

DEP Permit # E15-862
DEP Permit HDD Reference # PA-CH-0370.0000-RD
DEP HDD # S3-0500
Township – East Goshen
County - Chester
HDD Site Name – Eldridge Drive / North Chester Road Crossing

1st Public Comment Period

Commentator ID #	Name and Address	Affiliation
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1. Comment

At their meeting on October 1, 2019 the East Goshen Township Board of Supervisors approved the submission of the following comments to the Department of Environmental Protection for its consideration.

The Board also requested that I provide the Department with a copy of comments prepared by Christina Morley, who is a member of our Pipeline Task Force.

Using HDD Methodology

The reevaluation report notes that the first IR occurred as the drill was entering at a depth of 31 feet and the second occurred when the drill was exiting at a depth of 25 feet. The root cause of both IRs was attributed "poor soil and rock/overburden strength overburden".

Sunoco has proposed to increase the entry/exit angle from 10 degrees to 15-16 degrees in order to reduce the potential for IRs. The goal is to get the pilot bore hole down into competent bedrock ASAP.

We would suggest that this risk could be reduced by installing a sleeve to a depth of 40 feet or competent bedrock at each entry point. This sleeve could be installed by direct pipe bore methodology.

In addition, this risk could be further reduced by using the two drilling rigs and having them meet in the middle. Sunoco refers to this as an "intercept drill" and is proposing to use this on the SPLP HOD No. S3-0471.

If HDD is to be approved, this would provide the best chance for minimizing any future IRs.

Re-route Analysis

The reevaluation does not note that Interstate Energy/Adelphia has a pipeline easement that is immediately east of and adjacent to the public-right-of-way for North Chester Road.

Sunoco is currently using part of the Interstate Energy/Adelphia easement for a construction area, subject to temporary construction easements.

In addition, based on the plan and profile that was submitted with this reevaluation, Sunoco intends to install some of the 20-inch pipeline installed within existing permanent easements that they have obtained for this project that overlap the Interstate Energy/Adelphia easement.

It would seem to be relatively simple for Sunoco to obtain the additional permanent easements required.

Then, at the northern end of this segment, have the 20-inch pipeline cross North Chester Road; utilize either with a conventional bore, direct bore, or open cut construction and then install the 20-inch pipeline utilizing open cut construction to its connection point at the south end of this segment. This would eliminate any potential for an IR. In addition, if the North Chester Road crossing was done by conventional bore or direct bore, this alternative would not result in any additional traffic impacts, since all of the construction would take place outside of the public road right-of-way.

(1)

Letter – [Rick Smith](#)

2. Comment

I submit the attached 8 page document as comments for consideration during the Public Comment Period. I am a longtime resident of East Goshen Township and a member of the Township's Pipeline Task Force. Thank you for accepting my comments into the public record.

Report Titles and Labels

The Title of the HDD Re-Evaluation Report is "Eldridge Drive/North Chester Road Crossing" which appears to reference two different drill site locations in East Goshen Township, PA. Further, the attached HDD Hydrogeologic Re-Evaluation Report, prepared by GES, simply refers to the location being evaluated as "S3-500 North Chester Road" and makes no reference by name to Eldridge Drive whatsoever. At a recent public meeting in East Goshen Township on September 19, 2019 a map bearing the Energy Transfer logo was presented to the Township Supervisors and audience, and referenced by Energy Transfer representatives, which clearly illustrated one drill site location labeled as Eldridge Drive HDD 500 (20") and a separate drill site location labeled as North Chester Road HDD 521 (16" & 20"). If the First Report is only referencing the Eldridge Drive location it should be simply and clearly labeled as such. Although maps provided in the attached GES document show what appears to be the Eldridge Drive location, the name of their report clearly refers to an entirely different drill site location.

