



January 27, 2021

Via electronic mail - johohenste@pa.gov

John F. Hohenstein, P.E.
Environmental Program Manager
Pennsylvania Department of Environmental Protection
Southeast Regional Office
Waterways and Wetlands Program
2 East Main Street
Norristown PA 19401

Re: HDD 290 Emergency Permit Application Status and Response to Comments

Dear John:

Following the Department's issuance of the September 11, 2020 Administrative Order, on September 18, 2020 Sunoco Pipeline L.P. ("SPLP") submitted a Chapter 102 & Chapter 105 Minor Modification Application to the Department for the containment structure and related additional limit of disturbance necessary to complete grouting of the HDD 290 borehole required by paragraph 6 of the Administrative Order. On September 23, 2020, the Department issued a Technical Deficiency Letter identifying deficiencies in the application to be addressed within 30 calendar days. During a phone call the following day on September 24, 2020, the Department advised SPLP that it would be receiving an email clarifying what steps SPLP must take to move forward with the grouting work.

By email dated September 25, 2020, the Department instructed SPLP that the previously submitted minor modification application should be withdrawn and re-submitted as a Chapter 105 emergency permit request to the Department, and that SPLP address certain comments in the Technical Deficiency Letter. That same email relayed that SPLP should incorporate the borehole grouting activities into the previous emergency permit request originally submitted on August 17, 2020 to address the stabilization grout installed in Wetland WL-17, and the Department stated that "This approach should aid Sunoco to more quickly address the requirement in the AO to immediately secure the borehole, which having additional containment facilities in place should an IR occur." Just five days later on September 30, 2020, as instructed by the Department, SPLP re-submitted a request to grout the borehole as an amended emergency permit (the "Emergency Permit Request"), and which also addressed the technical deficiencies previously noted by the Department.

Following submittal of the Emergency Permit Request, SPLP routinely inquired into the status of the Department's review of the application, at minimum weekly during the standing weekly Open Matters Call.

SPLP appealed the Administrative Order before the Environmental Hearing Board, and the case proceeded through a hearing on SPLP's Petition for Supersedeas on October 27-30 2020. While awaiting a decision from the Board, the Department informed SPLP that it would take no further action on the Emergency Permit Request (or any other submittals SPLP had previously made in relation to the HDD 290 location), until the Board issued its ruling on the Petition for Supersedeas. The parties submitted their post-hearing briefing on November 23, 2020.

More than two weeks after parties submitted post-hearing briefing,¹ on December 10, 2020 – 71 days after SPLP submitted the Emergency Permit Request (83 days after SPLP had submitted the information originally as a Minor Modification application) – the Department provided its first set of comments on the Emergency Permit Request via email. In that email, the Department listed five primary comments on the Emergency Permit Request, three of which focused on issues related to restoration activity, rather than on the actual borehole grouting activity that was the focus of the request and the immediate activity that SPLP was requesting the Department's permission to perform.

The Department's comments were as follows:

1. *PNDI clearance from USFWS needs to be received that includes clearance for all grouting and restoration activity sought to be conducted under the EP.*
2. *Need grouting work plan specifics, sealed by a P.G. and P.E., That plan should:*
 - a. *Define type of operation - staged or stepped plan.*
 - b. *Provide for reporting of monitoring injection pressure and flow rate on a real time basis*
 - c. *Explain the type of material used in the grouting process including material properties such as viscosity*
 - d. *Discuss anticipated surface discharge location, volumes etc...*
 - e. *Provide a sequencing discussion of what triggers next step and how to move to next step*
 - f. *Discuss considering small slugs of grout vs. continuous grout*
 - g. *Provide an explanation of when the drill stem pipes will be pulled back, and at what volume it will be pulled back*
 - h. *Explain how the plan will be executed to minimize risk*
3. *Provide a restoration plan for the Wetland WL-H17 taking into account cold weather, dormant plants, frozen ground and seasonal stabilization.*
4. *Provide the extended restoration schedule acknowledging full restoration will not be able to be accomplished until Spring.*
5. *Provide discussion and monitoring plan that addresses water quality and pH concerns for adjacent wells, streams, wetlands, seeps.*

¹ The Board issued its ruling granting, in part, SPLP's Petition for Supersedeas on December 16, 2020.

Response to Comment 1

First, the Department's first comment – that SPLP needs to obtain a PNDI clearance from USFS for both the borehole grouting and restoration activities – does not relate to the activity that SPLP is seeking to immediately perform, which is grouting of the borehole. SPLP obtained a PNDI clearance for the borehole grouting activity on October 15, 2020, which was directly sent to the Department by USFWS. A copy of this PNDI clearance is provided again for the Department's reference and convenience as **Attachment "A."** SPLP also submitted a request for a PNDI clearance for future restoration work on October 30, 2020, a copy of which was also provided to the Department via email on November 11, 2020. The PNDI clearance for the restoration activity was also recently received on January 8, 2021, a copy of which is provided as **Attachment "B."** Thus, SPLP has obtained the appropriate PNDI clearance for both of the proposed activities – grouting the borehole and restoring the wetland area – which are independent and staged tasks.

Response to Comment 2

Regarding the Department's second comment, that requested specifics on a grouting work plan, SPLP is submitting as **Attachment "C"** a detailed explanation of how the borehole grouting activity will proceed, with the option of either utilizing a PennDOT 1:3 grout mix or the Term-Ex grout product. The differences in these two grouting work plan options are described in Attachment C, which also includes corresponding transmittals that have been signed and sealed by both a P.G. and a P.E., as requested by the Department.

