

HDD Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan

Pennsylvania Pipeline Project

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**HDD INADVERTENT RETURN ASSESSMENT, PREPAREDNESS, PREVENTION
AND CONTINGENCY PLAN
PENNSYLVANIA PIPELINE PROJECT**

1.0 PROJECT DESCRIPTION

Sunoco Pipeline L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project (Project or PPP) that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation. The Project involves the installation of two parallel pipelines within an approximately 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline will be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. For a detailed Project Description see Attachment 9 of the Project's Chapter 105 Joint Application for Permit.

2.0 SURFACE AND GROUNDWATER PROTECTION PLANS

SPLP has developed four plans that accompany the Erosion & Sedimentation Plan (E&S Plan). These plans assess the potential impacts and provide for the protection of surface and groundwater due to Project activities. The overarching PPC Plan is designed to address spill prevention, countermeasures, and response in general. Potential impacts to surface waters and public and private water supplies in particular have been analyzed and addressed within two supplemental plans to the PPC Plan: a Water Supply Assessment, Preparedness, Prevention and Contingency Plan (Water Supply Plan); and this Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan (IR Plan). This Water Supply Plan provides for the assessment of the existing public and private water supplies in or along the Project, as well as identifies prevention and preparedness measures to be implemented to protect those supplies. This IR Plan outlines the preconstruction activities implemented to ensure sound geological features are included in the HDD profile, the measures to prevent impact, and the plan to be implemented if an impact were to occur. In addition, a Void Mitigation Plan for Karst Terrain and Underground Mining (Karst Plan) is provided as part of the E&S Plan and assesses the potential impacts and avoidance and mitigation measures during open-cut and drilling procedures. The purpose of these plans is to protect surface and groundwater resources Project-wide. The PPC Plan is provided as Attachment 12A of the Project's Chapter 105 Joint Application for Permit, the Water Supply Plan is provided as Attachment 12B, this IR Plan is provided as Attachment 12C, and the Karst Plan as Attachment 12D. These four plans also accompany every E&S Plan developed for the Project under the Chapter 102 regulations.

3.0 INADVERTENT RETURN PLAN

This plan satisfies the requirements set forth in 25 Pa. Code Section 78a.68a and Section 102.5(l), and is in accordance with PADEP's Guidelines for the Development and Implementation of Emergency Response Plans. This IR Plan presents methodologies to control and minimize the impacts to sensitive environmental resources from inadvertent returns (IR) of drilling fluids associated with the proposed horizontal directional drill (HDD) crossings along the construction of the Project. Specifically, these methodologies are divided into three categories as follows:

- HDD site feasibility analysis – IR risk assessment
- HDD implementation procedures – IR preparedness
- IR contingency response

This plan also contains a specific section outlining the procedures to be implemented to avoid potential impacts to the bog turtle (*Glyptemys muhlenbergii*), a federally threatened species. A listing of HDD sites is provided in Appendix A with the special bog turtle HDDs highlighted. Construction personnel will be provided detailed construction plans for each HDD, and will be required to implement all erosion and sedimentation control and this contingency plan.

4.0 HDD OVERVIEW

HDD is a steerable trenchless method of installing underground pipe, conduit, or cable in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal to no impact along the bore path. The earliest forms of HDD emerged in the 1960s and have since been greatly improved. HDDs are typically utilized when conventional trenching techniques are not desirable or practicable. It is suitable for a variety of soil and geologic conditions and primarily intended for obstacle avoidance including, but not limited to, river crossings, roads, and environmental features.

HDD Fluids

The principal functions of drilling fluid in HDD pipeline installation are listed below.

- Transportation of Spoil – Drilled spoil, consisting of excavated soil or rock cuttings, is suspended in the fluid and carried to the surface via a fluid stream flowing through the drill annulus between the bore hole and the drill rig.
- Cleaning and Cooling of Cutters – Build-up of drilled spoils on bit or reamer cutters is removed by high velocity fluid streams directed at the cutters. Cutters are also cooled by the fluid.
- Reduction of Friction – Friction between the pipe and the bore wall is reduced by the lubricating properties of the drilling fluid.
- Bore Stabilization – Stabilization of the drilled hole is accomplished by the drilling fluid building up a "wall cake" which seals pores and holds soil particles in place. This is critical in HDD pipeline installation.
- Transmission of Hydraulic Power – Power required to turn a bit and mechanically drill a hole is transmitted to a downhole motor by the drilling fluid.
- Hydraulic Excavation – Soil is excavated by erosion from high velocity fluid streams directed from jet nozzles on bits or reaming tools.
- Soil Modification – Mixing of the drilling fluid with the soil along the drilled path facilitates installation of a pipeline by reducing the shear strength of the soil to a near fluid condition. The resulting soil mixture can then be displaced as a pipeline is pulled into this formation.