Recommendation(s): The Operator needs to clarify which site(s) their report is about. Their contractor, GES, needs to clarify which site their work is about. The DEP website should include a full and complete list of all drill sites, the corresponding HDD number, and clarify the status of each location's subjectivity to Re-Evaluation reporting under the Settlement because it appears that active drill sites are being combined, renamed, and renumbered in an unofficial manner. The reports generally appear rushed and sloppy.

Geologic and Hydrogeologic Analysis

The Eldridge Drive/North Chester Road Re-Evaluation Report (First Report) states that "based on published mapping the entire HOD profile passes through a quartzofeldspathic granulite facies of the Baltimore Gneiss." Section 2.2.2 of the attached GES Report includes a map from PA GEODE that illustrates the bedrock lithography of the HDD profile with the symbol "Ybggg" which refers to "Precambrian age crystalline rocks of the Baltimore Gneiss. Within some parts of the Baltimore Gneiss the Ybggg unit can include quartz-rich rocks which also contain minor garnet, biotite, kyanite, and sillimanite (Bosbyshell, 2006)." In reviewing multiple maps and reports of the geology of Chester County and East Goshen I find no reference to "Baltimore Gneiss". For reference I am including links to some of those reports.

Chester County Geologic Formations, Chester County Planning Commission
<https://www.chesco.org/DocumentCenter/View/2486/d-geology?bidId=&fbclid=IwAR1iLGCzNGNR19wPloqAJ2dcyngKYbH9gHC1c5G0mZRreq4qGfqRMF7CFKk>

MacroStrat <https://macrostrat.org/map/#/z=13.6/x=-75.5191/y=39.9842/bedrock/lines/>

Further, the bore samples in the attached GES report appear to only show two bore samples that were taken for site S3-0500. The report also includes Test Borings for a location labeled as S3-0510 although there is no indication as to what drill site that is referring to either in the written reports or on the map that was presented to the East Goshen Township Supervisors and residents on September 19, 2019 at the public meeting.

Finally, in reviewing the aerial photos labeled as "Test Boring Location Plan" which bear the TerraCon logo, it appears that at least one, and possibly both boring locations are outside of the Eldridge Drive site. One boring location is North of Paoli Pike while the Eldridge Drive HDD site as noted in the report extends southward, from the intersection of 352 & Boot Road to Bancroft/Eldridge Drive.

Recommendation: More thorough geophysics testing needs to be done, including deeper bore samples, for the entire area along Route 352 to understand exactly what the bedrock composition is. Upon reviewing the HDD Re-Evaluation Reports for other nearby locations, the DEP was clearly unsatisfied with the quality of the bore samples which were taken and urged further more comprehensive testing of the entire area.

Radon Hazard

Additionally, it is my understanding that radon release may be a hazard associated with drilling into the rocks in this region of the Commonwealth, as noted in this USGS document which describes the risk:

<https://pubs.usgs.gov/sir/2017/5018/sir20175018.pdf>

"In a study conducted by the U.S. Geological Survey, in cooperation with the Pennsylvania Department of Health and the Pennsylvania Department of Environmental Protection, radon occurrence was evaluated in 1,041 groundwater samples collected during 1986- 2015 from 16 geologic units in Pennsylvania with 25 or more radon in groundwater samples. Radon concentrations in groundwater greater than or equal to the proposed U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 300 picocuries per liter (pCi/L) were present in 87 percent of the samples, whereas concentrations greater than or equal to the proposed alternative MCL (AMCL) of 4,000 pCi/L were present in 14 percent of the samples. The highest radon concentration in groundwater was 32,280 pCi/L in a sample from the Chickies Formation (Cch) in the Piedmont Physiographic Province of southeastern Pennsylvania. Overall, the highest radon concentrations measured

were in groundwater in the schists, gneisses, and quartzites of geologic units in the Piedmont Physiographic Province of southeastern Pennsylvania."

Recommendation: The DEP should require that radon testing (and remediation if necessary) be provided for all residences within 1,000 feet of any Mariner East HOD location at the cost of the operator.