Response to Comments 3 and 4

Like the Department's first comment, the Department's third and fourth comments are entirely focused on the restoration of wetland WL-H17, rather than what the Emergency Permit Request seeks to do, which is grouting of the borehole. The restoration of the wetland and streams are the subject of a separate provision in the Administrative Order (paragraph 4). On October 1, 2020, SPLP submitted a technical report to the Department that specifically addressed the restoration of Wetland WL-H17: HDD S3-0290 Impact Assessment and Restoration Plan - Streams S-H10/S-H11 and Wetland H17.² To date, the Department has not provided any technical comments on this report, which SPLP submitted to the Department over three months ago. To the extent necessary for the season in which the restoration activity will occur, the restoration plan for wetland WL-H17 will be tailored to account for cold weather, dormant plants, frozen ground, and seasonal stabilization.

² SPLP also submitted a parallel Impact and Restoration Plan for the Marsh Creek Reservoir to the Department on October 1, 2020.

Response to Comment 5

On the fifth and final comment, the Department requests a monitoring plan regarding water quality and pH concerns for adjacent residential wells, streams, and seeps. SPLP has developed a proposed well test plan to monitor water quality and pH for those well owners willing to allow testing. A copy of this testing plan is provided as **Attachment “D.”** SPLP is in the process of contacting landowners to discuss the proposed plan, which addresses both pH and water quality, and this plan will be updated/finalized. Testing, if allowed by the landowners, will begin the week of January 25, 2021.

For the streams and seeps, SPLP has and will continue to monitor water quality, including pH, once a week at the monitoring points listed in the Impact and Assessment and Restoration Plans previously submitted to the Department. This monitoring will continue at the downstream points of the existing containment structure on a daily basis when the borehole grouting activity has started. SPLP will also sample at an additional 4 monitoring points within the stream and an additional 3 monitoring points wetland/seep (as shown on the map provided as **Attachment “E”**), which will be tested for pH once per week beginning the week of January 25, 2020, and then daily during the grouting activity.

The stream (SS) and wetland/seep (WL/S) sample points are depicted on **Attachment D**, and described as follows:

- SS-1: located on S-H10 downstream of all other new points but upstream of next closest monitoring point (MP6) that was established in August 2020
- SS-2: located on S-H10 along reach upgradient of S-H11 confluence
- SS-3: located on S-H11 just upgradient of confluence with S-H10
- SS-4: located on S-H11 upstream of other seep influences and immediately downstream of subsidence containment area
- WL/S-1: located primarily in wetland area that does not contain obvious surface water
- WL/S-2: located in wetland/seep area that has a surficial drainage pattern connecting to S-H11
- WL/S-3: located in wetland/seep area, variable location characteristic options available (surface water or no surface water)

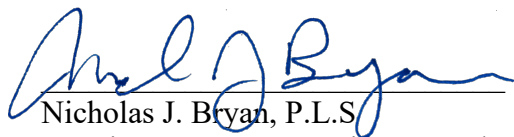
The SS points would be sampled in flowing surface water that may or may not freeze at during the winter season with sufficiently cold temperatures, but to date they have not yet frozen. The WL/S points would be sampled via shallow piezometers that would be installed to a depth of approximately 2 feet below grade (similar to A54/A55 locations). It is likely any seep/surface water at these locations would freeze at some point during this winter season, which is an additional reason to install the piezometers. SPLP will record pH, SC, and temperature at each of these seven additional monitoring locations.

In addition, on January 4, 2021 SPLP and the Department had a conference call regarding outstanding permitting issues for HDD 290, during which there appeared to be confusion on behalf of the Department regarding the scope of the Emergency Permit Request, versus other submissions that SPLP has made to the Department in relation to HDD 290 (e.g., HDD Restart Reports, Chapter 102 and Chapter 105 permit modifications). To be clear, the Emergency Permit Request is focused exclusively on the grouting activity. All other issues, such as the ultimate restoration of the wetland and further construction of pipeline in the HDD 290 work location is the subject of independent submissions to the Department. Thus, there is no reason for the Department to not immediately approve the Emergency Permit Request and allow SPLP to perform the grouting activity. Any other issues regarding the HDD 290 work location can remain subject to other submissions that are currently under review by the Department.

As of the date of this letter, the Department still has not yet approved the Emergency Permit Request. As you are aware, in late December 2020, the southern end of the HDD 290 work area has experienced the development of three earth features proximate to the HDD 290 profile after snowmelt and rainfall. Consistent with the Department's prior positions and the Administrative Order, the prolonged cessation of construction at the HDD 290 location, and the Department's continued inaction and delay in approving the Emergency Permit Request to allow SPLP to "immediately" grout the borehole as originally ordered by the Department over four months ago, has exacerbated and will continue to exacerbate site conditions. SPLP therefore requests that the Department immediately issue the Emergency Permit and allow SPLP to grout the HDD 290 borehole, which will further stabilize the area and serve as both a mitigative and preventative measure against any potential future earth features from developing in the area.

If you need any additional information, please contact me as soon as possible at (570) 505-3740 or via email at Nick.Bryan@EnergyTransfer.com.