The major component of drilling fluid used in HDD pipeline installation is fresh water, typically obtained at the crossing location. To increase the hydraulic properties of the water, it is generally necessary to modify it by adding a viscosifier. The viscosifier used almost exclusively in HDD drilling fluids is naturally occurring bentonite clay, which is principally sodium montmorillonite. It is not a listed hazardous material/substance as defined by the U.S. Environmental Protection Agency's (USEPA) Emergency Planning and Community Right-to-know Act (EPCRA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulatory criteria. If the product becomes a waste, it does not meet the criteria of a hazardous waste, as defined by the USEPA. Bentonite is non-toxic and commonly used in farming practices, but has the potential to impact aquatic habitats and wildlife if discharged to waterways in significant quantities.

All stages of HDD involve circulating drilling fluid from equipment on the surface, through a drill pipe, and back to the surface through a drilled annulus. Drilling fluid returns collected at the entry and exit points are stored in a steel tank and processed through a solids control system which removes spoil from the drilling fluid, allowing the fluid to be recycled. The cleaned fluid is trucked back to the entrance point for reuse. The basic method used by the solids control system is mechanical separation using shakers, desanders, and desilters. The excess spoil and drilling fluid are transported to, and disposed of, at an approved and permitted solid waste landfill.

Drilling fluid expended downhole will flow in the path of least resistance. In the drilled annulus, the path of least resistance may be an existing fracture or fissure in the soil or rock substrate. When this happens, circulation can be lost or reduced. This is a common occurrence in the HDD process, but does not prevent completion. However, the environment may be impacted if the fluid inadvertently returns to the surface at a location on a waterway's banks, within a waterway or wetland, or other potential receptor. When this occurs, it is called an inadvertent return or release.

5.0 INADVERTENT RETURN MINIMIZATION METHODOLOGIES

The use of HDD for obstacle or resource avoidance during pipeline construction has been extensively utilizing for decades with high levels of success. Notwithstanding this fact, inadvertent returns of drilling fluids can occur for various reasons. The following sections detail methodologies to be implemented for the Project with the intent of eliminating or minimizing inadvertent returns based on a sound understanding of the reasons that cause returns.

5.1 HDD SITE FEASIBILITY ANALYSIS AND DESIGN

To ensure the highest probability of success on the proposed HDD installations, SPLP has assembled a technical team (Team) which includes engineers, scientists, and consultants having expertise in HDD design, construction, and environmental issues. Provided below are the methodologies the Team employs to eliminate / minimize inadvertent returns.

5.1.1 SITE FEASIBILITY ANALYSIS & IR RISK ASSESSMENT

Feasibility Analysis - Overall

The Team's first step in evaluating a potential HDD location for successful installation was to identify a need (e.g., sensitive habitat, infrastructure) and then perform a feasibility analysis. Previous project HDD data (i.e., Mariner East I projects) was used to assist with this feasibility analysis. Locations where IRs were recorded for Mariner East I projects that also are the locations where HDDs are planned for the PPP are identified in Appendix C and discussed further within those individual assessments. This initial analysis included the following primary constructability areas of review:

- Physical / technical constraints (angle, required depths >5ft at streams and >4 feet at wetlands)
- Practicability constraints
- Geological constraints (karst terrain/carbonate rock/geologic structures)

A general discussion of these constraints is provided within Section 3.2 of the Project's Trenchless Feasibility Study provided within the Project's Alternatives Analysis of the Project's Pennsylvania Department of Environmental Protection (PADEP) Joint Application for Permit.

