are approached by the drill bit.**

SPLP's June 17 Response:

Because of this HDD's setting within a karst formation, enhanced monitoring of all aspects of the HDD will be implemented from initiation to completion. Prior to initiating the 16-inch pilot hole, the drilling contractor, environmental inspector and professional geologist (PG) will review the revised 16-inch profile and the 20-inch as-built profile to pinpoint areas of potential concern. Further, SPLP will provide the drilling contractor and the inspectors with locations of potential areas of concern for fluid loss and IRs based on previous areas of loss and IRs, as well as areas identified by the geophysical survey (e. g., low density areas identified in the seismic survey). As those areas of concern are approached, additional efforts will be made to include increased

monitoring of pressure changes and increasing the frequency of drill path surveys to identify any surfacing of air, groundwater or drilling fluid in the event of a loss of drilling fluids. Further, the drilling contractor will evaluate the need to modify the characteristics of the drilling fluid (i.e., viscosity) and increase the frequency of swabbing the borehole to reduce the potential for cuttings to accumulate within the borehole. Finally, during HDD operations the site-specific best management practices referenced in response to Item #1 will be implemented to decrease the potential for IRs.

Supplemental Response:

This HDD was initiated in April 2017, and the pilot hole completed on July 12, 2017. This time frame preceded SPLP's mandated use of an Annular Pressure Monitoring (APM) tool during pilot phase drilling, an enhanced HDD monitoring program, and set of Best Management Practices (BMPs) to be implemented during all phases of an HDD. No corrective actions, such as the use of loss control materials (LCMs), or grouting were implemented during any phase of this HDD during installation of the 20-inch pipeline.

The pilot phase drilling proceeded from east to west using a mod motor. A review of the drilling observations reflects LOCs commencing soon after the start of the pilot drilling, with a void documented at 671 ft of progress, and then the IR at the land surface documented at 692 ft of pilot hole progress. A pilot hole was started from west to east using an air hammer but at 300 ft of progress all air returns were lost. A new east to west pilot hole was started at an offset to the original, but at 602 ft of progress, the original IR locations re-activated. The IR location was used as an unconventional relief hole through the completion of the pilot hole and reaming until a 12-inch diameter reamer completed a pass through the profile. Stage reaming using a 22-inch diameter reamer, and final reaming using a 30-inch diameter tool were completed without re-activation of the IR locations.

The 2018 geophysics assessment results confirms and explains the LOCs and IR occurrences. The Seismic Multi-Spectral Analysis of Surface Waves (MASW) data indicates a low velocity zone from HDD Station 5+65 to 6+50, and the Electrical Resistivity data indicates a low conductivity zone from HDD Station 5+10 to 6+50. These zones correlate to the location of the "void" and IR locations discussed above and these zones will be identified to the drilling contractor, environmental inspectors, utility inspectors and professional geologists prior to the start of the 16-inch pilot hole.

Although the redesigned HDD profile for the 16-inch pipeline is deeper than the original, it is likely that similar drilling conditions will be encountered during both the pilot phase and small diameter stage reaming phase.

As stated in the Reevaluation Report, SPLP mandates the use of the AP tool during pilot phase drilling. This tool allows for the detection of drilling fluid losses before an observable LOC can be detected at the entry pit. Considering the karst geology and extent of low velocity zones detected

by the geophysical assessments, the use of Loss Control additives is unlikely to resolve LOCs. In response to LOCs, or IRs, and based upon the available monitoring and drilling data, SPLP will require the contractor to use “bore grout” injections with an appropriate curing time, or cement based grout injections with a minimum of 12-hours cure time to counteract LOCs and IRs.

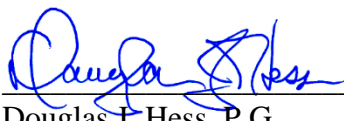
SPLP submits that we have been, and are, in complete compliance with the agreed terms and analysis requirements of the Order, as agreed to by the Department, and that no further analysis is required for the Department to consent to the start of this HDD. SPLP therefore requests that the Department approve the Re-Evaluation Report for the Interstate 81 Crossing Horizontal Directional Drill (S2-0220) as soon as possible.

Sincerely,



Larry J. Gremminger, CWB
Vice-President – Environmental, Health & Safety
Energy Transfer Partners
Mariner East 2 Pipeline Project

Pertaining to the practice of geology and information conveyed.



Douglas J. Hess, P.G.
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Skelly and Loy, Inc.
Director of Groundwater and Site Characterization
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8/28/2019
Date