Thank you,



Nicholas J. Bryan, P.L.S.
Sr. Director – E&C Environmental
Energy Transfer

- Encls. **Attachment A** – PNDI clearance for grouting activity
Attachment B – PNDI clearance for restoration activity
Attachment C – Grouting work plan
Attachment D – Well monitoring plan
Attachment E – Map of additional monitoring points

Attachment A



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

October 15, 2020

Donald Knorr
Pennsylvania Department of Environmental Protection
2 East Main Street
Norristown, PA 19401

RE: USFWS Project #2020-0037
PNDI Receipt # 708155

Dear Mr. Knorr:

This responds to your email of October 5, 2020, to the U.S. Fish and Wildlife Service (Service) requesting information about federally listed and proposed endangered and threatened species within the area affected by the proposed DEP Emergency Permit for the ME2 PPP HDD S3-0290 project located in Upper Uwchlan Township, Chester County, Pennsylvania. The proposed project is within the known range of the bog turtle (*Clemmys muhlenbergii*), a species that is federally listed as threatened. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

Our office has reviewed your email and an email of October 2, 2020 from Ben Berra (a Qualified Bog Turtle Surveyor) regarding this project, which explained that Sunoco had an inadvertent return (IR) when conducting a horizontal direction drilling (HDD) at this site. This line is collocated with another pipeline. In order to protect the integrity of the existing line, Sunoco proposes to grout the failed pilot hole from entry point to exit point, which is approximately 1,575 feet.

Sunoco will know the grouting has completely filled the failed hole when the grout returns to the surface. They are prepared for this to happen and will have vacuum trucks and a containment structure in place to minimize impacts. Due to the more solid nature of this substance, the grouting is not expected to go offsite or have significant environmental impacts.

The HDD was conducted in order to avoid impacts to wetlands. Phase 1 surveys were conducted in 2014 at wetland H17, the wetland that is being impacted by the IR and grouting project, and adjacent wetlands (C48, C47, C46 and C 44). All of these wetlands were determined to contain potential bog turtle habitat. Therefore, Phase 2 surveys occurred in all of these wetlands in 2014. The Phase 2 surveys concluded probable absence, except for wetland C44, which the Service

determined to be hydrologically connected to a known bog turtle site discovered by Skelly and Loy in the early 2000s.

Although 6 years have lapsed since Phase 2 surveys were conducted at these wetlands, due to the low population density at the wetland which is connected to C44, the inferred absence of bog turtles in all of the other wetlands from the 2014 phase 2 surveys, and the fact that the grout will be contained within a limited area, we conclude that grouting of the line will not cause negative effects to the bog turtle. This letter does not address the HDD, IR, alternatives, potential reroutes, clean up, or subsequent restoration that may need to occur at this site due to the IR. This letter solely addresses the filling of the pilot hole with grout in order to insure the integrity of the existing line.

This response relates only to endangered and threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

If you have any questions regarding this matter, please contact Pamela Shellenberger of my staff at 814-234-4090 x7459.

Sincerely,

A handwritten signature in black ink that reads "Sonja Jahrsdoerfer". The signature is written in a cursive style with a large, prominent "S" at the beginning.

Sonja Jahrsdoerfer
Project Leader

Brad.Schaeffer@tetrattech.com
bberra@skellyloy.com

Attachment B



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

January 8, 2021

Brad Schaeffer
Tetra Tech, Inc.
301 Ellicott Street
Buffalo, NY 14203

RE: USFWS Project #2021-0037
PNDI Receipt # 720866

Dear Mr. Schaeffer:

This responds to an email received December 8, 2020, requesting additional review and information about federally listed and proposed endangered and threatened species within the area affected by the proposed ME2 PPP request for restart/restoration of the wetland associated with the Horizontal Directional Drill (HDD) S3-0290 project located in Upper Uwchlan Township, Chester County, Pennsylvania. The proposed project is within the known range of the bog turtle (*Clemmys muhlenbergii*), a species that is federally listed as threatened. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

In a letter dated October 15, 2020, the U.S. Fish and Wildlife Service (Service) provided our conclusion that the project would not cause negative effects to the bog turtle to the Pennsylvania Department of Environmental Protection (DEP) for a grout plan for the referenced HDD. Similarly, in a letter dated December 9, 2020, the Service determined that geophysical work related to the proposed restart of the HDD at wetland H17 is not likely to adversely affect the bog turtle.

You requested our review of the restart of this HDD and restoration of associated wetland impacts due to the installation of a containment structure, as these control measures will require additional impact of approximately 0.6 acres of wetland H17 (0.186 acres of PEM wetland, and 0.433 acres of PFO wetland).

The containment structure is to be installed at the location that has been determined to be the most likely place where an inadvertent return (IR) may occur in the future. The control measure is being installed to contain an IR should it occur. After drilling is complete, this portion of the wetland will be restored.

Phase 1 surveys were conducted in 2014 at wetland H17, the wetland that is being impacted by the restart/restoration work, and adjacent wetlands (C48, C47, C46 and C44). All of these wetlands were determined to contain potential bog turtle habitat. Therefore, Phase 2 surveys occurred in all of these wetlands in 2014. The Phase 2 surveys concluded probable absence, except for wetland C44, which our office determined to be hydrologically connected to a known bog turtle site (discovered by Skelly and Loy in the early 2000s).

Although 7 years have lapsed since Phase 2 surveys were conducted at these wetlands, due to the low population density at the wetland that is connected to C44, and the inferred absence of bog turtles in all of the other wetlands from the 2014 phase 2 surveys, we conclude that the restart/restoration work will not cause negative effects to the bog turtle. This letter solely addresses the restart/restoration work.