Feasibility Analysis – Site Specific

Upon evaluation of the need and positive initial feasibility analysis, planned HDDs were further evaluated utilizing the data already collected during the initial assessment along with site-specific geotechnical and geologic information applicable to the boring locations to make a final feasibility determination. A positive final feasibility determination, then moved the HDD into full design. Project engineers, scientists, and consultants, utilized the site-specific data to design an HDD meeting SPLP specifications along with minimizing the risk of inadvertent return as the highest criteria. In particular, at locations where IRs were noted for the Mariner East I project, the location of the IR, the size of the IR, the drill log, and the design of the IR were all taken into consideration during feasibility and planning. In some, cases such as an early planned drill at the Marsh Creek reservoir in Chester County, the line was rerouted based on these analysis.

With completion of full design, PADEP requested SPLP to provide a risk assessment for each proposed location, and that is provided in Appendix C. Each assessment contains a summary documenting the particular HDD features and assigned an IR risk assessment, as follows:

- Low risk
 - Geotechnical report indicates non-gravel soils, layers of sand, silt, clay, and/or rock present at HDD profile.
 - Site considered acceptable – recommend no additional review necessary
- Medium risk
 - Geotechnical report indicates gravel or cobble present in a high value area (wetland, waterbody, and/or drinking water reservoir).
 - Identified geological constraints are present and need to be considered
 - Site considered marginally acceptable – recommend additional site inspections for IR during HDD process
- High risk
 - Geotechnical report indicates elevated gravel or cobble present in a high value area (wetland, waterbody, and/or drinking water reservoir). High volume of IR anticipated.
 - Site considered potentially unacceptable – recommend additional inspection and/or further engineering review.

The IR risk assessments and corresponding geotechnical reports are provided within Appendix C. Additionally, available information on geological constraints were assessed in relationship to the HDD location plan and profile drawing locations. None of the risk assessments returned a high risk evaluation result for the HDDs to be implemented for the Project.

5.1.2 WATER SUPPLY PROTECTION

Both public and private water supplies in proximity to and downstream of the Project have been evaluated and described in the Water Supply Plan. Existing location data, as well as consultations with water supply providers, provided the basis for identification of potential risks and concerns. The Water Supply Plan is companion to this IR Plan and further outlines the prevention measures, as well as the preparedness and contingencies plans that ensure water supplies will be protected.

5.1.3 DRILLING FLUID CONTROL

The most effective way to minimize environmental impact associated with HDD installations and specifically with drilling fluids is to maintain drilling fluid recirculation. Maintenance of fluid circulation is the responsibility of the HDD contractor. Monitoring of drilling mud volumes, pressures, and pump rates/returns will assist in determining if

significant drill mud loss occurs signaling a possible inadvertent return. The following requirements shall be placed upon each HDD contractor with respect to drilling fluid control:

- Instrumentation – The contractor shall at all times provide and maintain instrumentation which accurately locates the pilot hole, measures drill string axial and torsional loads, and measures drilling fluid discharge rate and pressure. SPLP, or their designee, shall have access to these instruments and their readings at all times. A log of all recorded readings shall be maintained and will become a part of the “As-Built” information to be supplied by contractor to SPLP.
- Composition – The composition of all drilling fluids proposed for use shall be submitted to SPLP for approval.
- Recirculation – The contractor shall maximize recirculation of drilling fluid to the borepit. The contractor shall provide solids control and fluid cleaning equipment of a configuration and capacity that can process drilling fluids to the borepit that produce drilling fluid suitable for reuse. SPLP may specify standards for solids control and cleaning equipment performance or for treatment of excess drilling fluid and drilled spoil.
- Loss of Circulation – The contractor shall employ its best efforts to maintain full annular circulation of drilling fluids. Drilling fluid returns at locations other than the entry and exit points shall be minimized. In the event that annular circulation is lost, the contractor shall take one or more of the following steps to restore circulation:
 - Size the hole frequently by advancing and retracting the drill string in order to keep the annulus clean and unobstructed.
 - When drilling fluid flow has been suspended, establish circulation slowly and before advancing.
 - Minimize annular pressures by minimizing density and flow losses. Viscosity should be minimal, consistent with bore cleaning and stabilization requirements.
 - Minimize gel strength.
 - Control the balling of material on bits, reaming tools, and pipe in order to prevent a plunger effect from occurring.
 - Control penetration rates and travel speeds in order to prevent a plunger effect from occurring.
 - Seal a zone of lost circulation using a high viscosity bentonite plug.
 - Suspend drilling activities for a period of six to eight hours.