Additional study on relationship between drilling and elevated radon levels in homes:
<https://ehp.niehs.nih.gov/doi/10.1289/ehp.1409014>

Pipe Information and Pipe Stress Analysis

The First Report discusses pipe stress allowances in relation to the amount of curvature that a length of pipeline can withstand during installation. No discussion is provided about stress or movement that this pipeline may encounter after installation although it is clearly noted in the Geologic and Hydrogeology Analysis section of the same report that the Eldridge Drive location has a possible 21 fracture zones and it is worth noting the ROW is located between two 100-year floodplains.

Recommendation: Since fracture zones are areas where strike-slip movement occurs it is recommended to adopt the same solutions that are used for other pipelines in areas of seismic risk and increase the pipe wall thickness from 0.456 to 1" to 1.25" and encase the pipe inside a corrugated metal casing that allows for spacing and movement. This casing should then be placed inside a vault with 2-foot-thick reinforced concrete walls and slabs, constructed in segments separated by gaps which will allow it to "articulate" to absorb the compression and rotation from any earth movement. While this mitigating step doesn't have to be required for the entire length of the pipeline, it certainly should be a requirement where geological testing shows elevated fault zone risk. Eldridge Drive, with 21 fault zones, certainly qualifies as one such location, and should trigger more extensive geological testing at adjacent locations as well before any further drilling or installation activities occur.

If this pipeline is classified as critical infrastructure, as Sunoco/ET has repeatedly stated in public forums and claimed in legal cases then protecting it from seismic movement and other hazards, such as flooding, should be a priority. I see no discussion of specialized engineering construction solutions that have been undertaken to mitigate the risks of the fault zones and flood plains present at this location and the information on "Pipe Information and Pipe Stress Analysis" should be deemed insufficient by the DEP. Reference:

<https://www.structuremag.org/?p=4073>

Root Cause Analysis for the 16-Inch Pipe Installation IRs

Two IRs occurring during pilot phase drilling. The First Report provides a one paragraph "Root Cause Analysis" that offers a two-sentence explanation for the first IR and another two-sentence explanation for the second IR. And finally, a two-sentence finding that assumes the same root cause for both IRs.

Recommendation: The Department should require a more thorough and substantial Root Cause Analysis response from the Operator, where each IR event is separated from the other, with its own specific timeline, contributing factors, and a root cause is identified for each location. Combining information about separate IR events should not be allowed when reporting or analyzing data.

Hydrogeology, Ground Water, And Well Production Zones

"Attachment 1 provides an extensive discussion on the hydrogeology and results of the geotechnical investigation performed at this location."

Attachment 1 includes a summary report prepared by GES of the field tests that were performed by two previous contractors: Tetra Tech (in Dec 2015), and Terracon (in September 2017). GES clearly states in their report that they did not perform or oversee the geotechnical work done in the attached reports, but that they merely reviewed the old reports and have provided their summaries of those studies. As the geotechnical work of these two previous contractors has been submitted by Sunoco/ET numerous times for other locations subject to HDD Re-Evaluation, the DEP knows by now that the boring samples done by these contractors are insufficient. In fact, regarding the adjacent site of Bow Tree /Strasburg S3-0520, in a letter dated March 13, 2018 to Mr. Matthew Gordon of Sunoco, the DEP states:

"Five geotechnical borings were drilled along the pipe run to depths of 56 to 105 feet bgs. No analysis was provided describing depths of what could be considered "competent" bedrock in each of the borings. In fact, the borings only encountered highly fractured bedrock down to a depth of 105 feet. The Report suggests that bedrock competency values are poor in some areas of the pipe run. An analysis describing the depths of what could be considered "competent" bedrock should be completed."

For this site of Eldridge Drive S3-0500, Sunoco/ET has submitted two bore samples, (although the reports include bore samples for a third un-named site S3-510 as well.)