This response relates only to endangered and threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

If you have any questions regarding this matter, please contact Pamela Shellenberger of my staff at 814-234-4090 x7459.

Sincerely,



Sonja Jahrsdoerfer
Project Leader

cc: Pat Green, Tetra Tech, Inc.

Brad.Schaeffer@tetrattech.com
Pat.Green@tetrattech.com

Attachment C

MEMORANDUM

TO: Monica Styles, Energy Transfer

FROM: David M. Anderson, PG and Mark G. Foerster, PG

COPY: David Mostoller, RETTEW

DATE: January 27, 2021

PROJECT NAME: Sunoco Pipeline LP Mariner East 2 Pennsylvania Pipeline - Spread 6 **PROJECT NO.:** 096303002

SUBJECT: S3-0290 Milford/Little Conestoga Road Grouting Procedures

A Pennsylvania-licensed PG has reviewed the attached grouting-procedures for use at the S3-0290, Milford/Little Conestoga Road HDD drilling site. The grouting procedures are defined in the Michels attachments as temporary (Therm-Ex Grout Operation, not for abandonment of the HDD-borehole) and permanent (PennDOT GR1 Mix Operation, for abandonment of the HDD-borehole). The Concrete Mix Design Form for the PennDOT GR1 grout is attached as well.

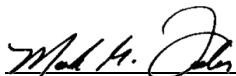
The Therm-Ex Grout Operation, intended for use without abandonment of the borehole, is considered to be a temporary measure for grouting of the existing borehole. Therm-Ex injection-grouting will be conducted from the east drilling pad into the reamed portion of the borehole. Following completion of injection-grouting the reamed portion of the borehole, Therm-Ex grout will be gravity-fed into the pilot borehole from the west drilling pad. RETTEW considers the approach to be appropriate for temporary grouting of the borehole and adjacent subsurface soils and/or bedrock, while allowing for HDD operations to be attempted again at a later date.

The PennDOT GR1 Mix Operation, intended for use if the borehole is abandoned, is considered to be a permanent measure for grouting of the existing borehole. Grouting of the entire borehole length with GR1 grout will be conducted from the east drilling pad with the open end of the drill-stem at approximately 704 feet from the west end. Grouting will continue with the drill-stem in place for as long as possible. If required, the drill-stem will be tripped-out to continue grouting. The entire grouting operation will continue until refusal is observed, at which time, the grout will be permitted to set up. The operations will resume from the west drilling pad with trip-in of the drill-stem to refusal. Grouting will continue with the drill-stem in place or tripped-out if required until refusal of the grout is observed from the west drilling pad. RETTEW considers this approach to be appropriate for permanent grouting of the borehole and adjacent subsurface soils and/or bedrock.

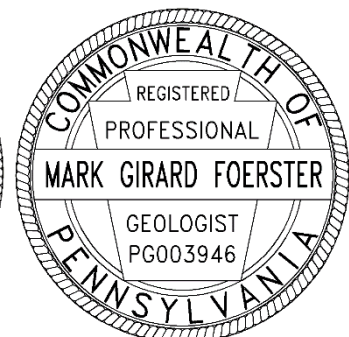
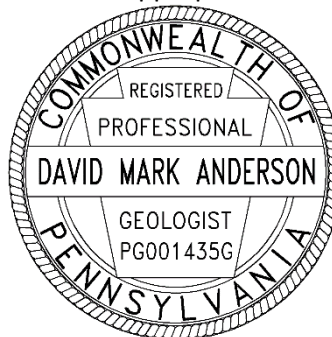
In RETTEW's professional opinion, both grouting options are appropriate as corrective actions for the affected section of HDD S3-0290.



David M. Anderson, PG
License No. PG001435G



Mark G. Foerster, PG
License No. PG003946



Page 2 of 2
Monica Styles, ET
January 27, 2021
RETTEW Project: 096303002

Enclosures

Therm-Ex Grout Operation Temporary Grouting for HDD
PennDot GR1 Mix Operation Permanent Grouting for HDD 290
2020 PENNDOT GR1 Form

Z:\Shared\Projects\09630\096303002 - SL - Spread 6 HDDs Geophysics\GE\S3-0290 Little Conestoga Road\Grouting Plan\S3-0290 Grouting Procedures_2021-01-27.docx

ENCLOSURES



THERM-EX GROUT PROCEDURE FOR TEMPORARY GROUTING OF HDD 290

---NOT TO BE USED FOR ABANDONMENT OF HDD HOLE---
---Existing Drill Rod would remain in the hole---

Therm-Ex Grout is NSF certified. Safety Data Sheet has been previously submitted.

Prior to commencement of grouting all required environmental control devices (ECDs), personnel, equipment and materials will be in place at the designated areas as required by permits and consultation with the Company's environmental team.

Below is a list of steps, in order, for the completion of the Therm-Ex Grouting operation:

1. Remobilize rigs, ancillary equipment and personnel to both the entry and exit side.
2. Install, from the east side, a 12" diameter wash over tool on drill stem and trip in 1,574' to the end of the previously reamed 30" hole. This operation may require the use of drilling mud or water if any cuttings are encountered while tripping in to clear any possible blockages. The wash over tool goes over top of the existing drill rod in the hole. The drill rod in the hole would remain in place throughout and after this operation is completed.