5.1.4 ENVIRONMENTAL / GEOLOGIC INSPECTION

Inspection Overview

To ensure that HDD operations are conducted in accordance with permit conditions, established requirements, and standard HDD industry practice, SPLP will provide Environmental Inspectors (EIs) to monitor all pipeline construction activities, with increased attention provided to HDD installations. Specifically, each construction spread will field a team of EIs, one of which will be a licensed Professional Geologist (PG). The PG will primarily focus on trenchless excavation construction activities, report on the HDD contractor’s performance, and notify the Spread’s Lead EI if the HDD contractor fails to conform to established requirements. The EIs and PGs will report directly to SPLP Environmental Compliance Coordinator (ECC). Established requirements to which the HDD contractor must conform include, but are not limited to, the construction drawings, technical specifications, permits, easement agreements, and contractor submittals.

PG Qualifications

The minimum requirements of the PG shall include the following:

- Current Professional Geologist license in Pennsylvania

- Experienced in the field of hydrogeology
- Previous experience with linear pipeline projects
- Previous experience with HDD installations

5.1.5 HDD ALIGNMENT MONITORING AND IR PROTOCOLS

Persistent monitoring of the HDD alignment for an IR is an integral component in minimizing adverse environmental impacts. The intensity of this monitoring will vary depending upon the following drilling fluid operational conditions:

- Condition 1: Full circulation
- Condition 2: Loss of circulation
- Condition 3: Inadvertent returns

Monitoring Protocol for Condition 1 – Full Circulation

When HDD operations are in progress and full drilling fluid circulation is being maintained at one or both of the HDD endpoints, the following monitoring protocol will be implemented.

- The presence of drilling fluid returns at one or both of the HDD endpoints will be periodically documented.
- Land-based portions of the drilled alignment will be periodically walked and visually inspected for signs of inadvertent drilling fluid returns as well as surface heaving and settlement. Waterways will be visually inspected from the banks for a visible drilling fluid plume.
- Drilling fluid products present at the jobsite will be documented.

If an inadvertent drilling fluid return is detected during routine monitoring, the monitoring protocol associated with Condition 3 will immediately be implemented.

Monitoring Protocol for Condition 2 – Loss of Circulation

When HDD operations are in progress and drilling fluid circulation to the HDD endpoints is lost or severely diminished, the following monitoring protocol will be implemented.

- The HDD contractor shall notify the EI/PG.
- The EI/PG will notify the Spread's Lead EI that drilling fluid circulation to the HDD endpoints has been lost or severely diminished.
- The EI/PG will document steps taken by the HDD contractor to restore circulation. Should the contractor fail to comply with the requirements of the HDD Specification, the EI/PG will notify the Spread's Lead EI so that appropriate actions can be taken.
- If circulation is regained, the EI/PG will inform the Spread's Lead EI and resume the monitoring protocol associated with Condition 1.
- If circulation is not re-established, the EI/PG will increase the frequency of visual inspection along the drilled path alignment as appropriate. Additionally, the EI/PG will document periods of contractor downtime (during which no drilling fluid is pumped) and the contractor's drilling fluid pumping rate in case it should become necessary to estimate lost circulation volumes.

Monitoring Protocol for Condition 3 – Inadvertent Returns

If an inadvertent return of drilling fluids is detected, the following monitoring and operational protocol will be implemented.

- The HDD contractor shall immediately notify the Lead EI, EI/PG, Chief Inspector, and ECC.
- The EI/PG shall document the location, magnitude, and potential impact of the return.
- If it is determined that the inadvertent return has minimal impact, HDD operations will continue. The EI/PG will monitor and document the inadvertent return as well

as periods of contractor downtime and the contractor's drilling fluid pumping rate in case it should become necessary to estimate inadvertent return volumes.

- If it is determined that the return does create a significant impact, drilling operations will be suspended until containment measures can be implemented by the contractor. Documentation of any containment measures employed will be provided by the EI/PG. Once adequate containment measures are in place, the contractor will be permitted to resume drilling operations subject to the condition that drilling operations will again be suspended should the measures fail. The EI/PG will periodically monitor and document both the inadvertent return and the effectiveness of the containment measures. Periods of contractor downtime and the contractor's drilling fluid pumping rate will also be documented in case it should become necessary to estimate inadvertent return volumes.