The two borings are referenced in a letter from Terracon Consultants dated October 18, 2017, labeled as B6-12W and B6-12E, drilled to depths of 139.5 and 172 feet respectively. Sample 86-12W appears to have been at a location that is not even near the Eldridge Drive location, according to the map provided in the report and should be disregarded entirely.

Further, according to the data in the Tetra Tech reports, none of the core samples appear to exceed depths of 30 feet. Notes on the report state that "Core hole collapsed due to soil content. Unable to core past 31'. The Tetra Tech reports appear to be the least competent reports submitted as part of the Geology attachments and should not be allowed to be continuously re-submitted by the Operator for multiple HDD sites.

Recommendation: The DEP should reject the following content of the Geology and Hydrology Reports:

- All TetraTech 2015 Borings (December 2015). Reason: No boring samples were taken below depths of 30 feet; notes state core hole collapsed; unable to core past 31'; insufficient to determine bedrock data.
- Terracon Test Borings 86-12W Reason: Sample Taken Outside of Eldridge Drive Drill Site Area.
- Tetra Tech Test Boring SB-01, SB-01A for HOD S3-0510. Reason: Not Applicable to HDD S3-0500 Eldridge Drive

Adjacent Feature Analysis

The First Report states that "No Waters of the Commonwealth occur along the HDD alignment."

The following report titled The Natural & Historic Environment of East Goshen Township states that "East Goshen Township is bisected by watershed boundaries that parallel Paoli Pike and Route 352."

The report also states that "A 100-year floodplain encompasses each of East Goshen's two waterways. 100-year floodplains are areas that adjoin streams, ponds, or lakes which are subject to inundation by 100-year floods. Floodplain areas are important considerations because they carry the floodwaters that pose potential threats to lives and property. Development in and around these areas may reduce water quality and increase erosion, as well as threatening wildlife and their habitats. The 100-year floodplains are shown on the accompanying map."

This is important because no reference is made to the adjacent floodplain risks in the Operator's report of Adjacent Feature Analysis and the operator has offered no solutions to mitigate the risks of pipeline development, increased erosion, threats to the public, property, or wildlife and habitat.

Recommendation: The "Adjacent Feature Analysis" is incomplete in insufficient. The DEP should not allow development in an area with 21 fracture traces, floodplain risk, substantial nearby wetlands and watersheds. No permit should be issued for work in this area.

References:

Natural & Historic Environment, East Goshen Township -
<http://eastgoshen.org/wp-content/uploads/2014/08/EGT-OS-1993-OS-PLAN-3-Nat-and-Hist.pdf>

East Goshen Township Wetland Vegetation Inventory and Management
Recommendations -

https://repository.upenn.edu/cgi/viewcontent.cgi?article=1030&context=morrisarboretum_botany_works.

Alternative Analysis

The Operator has stated that an evaluation of alternative routes has been conducted and no viable alternative route exists. This determination was made based on factors described as "cost, existing technology, and logistics."

No discussion is offered as to consideration of public safety or efforts to identify routes with low population densities. No mapped alternatives are provided as is typical with other permitted projects in other regions of the country, by reputable operators. I have reviewed numerous other permitted pipeline projects where one can clearly see mapped Alternate Route 1, Alternate Route 2. I have never seen any such document related to Mariner East because they use the same recycled language about how no alternate route exists.

Recommendation: The DEP should require a more substantial Alternative Route Analysis surrounding the process to determine alternate routes and require the Operator to submit supporting documentation, including but not limited to, actual maps.

Drilling Crew, Inspectors, Contractors

In the First Report section titled Conclusion, the Operator states they will provide the drilling crew and Inspectors who will monitor the drilling process, employ best practices, and use Loss of Control Materials if an IR is noted. There is no discussion of how IRs or any other event such as a suspected subsidence will be reported.