During step 2, there is a chance that material will be released at or near the previous IR location.

3. Once the washover tool is in place. The Therm-ex grout is mixed with water in a mud tank to an approximate viscosity of 80 seconds and is then dispersed via the washover tool into the annulus.
4. It is estimated that each joint will require approximately 1,000 gallons of material which equates to an estimated 31.25 gallons per foot (for the 30" reamed portion of the existing hole)
5. The therm-ex grout once injected into the annulus will displace the remaining material within the annulus and will be hauled off to an appropriate disposal facility.
6. It is estimated that the total operation will require approximately 50,000 gallons of material to be dispersed into the annulus which means that the same amount will be displaced and hauled off.
7. Once the wash over tool is tripped out of the casing on the east end of the HDD the operation will be completed in the previously reamed portion of the hole.
8. Move operations to the west side and gravity feed approximately 1,200 gallons in the previously piloted portion of the hole.

Estimated Timeline:

- 3-5 days to reset up the drilling rigs and ancillary equipment.
- 1 day to trip in washover tooling.
- 1 day to complete injection of therm-ex grout.
- 1 day to move operations to the west side and free flow therm-ex grout.

This plan would be completed in a step by step basis as defined above. Flow rate would be monitored by taking the the high stand pipe pressure (this is an above ground reading) of each joint pulled backed along with average flow rate. Pressure readings down hole cannot be achieved during this operation.

The hole has been idle for over 4 months now so there is no way to tell what condition the hole will be in at the time of the Therm-ex grouting operation. When the 30" reamer was removed from the hole, all material came to the exit pit, east side, which indicated at that time the inadvertent return had sealed itself and no blockages were then present.

Once the grouting process starts it will be a continuous operation, a joint of drilling rod will be pulled back, additional therm-ex grout will be mixed and dispersed into the annulus via the washover tooling. This will continue until the annulus is full of therm-ex grout and the previous material has been displaced from the annulus.

For step 2 above, once the washover tool is at the end of the previously reamed hole, approximately 1,574', one drill rod will be pulled back for every 1,000 gallons of material released into the annulus.

SDS sheets have been previously submitted. NSF certified.



PENNDOT GR1 MIX PROCEDURE FOR PERMANENT GROUTING OF HDD 290

---All Drilling Rod would be removed from the hole---
---Some casing pipe will remain in the ground---

PennDot GR1 Mix is approved and used by the Pennsylvania Department of Transportation.

Prior to commencement of grouting all required environmental control devices (ECDs), personnel, equipment and materials will be in place at the designated areas as required by permits and consultation with the Company's environmental team.

Below is a list of steps, in order, for the completion of the PennDot GR1 Mix operation:

1. Remobilize rig, ancillary equipment and personnel to the exit (East) side.
2. Add on 22 joints (approximately 704') of 6.625" drill stem to the entry (West) side as the 7.625" drill stem is tripped out of the exit (East) side. The 6.625" drill stem is used when completing grouting operations.
3. After the 22 joints are added, no more drill rod will be added on the west side and the 7.625" drill rod will be continued to be tripped out until the end of the 6.625" drill rod is open ended at approximate station number 19+49, which is approximately 704' from the exit (East) side hole.
4. Start deploying PennDot GR1 grout mix and trip out stem as needed. The drill stem will remain in the same place as long as conditions allow and wait until the end of the day to trip out the drill rod or a field determination may be made to trip after so many truck loads of grout are deployed. It is estimated that a total of 16 truck loads (approximately 144 cubic yards) will be deployed on this day.

The 16 truck loads are the maximum amount of trucks estimated to be able to be used within the Township working hours.

During steps 2 through 4, there is a chance that material will be released at or near the previous IR location.

5. The next day trip back in with the 6.625" drill stem to refusal and continue grouting.
6. Start deploying PennDot GR1 grout mix and trip out stem as needed. The drill stem will remain in the same place as long as conditions allow and wait until the end of the day to trip out the drill rod or a field determination may be made to trip after so many truck loads of grout are deployed. The amount of grout to be used is undetermined at this moment and will continue until the casing on the exit (East) side is shown to be full of grout.
7. Allow grout to set up and move operations / rig, etc. to the entry (West) side and begin setting up for operations.
8. Trip in 6.625" drill rod from the entry (West) side until refusal.
9. Start deploying PennDot GR1 grout mix and trip out stem as needed. The drill stem will remain in the same place as long as conditions allow and wait until the end of the day to trip out the drill rod or a field determination may be made to trip after so many truck

loads of grout are deployed. It is estimated that a total of 14 truck loads (approximately 126 cubic yards) will be deployed on this day.

The 14 truck loads are the maximum amount of trucks estimated to be able to be used within the Township working hours – the length of drill rod to pump through in step 9 is longer than the length in step 4 above.

10. The next day trip back in with the 6.625" drill stem until refusal and continue grouting.
11. Start deploying PennDot GR1 grout mix and trip out stem as needed. The drill stem will remain in the same place as long as conditions allow and wait until the end of the day to trip out the drill rod or a field determination may be made to trip after so many truck loads of grout are deployed. The amount of grout to be used is undetermined at this moment and will continue until the casing on the entry (West) side is shown to be full of grout.