5.1.6 HYDROLOGICAL IMPACTS

The HDD engineer is able to monitor pressure returns during the HDD. If the pressure drops, this would signify a potential return or the surfacing of ground water. If this occurs, an inspection of the HDD alignment and adjacent areas for returns would be conducted. If a groundwater discharge is identified, it will be photographed, characterized (i.e., location, size, limits, flow rate, flow direction, clarity, etc.) and reported to the chain of command which will follow the proper agency notification procedures. The inspection and early detection of any discharge will allow the HDD engineer to stop or adjust the HDD to reduce the potential for secondary impacts.

6.0 RESPONSE TO INADVERTENT RETURNS

If an IR is observed, the HDD contractor will take measures to eliminate, reduce, or control the return. The actions to be taken will depend on the location and time of return, site specific geologic conditions, and the volume of the return.

6.1 GENERAL CONDITIONS

- This IR Plan, PPC Plan, Water Supply Plan, and Karst Plan must be present onsite during drilling operations and made available to PADEP;
- PADEP is to be notified at least 24 hours prior to the beginning of each HDD, including conventional boring under waters of the Commonwealth. This notification will be made through PADEP's online Oil and Gas Reporting Electronic (OGRE) application. The OGRE application is accessed via the DEP Greenport login in system at <https://www.depgreenport.state.pa.us>.
- All required permits and Material Safety Data Sheets must be onsite and made available to PADEP;
- Drilling fluid additives other than bentonite and water shall be approved by PADEP prior to use. All approved HDD fluid additives are listed on PADEP's web link here: <http://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/IndustryResources/InformationResources/Pages/default.aspx>;
- When a drilling fluid discharge or loss of drilling fluid circulation is discovered, the loss or discharge shall be immediately reported to PADEP; and,
- Any water supply complaints received by SPLP will be reported to PADEP within 24 hours electronically through its web site. This notification will be made through PADEP's online Oil and Gas Reporting Electronic (OGRE) application. The OGRE application is accessed via the DEP Greenport login in system at <https://www.depgreenport.state.pa.us>

6.2 INADVERTENT RETURNS IN UPLANDS

If a return is identified within or nearby the HDD alignment, within the adjacent uplands but outside of wetland areas, then notification, containment, and clean-up will be carried out as necessary. The EI will be required to be present as these activities may need to be conducted outside of pre-approved limits of disturbance. The CI and EI will work closely to determine the best course of action for inadvertent returns occurring within upland areas. The EI will be responsible for notification of the return to SPLP's ECC. PADEP Regional Permit Reviewers, the County Conservation District, and affected landowners (private or public) will be notified (see Section 6.5). The HDD contractor will take appropriate actions to reduce, eliminate, or control the return. The actions may include:

- Constructing a small pit or sandbag coffer around the return point, installing a section of silt fence and/or straw bales to trap as much drilling fluids as possible, and placing a pump hose in the pit to pump the drilling fluid back to the bore site or temporary holding area or vessels (i.e.: vac truck);
- Reducing drilling fluid pressures;
- Thickening drilling fluid mixture; and/or
- Adding pre-approved loss circulation materials to the fluid mixture, such as wood fibers or shredded paper.

Drilling fluid may be recovered, recycled, and reused to the extent practical. All waste drilling fluid will be properly managed.

6.3 INADVERTENT RETURNS IN WETLANDS / STREAMS

The environmental impacts of a return of drilling fluid into a water body include a temporary increase in local turbidity until drilling fluid dissipates with the current and/or settles to the bottom. In the immediate vicinity of a return, benthic organisms may be impacted if sufficient quantities of bentonite settle upon them.