Recommendation: Sunoco/ET must immediately report all IRs and any suspected subsidence to the DEP, the PUC, and the East Goshen Township immediately. In many cases where Notices of Violations have been issued by the DEP it was a resident-reported incident that was not reported by the Operator. This needs to be remedied. (2)

Letter – [Christina Morley](#)

3. Comment

Comments on what is needed to restart HDD from Boot Road/New Kent Apartments and Eldridge Road which really extends to about midway between Eldridge and Bow Tree Road along Route 352 [aka N Chester Road]. This is SPLP HDD No. S3-500. I believe this segment is listed as North Chester Road to Eldridge Road on your records.

Analysis of this area shows a lot of subsurface fracture zones which are where subsidence can begin. Subsidence is known to cause catastrophic ruptures in pipelines and given that this pipeline will be carrying NGLs within very close proximity to homes and is on a major local artery, every effort needs to be made to make sure this does not happen.

The report that shows the boring locations is difficult to follow. Bore samples S3-510 SB-01 and S3-510 SB-01A look to be outside of SPLP HDD No. S3-500 so that data should not be considered when analyzing this HDD segment. I was disappointed to see that land owners were not contacted before bore samples in this area were obtained where the land owners felt that work was being done outside of the easement boundaries. This lack of transparency seems to be unprofessional. Land agents should have notified land owners that work was scheduled so people were prepared for the bore samples to be obtained. The 2 deeper samples, S3-500 SB-01 and S3-500 SB-02 both caved in at around 30 feet. This provides no data on where the bedrock and how stable it is which will indicate if the area is sufficiently stable to support this segment of pipeline given the amount of subsurface fracture zones.

This HDD segment is adjacent to the HDD segment that goes from Strasburg Road to Bow Tree Road which also had inadvertent returns. [I do not know the designation of this HDD segment or I would reference it - I also believe it was renamed when it was combined with another HDD segment.] This area was reviewed as to what would need to be done so that the second HDD segment could be completed. The conclusion was that more bore samples were needed. [I'm not sure this was ever done but this was what had been agreed to. With this segment being combined with another segment after a change in contractor, I am hoping this has not fallen through the cracks.] Given this was the conclusion for an HDD segment adjacent to SPLP HDD No. S3-500, more samples should be obtained and analyzed to ensure the stability of the SPLP HDD No. S3-500 pipeline corridor especially in the areas that show a cutter or crevice upon seismic analysis. (3)

4. Comment

Pursuant to the Corrected Stipulated Order entered on EHB Docket No. 2017-009-L on August 10, 2017 (“Order”), and on behalf of Clean Air Council, Mountain Watershed Association, Inc., and the Delaware Riverkeeper Network (“Appellants”), please accept these comments on Sunoco Pipeline L.P.’s (“Sunoco”) re-evaluation report (“Report”) for the horizontal directional drilling indicated by drawing number PA-CH-0370.0000-RD.

1. The plans should be revised to clearly delineate high risk areas.

The results of the geophysical surveys indicate several fractured areas that present a risk of inadvertent returns and LOCs. In order for everyone working the site to make the best use of the information gathered in the geophysical surveys, the results should be juxtaposed with a cross-sectional view of the 20-inch line so the highest risk areas can be readily identified. Currently, Figures 3, 4, and 5 in the Geophysical Survey Report include cross-sectional views of the as-built 16-inch line, but not the proposed 20-inch profile. There is a blank place holder for the planned 20-inch line in the key for each figure. This information should be incorporated into the technical drawings that will actually be used on site. Sunoco states it will share the results of the fracture trace analysis with the crew, but the geophysical survey data is more robust and

accurate. The enhanced risk of IRs at this site needs to be taken seriously. Even if there are not waterbodies in the immediate vicinity of the site, it is located in a densely populated area, and dozens of properties are at risk of being damaged by upland IRs.

