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Subject: Comments on HDD S3-0300 Re-Evaluation Report Submission
Date: Thursday, January 16, 2020 4:04:00 PM

Larry,

The following comments follow from the Department's PG review of the HDD S3--0300 Reevaluation Report for Wetland C43/Park Road. This review of the re-evaluation of HDD No. S3-0300 has been completed in accordance with paragraphs 4 and 5 of the Stipulated Order (Order) issued under Environmental Hearing Board Docket No. 2017-009-L.

This 20-inch HDD alignment is proposed to be drilled from approximately the intersection of Park Road with Moore Road to approximately 360 feet south of the most southern baseball field at Hickory Park in Upper Uwchlan Township, Chester County. The proposed alignment crosses beneath Park Road, an unnamed tributary to nearby Marsh Creek lake, four lower-order tributaries, and a laterally-extensive wetland (wetland C-43). The alignment will be drilled through gravelly loam and silt loam overburden soils. Decomposed and severely weathered bedrock (saprolite) is present below these soils to a depth of approximately 30 feet and are characterized as micaceous sands and silts containing weathered bedrock fragments. Geologically, much of the proposed alignment passes through metasedimentary, pre-Cambrian-aged, graphitic, felsic gneiss. The northwestern third of the proposed alignment skirts the contact between the felsic gneiss and a smaller exposure of banded, mafic gneiss. No carbonate formations that would be susceptible to karst features are present in the area.

A fracture trace analysis indicates that two bedrock fractures cross the alignment. One fracture trace crosses at station 3+40 and trends east-northeast; the second fracture trace terminates along the alignment at station 9+05 and trends north-northwest. A geotechnical boring drilled at the west end of the proposed alignment indicated very poor rock quality designation (RQD) of 25 and less from 66 to 116 feet below ground surface (bgs), indicative of highly weathered and fractured bedrock with low strength. A somewhat higher RQD of 39 to 63 (still significantly fractured) is present from 116 feet bgs to the boring's terminal depth of 136 feet bgs. Rock cores collected at the east end of the proposed alignment reported highly weathered bedrock to 49 feet bgs but with higher strength bedrock at 61 to 96 feet and 121 to 136 feet bgs. It was noted that the entry/exit zones for the HDD pilot bore intercept highly weathered/low RQD bedrock from the ground surface down to at least 85 feet bgs. These zones would be more susceptible to experiencing a potential inadvertent return (IR) due to their high degree of fracturing and weathering. Two IRs were previously experienced on the east end of the alignment during the drilling of the 16-inch pipeline during punch out. This area lies beneath wetland C-43.

A geophysical survey along the proposed alignment using seismic refraction, multi-spectral analysis of surface waves, and electrical resistivity identified potential fracture zones crossing the alignment approximately every 60 feet. The geophysical survey correlated the thicker zones of weathered bedrock with potential fractures. However, none of the geophysical methods penetrated to the proposed maximum depth of the alignment.

Wetland C-43 and the stream tributaries are local groundwater discharge points for the area. Depth to groundwater measured in the geotechnical borings was 9 to 9.5 feet bgs. Given the depth to groundwater and the elevation of the proposed entry/exit points for the pilot bore, SPLP indicated there is a risk of groundwater discharge created by the completion of the pilot boring. Groundwater discharge was experienced during the drilling of the 16-inch pilot boring. Therefore, similar conditions are expected during drilling of the 20-inch pilot boring and steps should be implemented to contain discharged groundwater to prevent migration away from the work area and into waters of the Commonwealth.

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Six private wells were identified within 450 feet of the proposed alignment and two private wells were identified just beyond the 450-foot well survey area. The owners of all eight wells agreed to participate in SPLP's water supply sampling program.

Site Specific Comments of the HDD Analysis:

- The proposed maximum depth for the 20-inch pipeline is 114 feet below ground surface (bgs), which is 27 feet deeper than the original permitted alignment. This maximum depth corresponds to an elevation of 342 feet above mean sea level (MSL). According to the boring logs and photographs of the drill core provided, the bedrock at this elevation in boring B6-20W is highly weathered and has a low rock quality designation (RQD) of 27 percent. A highly fractured zone is present at this same elevation in boring B6-20E at the northeast entry/exit point, from elevation 342.2 to 340.9 feet MSL. No deep borings between the entry/exit points that evaluate bedrock conditions at the deepest point of the pipeline bore to determine if these highly weathered/fractured zones extend beneath the alignment and for what distance. These highly weathered/highly fractured zones may be more susceptible to a loss of drilling fluids and may increase the likelihood of an inadvertent return (IR).
- A review of the geophysical profiles for the proposed HDD alignment indicates that neither the seismic nor the electrical resistivity profiles penetrated the subsurface down to the lowest elevation of the proposed 20-inch pilot bore, at 342 feet MSL, for the entire distance between the entry/exit points. As such, it cannot be determined whether the highly weathered/fracture zone described above is present beneath the alignment due to the lack of data. SPLP needs to provide technical justification and supporting data for the proposed depth of the pilot bore.
- The eastern-most HDD entry/exit point at station 0+00 is located in between a PFO wetland and a PEM wetland. Details to prevent encroachment and/or damage to the PEM wetland

east of the HDD entry/exit point during continuation of pipeline construction to the east were not provided. SPLP should provide justification for terminating the HDD alignment at this location and consider extending the distance of this HDD alignment further to the east to prevent potential damage to the PEM wetland when eastward pipeline construction is continued.

- A responsible professional must be present on site at all times to monitor for and respond to any IRs or loss/reduction of drilling mud circulation or pressure.

Recommendations:

Based on the technical review of the information submitted in the subject Horizontal Directional Drilling Analysis and the related comments listed above, it has been determined, that to the best of our information, knowledge and belief, the requirements regarding geologic information and geologic analysis detailed in the Corrected Stipulated Order, EHB Docket 2017-009-L (“Agreement”), have not been met. Therefore, the DEP reviewer(s) are recommending "that the applicant be advised that additional information, identified in the site-specific comments section above be provided in order to complete review of the HDD re-evaluation portion of this site."

Thank you,
John

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