If the return is identified within wetlands and/or streams, drilling operations will be temporarily suspended to allow the EI to appropriately quantify the return, document its location, photograph the return, assess the potential to impact to the resource(s), and report the incident to SPLP's ECC. Notifications will be carried out as outlined within Section 6.5. Information about the return will be recorded and updated as necessary as a running report on the data form provided in Attachment B. SPLP's ECC is responsible for completion of the data form with the assistance of the EI and environmental compliance contractor. Each form will be updated as new information is learned about the return and as activities to restore the area occur. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return from initial discovery/notification through final restoration. **ALL inadvertent returns in wetlands and streams, regardless of size, are to be reported to the appropriate agencies in accordance with the notification section below.**

Containment, clean-up, and restoration activities that would require the installation of construction matting, placement of materials in the wetland or waterway, or the entry of construction vehicles and equipment are not allowed without prior PADEP/USACE approval. If upon reporting the incident, and under further consultation with the agencies, the return is determined to be significant enough to warrant containment, clean-up, and restoration via mechanical methods, then the following procedures will be followed:

- Draft containment and restoration plan, outlining the limits, types, and duration of disturbances, will be submitted to the PADEP/USACE for review and approval.

- Appropriate aquatic resource encroachment permits will be applied for depending on levels and types of disturbances required to clean up the material.
- Approved activities would only be implemented under the close, full-time supervision of the assigned EI.
- Drilling operations will resume when the return is contained and successfully remediated. The return area will continue to be monitored during the daily inspection.

One exception to ceasing drilling operations would be a return of drilling fluids during the pipe pullback process. Ceasing operations would pose significant risk of causing the pulled pipe to be stuck and not able to resume.

6.4 CONTAINMENT & CLEAN-UP MATERIALS AND EQUIPMENT

The HDD contractor will be required to have the necessary containment and clean-up equipment on-site, at the boring location and readily available for use. At a minimum, a combination of some or all of the following material and equipment should be on site and in ample supply depending on the extent of sensitive areas:

- Spill sorbent pads and booms
- Compost filter socks
- Straw bales (certified weed-free)
- Wood stakes
- Sand bags
- Silt fence
- Plastic sheeting
- Corrugated plastic pipe
- Shovels
- Push brooms
- Centrifugal, trash and sump pumps
- Vacuum truck
- Rubber tired or wide track back hoe
- Bobcat (if needed)
- Storage tanks (if needed)
- Floating turbidity curtain (may be considered for use on large streams) Timber (enough to cross 50% of the wetland length need to be readily available)

If necessary, a 24-hour outside emergency response company may be called in for assistance (such as Enviroserve – 1-800-642-1311).

6.5 NOTIFICATIONS

- PADEP is to be notified at least 24 hours prior to the beginning of each HDD, including conventional boring under waters of the Commonwealth. This notification will be made through PADEP's online Oil and Gas Reporting Electronic (OGRE) application. The OGRE application is accessed via the DEP Greenport login in system at <https://www.depgreenport.state.pa.us> .
- Any water supply complaints received by SPLP will be reported to PADEP within 24 hours electronically through its web site. This notification will be made through PADEP's online Oil and Gas Reporting Electronic (OGRE) application. The OGRE application is accessed via the DEP Greenport login in system at <https://www.depgreenport.state.pa.us>

- Affected landowners will be notified immediately regardless of location.
- When a drilling fluid discharge or loss of drilling fluid circulation is discovered in a wetland or water, the loss or discharge shall be immediately reported to PADEP, and if necessary, for emergency response or remedial activities, an emergency permit shall be sought under § 105.64 (relating to emergency permits). In the case of an inadvertent return, if the return is restricted to upland areas notification is to be to the County Conservation District and PADEP's regional permit reviewer as listed below.
- See the Project's Water Supply Plan for notifications to private and public waters suppliers.

A SPLP ECC will be responsible for the notifications described below of all returns occurring in or flowing into aquatic resources. SPLP's ECCs are identified as Christopher Embry (215-478-4144) and Matt Gordon (610-670-3284). The notifications will initially be via phone to the PADEP Emergency Response numbers listed below and then to the appropriate agency personnel via submittal of an initial inadvertent return data form located in Attachment B.