The entire annulus space sans drill rod is approximately 375.5 cubic yards. There will be cuttings that remain in the hole and it is planned not to completely fill in the spacing of the 36" casing pipe and the ends will be cut off after the grouting operation. Total estimated grout to be placed into the annulus is approximately 350 cubic yards.

It is possible that while grouting the annulus the drilling rod could potentially seize up and have to be left in the hole at which time a different grouting injection method may need to be deployed. The transition from the reamed hole to the pilot hole is the area within the annulus that would be the most susceptible location for this situation to arise.

Estimated Timeline:

- 3-5 days to set up the drilling rigs and ancillary equipment.
- 1 day to add 22 joints of the 6.625" drill rod and trip out the 7.625" drill rod.
- 1 day to deploy approximately 16 loads (144 cub yds) of grout and trip out drill stem.
- 1 day to trip in drill stem to the previous days grout plug and deploy remainder of grout to finish filling exit (East) end of the hole.
- 3-4 days to move drill rig and ancillary equipment to the entry (West) side and
- 1 day to trip in drill stem to grout plug/refusal.
- 1 day to deploy approximately 14 loads (126 cub yds) of grout and trip out drill stem.
- 1 day to trip in drill stem to grout plug and deploy remainder of grout to finish filling the entry (West) side pilot hole
- 3-4 days to rig down and demobilize drill equipment.

This plan would be completed in stages as defined above. Flow rate will vary as the grouting material will be coming from a grout truck to a pump truck into the drill rod. After each truck load is completed the next load will then get hooked up to the pumper truck and grouting will commence. Pressure readings can be obtained in bar pressure from the pumper truck but that

just gives you the pressure to move the pistons on the pumper truck and does not provide information regarding pressures down hole. Achieving down hole pressure readings during this operation is not achievable.

The hole has been idle for over 4 months now so there is no way to tell what condition the hole will be in at the time of the PennDot 1:3 grouting operation. When the 30" reamer was removed from the hole, all material came to the exit pit, east side, which indicated at that time the inadvertent return had sealed itself and no blockages were then present.

Once the grouting process starts it will be conducted in stages as described above. Pull back of drilling rod once the grouting operation starts will vary based on field conditions and determined by the driller on site. Quantities to be injection per step/day are estimated based on the allowable township working hours.

If an inadvertent return (IR) were to occur during the grouting process the injection of the grout should continue, as long as the IR is properly contained, until the grout material is observed coming from the IR location and then stop. This will ensure that a full column of grout is within the IR pathway and then let it set up sealing off the IR pathway prior to continuing the grouting operations.

Mix design attached.

TR-4221 (12-15)



Concrete Mix Design Form

Supplier Code

DEL46C42

JMF No.

GR1

JMF Year

2020

Supplier/JMF/Design # (Opt.)

GR1

Producer	Delaware Valley Concrete, Inc
Location	
Contractor	
Sec/Segment	
SR/VO	
Material Class	CONC
Mix Identifier	Grout
Structure Class	S3
ECMS No./PO No.	
JMF Status	Approved

Material	Material Code	Material Class	Product Name	Producer Name	Supplier Code	Sp. Gr.	Abs	ASR	
Cement	276	1	Keystone Type 1	Keystone Cement Company	KEYSP 15	3.150			
Pozzolan	276	GGBFS	Lehigh Slag-ALLCEM	Lehigh Cement Company, LLC	LEH-4 15	2.880			
Fine Aggregate	207	A	FA	Aztec Materials, LLC	AZTNJA14	2.629	0.66	0.02	
Water	420	WTRMIX	Water	Delaware Valley Concrete, Inc.	DEL46C42	1.000			
						Oz/cwt	Oz/yd	Mfg Dose/cwt	
								Min	Max
Admixture	403	AEA	AEA	Sika Corporation	SIKA3 15	1.50	10.90	0.20	
Admixture	403	RE	Plastiment	Sika Corporation	SIKA3 15	1.00	7.30	1.00	4.00
Admixture	403	WR	Sikaplat 300GP	Sika Corporation	SIKA3 15	2.00	14.50	2.00	8.00

When RE admixture is used in concrete $\geq 80^{\circ} F$ or in hot weather, the manufacturer's minimum recommended dosage rate for RE admixture must be used to get 90 minutes of mixing time.

When using HRWR admixture, it must be used at the manufacturer's minimum dosage rate to use the maximum of 8" slump per 704.1(d)a.

When using a WR admixture, it must be used at manufacturer's minimum dosage rate to use the maximum of 61/2" slump spec per 704.1(d)4.a.

Any additional admixtures utilized to enhance the concrete performance may be below the manufacturer's minimum recommended usage rate.

RCP Coulombs

Total admix water per cubic yard

From trial mix dated 01/15/2019

Microstrain

Total admix solids per cubic yard

28/7 ratio from worksheet dated 01/15/2019

Strength Data Based on Max W/C 0.540

28/7 day strength ratio (AAAP Only) 1.88

% Air 6.00

F^oc (Compressive Strength) PSI

7 Days	1,930	Avg PSI	28 Days	3,625	Avg PSI		
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	Material Code	Material Class	Supplier Code	Max W/C	Mix # 2	Mix # 3	Mix # 4	Mix # 5	
W/C Ratio by wt.				0.540	0.520	0.500	0.480	0.460	
Cement (lbs)	276	1	KEYSP 15	508	508	508	508	508	
Pozzolan (lbs)	276	GGBFS	LEH-4 15	218	218	218	218	218	
Total Cementitious (lbs)				726	726	726	726	726	
Total Coarse Agg. (lbs)									
Fine Agg. (lbs)	207	A	AZTNJA14	2512	2548	2587	2626	2664	
Total Water (lbs)				392	378	363	348	334	
Admixture Water (lbs)									
Mix Water (lbs)				392	378	363	348	334	
Admixture Solids/yd (lbs)									
Total (lbs)									
Unit Weight (lbs/cu.ft.)									
Coarse Agg. (cu.ft)									
Total Water (gal.)				47.1	45.4	43.6	41.8	40.1	
Mix Water (gal.)				47.1	45.4	43.6	41.8	40.1	