2. Sunoco had not accounted for steering challenges associated with local geology.

The proposed profile will pass through Baltimore Gneiss, a formation known for heterogeneous rock that can lead to difficulties in drilling and steering. Sunoco had to abandon an attempt to install the 16-inch line at this location due to steering difficulties. And yet, the Report does not propose a course of action to address the steering problems that could arise with the next installation. At other HDD sites where Baltimore Gneiss was encountered, Sunoco's geologists made specific recommendations for how best to proceed, including recommendations regarding drilling rate and pressure, and to use a diamond bit. The Department should ensure that an appropriate plan is in place to avoid and mitigate steering difficulties here.

3. Sunoco had not provided sufficient evidence that it will test and protect water supplies.

Sunoco identified 84 parcels within 450 feet of the HDD alignment at this site. Sunoco claims, "As a result of the landowner outreach, SPLP verified the presence of one (1) private water supply well, and confirmed the remaining eight-three (83) landowners are served by public water." Sunoco should clarify how it confirmed that 83 of the parcels are served by public water as this statement is ambiguous. It is highly unlikely that Sunoco actually received replies from residents at all 84 parcels or made direct contact with them, so Sunoco may be relying on records from the local water company or another source, but some form of verification is needed. The highly fractured nature of the geology at this site puts any private water supplies that are present at risk.

Sunoco also claims that the one private well it did identify was not impacted by its drilling, but this cannot be confirmed as Sunoco only conducted baseline testing, not testing during or after the drilling of the 16-inch line as required by the Order. Sunoco should confirm that it will offer this landowner (and any other private well owners if more are identified) complete testing in association with the installation of the 20-inch line.

4. The analysis ruling out Direct Pipe Bore is unpersuasive.

In Sunoco's alternatives analysis, it rules out the use of Direct Pipe boring technology. It writes:

SPLP's construction contractors have successfully completed one (1)

Direct Pipe Bore approximately 925ft on the Pennsylvania Pipeline Project at the crossing of the Frankston [sic] Branch of the Juniata River in Blair County. This Direct Pipe Bore was setup within a relatively flat area immediately outside the river floodplain and bored under the floodplain, wetlands, and river, exiting at the toe of a mountain slope.

Application of Direct Bore technology along the HDD S3-0500 alignment is not feasible as the alignment requires steering in both the horizontal and vertical dimensions to replicate the HDD. Alternately, even using a direct bore where the alignment is straight for reasonable length, the entry pit dimensions to employ this method are larger than what is required for a conventional bore. The entry pit could not be closed until the bore was completed and the pipe segments welded together. Due to disruption to traffic that would result from a long-term closure of the roadway, SPLP concludes that an HDD crossing of this area remains the preferred methodology.

This analysis seems to identify three problems with the use of Direct Pipe at the Site. First, the setup site needs to be “relatively flat” such as at the Frankstown Branch crossing. Second, this drill would need horizontal steering. Third, it needs an entry pit larger than that needed for a conventional bore. However, the profile view of the Site reveals it is “relatively flat.” It would need less vertical steering than the Glen Riddle HDD Site, where Sunoco has proposed Direct Pipe (see [http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEast II/HDD_Reevaluation_Reports/Glen_Riddle_Road/Glen%20Riddle%20Road%20and%20Southeastern%20PA%20Railroad%20-%20S3-0620%20-%20PA-DE-0100.0000-RR.pdf](http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEast%20II/HDD_Reevaluation_Reports/Glen_Riddle_Road/Glen%20Riddle%20Road%20and%20Southeastern%20PA%20Railroad%20-%20S3-0620%20-%20PA-DE-0100.0000-RR.pdf)). Sunoco has not said that the amount of horizontal steering needed presents any sort of technical difficulty. Finally, the alternative Sunoco is proposing is not a conventional bore. So to compare the pit size to that of a conventional bore ignores that the proposed HDD would use a larger pit.

Overall, Sunoco has not demonstrated that Direct Pipe, which it argues minimizes the potential for inadvertent returns, would not be a viable option at the HDD Site.

Thank you for considering these comments. Please keep us apprised of your next steps on the HDD Site. (4-8)

Letter – [Clean Air Council 10-4-19](#)