The Pennsylvania Clean Streams Law regulations require that when any pollutant discharged into surface or groundwater, including sewers, drains and ditches, the person spilling the substance or the person owning the premises from which the substance is spilled must notify PADEP immediately. Therefore, all returns in aquatic resources SPLP will notify the appropriate PADEP regional emergency number immediately upon return discovery:

- PADEP Southwest Regional Office: 412-442-4000
- PADEP Southcentral Regional Office: 866-825-0208
- PADEP Southeast Regional Office: 484-250-5900
- PA Fish and Boat Commission Bureau of Law Enforcement: 717-705-7861
SWRO: 814-445-8974, SCRO: 717-486-7087, SERO: 717-626-0228
- Other agencies that will be notified:
 - U.S. Army Corps of Engineers
Pittsburgh District: 412-395-7155
Baltimore District: 410-962-3670
Philadelphia District: 215-656-6728
 - Local agencies and municipalities who are downstream users of water, as applicable (see Water Supply Plan supplied with the Project's E&S Plan)

Following notification to the appropriate emergency/regulatory numbers, SPLP's ECC will notify the following individuals via e-mail submittal of the inadvertent return form located in Attachment B. This will consist of the initial reporting of the return and open consultation and further reporting to the PADEP/USACE in regards the return. The further consultations will be regards to remediation approval, restoration approval, and the need for appropriate approval/permits. The inadvertent return data form will be used to document the consultation and approvals and report final remediation/restoration.

- PADEP Southwest Regional Permit Reviewer (Michael Engelhardt)
- PADEP Southcentral Regional Permit Reviewer (Andrew McDonald)
- PADEP Southeast Regional Permit Reviewer (Donald Knorr)
- USACE Pittsburgh District Permit Reviewer (Jared Pritts)

- USACE Baltimore District Permit Reviewer (Debby Nizer)
- USACE Philadelphia District Permit Reviewer (David Caplan)
- PGC – for returns on state game lands (Nathan Havens)
- DCNR – for returns on state forests and parks (David Mong)
- USFWS – Project Reviewer (Pamela Shellenberger)
- USFWS – Project Reviewer (Brian Scofield)

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Other Notifications

The existing environment in regards to public and private water supply in proximity to and downstream of the Project has been evaluated and described with in the Water Supply Plan. Existing location data, as well as consultations with supply providers, provided the basis for identification of potential risks and concerns. Notifications to private and public water supply owners and/or operators will be implemented in accordance with the Water Supply Plan.

County Conservation Districts shall be notified in depending on the county of occurrence:

County Conservation Districts	
Washington County 2800 North Main Street, Suite 105, Washington, PA 14301	724-705-7098
Allegheny County River Walk Corporate Centre, 33 Terminal Way, Suite 325B, Pittsburgh, PA 15219	412-241-7645
Westmoreland County J. Roy Houston Conservation Center, 218 Donohoe Road, Greensburg, PA 15601	724-837-5271

County Conservation Districts	
Indiana County 625 Kolter Drive, Suite 8, Indiana, PA 15701	724-471-4751
Cambria County 401 Candlelight Drive, Suite 229, Ebensburg, PA 15931	814-472-2120
Blair County 1407 Blair Street, Hollidaysburg, PA 16648	814-696-0877
Huntingdon County 10605 Raystown Road, Suite A, Huntingdon, PA 16652	814-627-1627
Juniata County 146 Stoney Creek Drive, Suite 4, Mifflintown, PA 17059	717-436-8953
Perry County P.O. Box 36, 31 West Main Street, New Bloomfield, PA 17068	717-582-8988
Cumberland County 310 Allen Road, Suite 301, Carlisle, PA 17013	717-240-7812
York County 118 Pleasant Acres Road, York, PA 17402	717-840-7430
Dauphin County 1451 Peters Mountain Road, Dauphin, PA 17018	717-921-8100
Lebanon County 2120 Cornwall Road, Suite 5, Lebanon, PA 17042	717-277-5275
Lancaster County 1383 Arcadia Road, Room 200, Lancaster, PA 17601	717-299-5361
Berks County 1238 County Welfare Road, Suite 200, Leesport, PA 19533	610-372-4657
Chester County 688 Unionville Road, Suite 200, Kennett Square, PA 19348	610-925-4920
Delaware County Rose Tree Park Hunt Club, 1521 N. Providence Road, Media, PA 19063	610-892-9484

7.0 SPECIAL BOG TURTLE AREA PROCEDURES

Final consultation with the USFWS (letter dated October 31, 2016) resulted in the identification of a single HDD that would require special bog turtle inadvertent return procedures. The drill of Wetland A54 and A55 in Lancaster County are occupied bog turtle habitats and both wetlands will be drilled with a single HDD. In accordance with USFWS final determination letter, activities at this HDD site (listed in Attachment A and highlighted in yellow) includes pre-construction and during construction procedures to ensure no bog turtles are negatively impacted, and outlines a contingency plan for inadvertent returns at this special concern area.