Designed By : Wade Armstrong

Designed Date : 1/8/19

Submitted By : Wade Armstrong

Submitted Date : 8/17/20

District Approver : Robert Merlie

Approved Date : 8/18/20

January 26, 2021

Project Number 212IC-BF-00037

Ms. Monica Styles
Energy Transfer Partners
100 Green Street
Marcus Hook, Pennsylvania 19061

**Re: Review of Work Plans for Grouting HDD S3-0290
Sunoco Pipeline L.P. - Pennsylvania Pipeline Project – Mariner East II
Construction Spread 6 – Milford Road
Upper Uwchlan Township, Chester County, PA**

DEP File No. ESG01015001
DEP File No. E15-862

Dear Ms. Styles:

Tetra Tech, Inc. (Tetra Tech) has completed a review of the work plan descriptions for temporary and permanent grouting of HDD S3-0290, which were prepared by Michels Pipeline (Michels®). The two work plans supplied to Tetra Tech on January 25, 2021 were titled:

THERM-EX GROUT PROCEDURE FOR TEMPORARY GROUTING OF HDD 290 NOT TO BE USED FOR ABANDONMENT OF HDD HOLE Existing Drill Rod would remain in the hole
PENNDOT GR1 MIX PROCEDURE FOR PERMANENT GROUTING OF HDD 290 All Drilling Rod would be removed from the hole Some casing pipe will remain in the ground

The Wyo-Ben Therm-Ex Grout™ and PennDOT GR1 grout mix are acceptable materials for their respective proposed applications. Also, the temporary and permanent grouting procedures described by Michels® are appropriate based on our understanding of the inadvertent return (IR) incident on August 10, 2020, emergency backfilling of the attendant subsidence feature, and the planned environmental controls and monitoring during the grouting process. In Tetra Tech's professional opinion, both grouting approaches are appropriate as corrective actions for the affected section of HDD S3-0290.

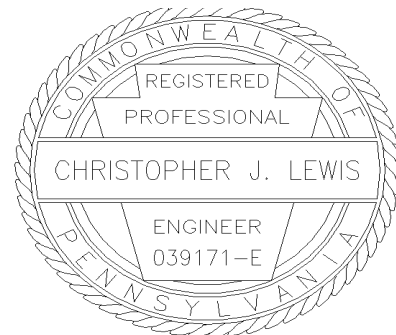
Should you have questions, feel free to contact me by phone (M: 724.859.0880 O: 412-829-3609) or e-mail Chris.Lewis2@tetratech.com.

Sincerely,
Tetra Tech, Inc.



Christopher Lewis, P.E.
Senior Project Manager

cc: File 212IC-BF-00037
N. Bryan, C. Embry - Energy Transfer
B. Schaeffer, Tetra Tech



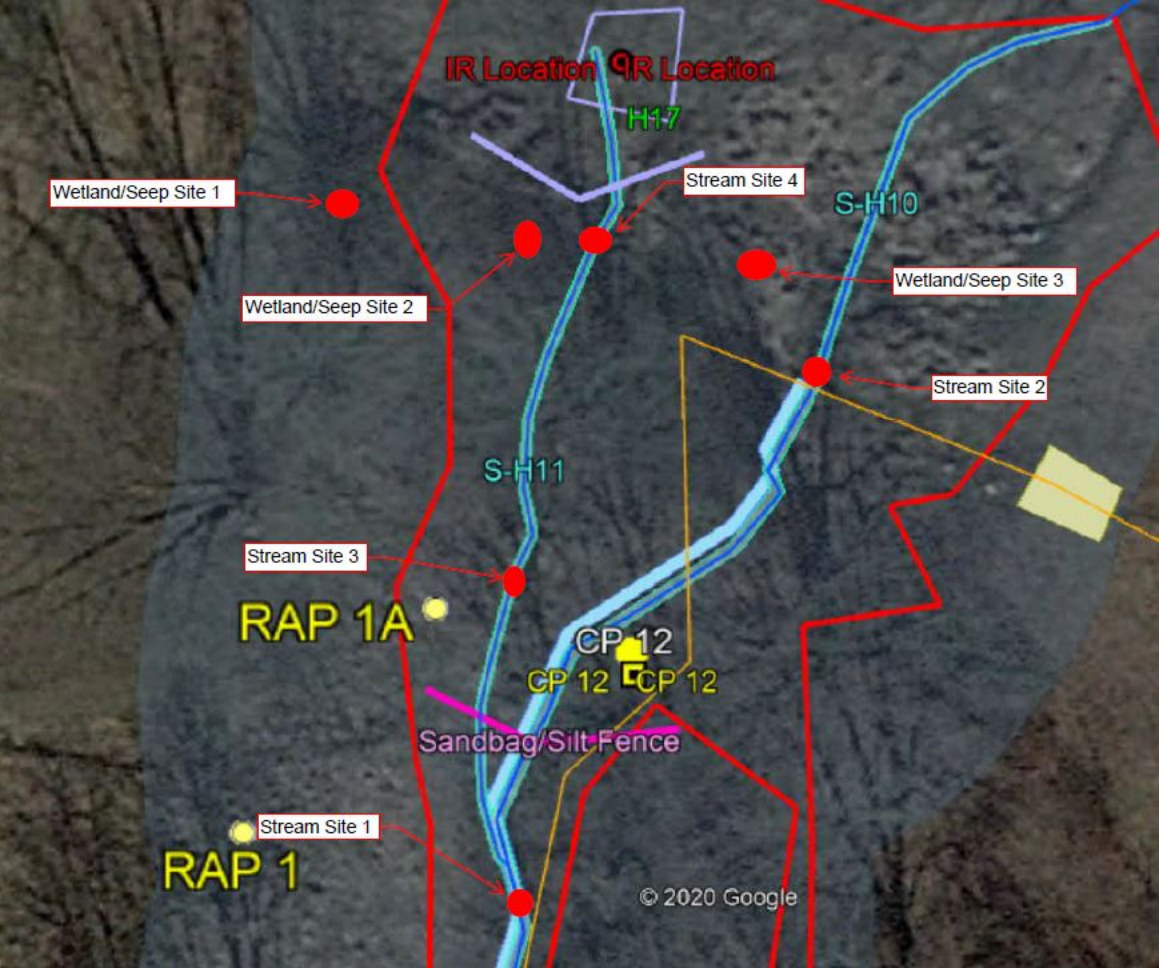
Attachment D

HDD 0290 Well Test Plan

Current Owner	Legal Tax Parcel ID	Number of Sources Sampled	Type of Sources Sampled	Location Code	Lat/Long of Source	Comments	Proposed Testing w LO Approval	LO Coordination/ Approval Results (Lands to Provide)
Charles and Nancy Starliper	3203 0039120	1	Well	WL-09052017-613-02	40.082612, -75.719319	GES completed two water testing events at this source. During both events, the landowner requested that the water sample be collected directly from the well via bailer, which we did successfully. If the landowner approves, during the monitoring program for grouting activities, GES can collect all water samples from outside, at the wellhead via bailer. Samples will be pre-treatment.	With LO approval. Full parameter testing once a week starting week of Jan 11, 2020 through 8 weeks after pipepull. Daily field testing 2 days prior to grout/HDD restart and 2 days after pipepull. See next spread sheet for parameters to be tested. During grouting or HDD restart samples will be sent for results with 1-3 day turn around time.	
PA Turnpike Commission	32-3-34	1	Well	Not Assigned	40.083502, -75.722189	We do not have Lat/Long for the source. The Lat/Long provided are for the parcel where the well is located. On February 28, 2020, per Land, the landowner declined water testing and Land had GES remove this parcel/source from the water testing program. Therefore, this well may not need to be part of the monitoring program during grouting activities.	No testing to be conducted	
Randal W. and Karalee B. Styer	32-3-54.5	1	Well	WL-01192018-628-01	40.081669, -75.713773	There are two wells located on this parcel. The supply well that GES has sampled and a geothermal well that was installed and never used. The geothermal well is buried and not accessible. Therefore, the geothermal well may not need to be part of the monitoring program during grouting activities. All outside spigots are post-treatment. Sediment filters are currently used for treatment. If pre-treatment samples are needed, GES would need to enter the house to collect the sample from the pressure tank spigot. Due to COVID-19, we are trying to limit going inside buildings for water testing, and entering the house on a routine basis may be too much of a disturbance to the landowner. The other pre-treatment location would be collecting the water sample directly from the well via bailer. However, we have never removed the well cap and we don't know if there are any obstructions in the well that would prevent using a bailer. Overall, there are various options for sampling this well, if the landowner approves.	No testing of geothermal well. Testing would only occur at the outside post treatment spigots. With LO approval. Full parameter testing once a week starting week of Jan 11, 2020 through 8 weeks after pipepull. Daily field testing 2 days prior to grout/HDD restart and 2 days after pipepull. See next spread sheet for parameters to be tested. If post-treatment testing results in anomalies then testing pre-treatment would be inquired with Landowner for further investigation. During grouting or HDD restart samples will be sent for results with 1-3 day turn around time.	

	Weekly Test Parameters	Daily Field Test Parameters
General Chemistry	pH	pH
	Specific Conductance	Specific Conductance
	Turbidity	Turbidity
	Total Dissolved Solids (TDS)	
	Total Suspended Solids (TSS)	
	Hardness	
	Anions: Bromide, Chloride, Sulfate	
	Total Alkalinity	
Trace Metals	Metals Analysis: (Ba, Ca, Fe, K, Mg, Mn, Na)	
Organics	BTEX	
	Light Gas Analysis [Methane, Ethane, Ethene, Propane]	
Bacteria*	Total Coliform, E. Coli, Fecal Coliform	

Attachment E



IR Location QR Location

H17

S-H10

S-H11

Wetland/Seep Site 1

Wetland/Seep Site 2

Stream Site 4

Wetland/Seep Site 3

Stream Site 2

Stream Site 3

RAP 1A

CP 12

CP 12 CP 12

Sandbag/Silt Fence

Stream Site 1

RAP 1