As discussed, the primary potential environmental impact associated with HDD revolves around the use of drilling fluids. Inadvertent return of drilling fluids is a potential environmental concern in general and is of particular concern to the USFWS and SPLP in regards to potential impacts to bog turtles. Although implementation of the HDD crossing method represents one of the highest levels of avoidance of impacts (by minimizing/avoiding open trench excavation and the operation of construction equipment in the wetland), the purpose of this IR Plan is to present SPLP's plan to further minimize potential impacts to bog turtles associated with all phases of the HDD process and in particular in the event of an inadvertent return. The objectives of this section of this contingency plan are:

- Avoid impacts to the bog turtle.
- List known or potential bog turtle habitats.
- Ensure that project work areas and wetlands are clearly defined on engineer approved project plans.
- Ensure all construction contractors are appropriately trained on the identification of this species and its biology, the notification procedures, and implementation of this contingency plan.
- Ensure bog turtle wetlands/areas are marked prior to construction and that all work areas are appropriately defined (e.g., staked) according to project plans.
- Ensure bog turtle wetlands/areas are sealed off/protected from construction activities.
- Provide daily inspection of contractor activities to ensure compliance with project work plans.
- Provide daily inspection of the HDD alignment and adjacent areas for timely detection of inadvertent returns.
- Ensure all appropriate notifications are made to the USFWS, United States Army Corps of Engineers (USACE) and PADEP, and all other applicable regulatory agencies in a timely manner and that all required documentation is completed as identified in this document.

7.1 PRE-CONSTRUCTION ACTIVITIES

All construction, including professional survey personnel will be trained on implementation of this plan, the identification of this species and its biology, and the location of the areas of particular concern. All construction personnel, Environmental Inspector (EI), and on-site bog turtle Specialist (BT Specialist) will be provided with the necessary project plans, mapping, permits, authorized impacts, clearance letters, conservation plans, and this contingency plan prior to the start of construction activities.

To reduce the risk of unintentional damage to bog turtles and their habitats, a BT Specialist will inspect the surveyed (e.g. staked) entrance and exit locations and access roadways associated with the HDD prior to disturbance to ensure that they are not sited in bog turtle habitat and in accordance with project plans (A BT Specialist is defined as an individual

holding a Pennsylvania Fish and Boat Commission a Scientific Collector's Permit, and a Special Permit to survey for and handle bog turtles species pursuant to 58 PA Code 75.4). In addition, the boundary of the bog turtle habitat nearest the work areas will be temporarily marked to ensure no activities are unintentionally conducted within bog turtle wetlands and work is restricted to approved work-spaces. Under the direction of the BT Specialist, silt fence will be installed between wetlands and work areas to also prevent bog turtles from entering construction work spaces. Under the direction of the BT Specialist, some areas of herbaceous vegetation may require clearing so that inspection of the area for bog turtles can be made easier. In accordance with the USFWS determination letter, SPLP has also agreed to implement groundwater monitoring and bog turtle radio-telemetry study at the Wetland A54/A55 drill that will occur preconstruction, during, and post-construction.

7.2 CONSTRUCTION ACTIVITIES

All procedures implemented by the drilling contractor discussed previously in this contingency plan to reduce the potential for, identification, and notification of inadvertent returns will be implemented at all HDDs. At the bog turtle HDD of Wetlands A54 and A55, inspection of the work areas and compliance with the project plans will be carried out daily by the BT Specialist. In addition, when drilling commences the BT Specialist will inspect all disturbed upland areas and silt fencing multiple times for bog turtles and inadvertent returns. In addition, each wetland will be inspected once-daily for the occurrence of inadvertent returns, including the surfacing of ground water by the BT Specialist. Multiple, daily inspections for inadvertent returns within the wetlands areas were determined unnecessary and a one-time daily inspection would reduce the direct disturbance of normal behaviors if turtles are present. These inspections will continue until drilling is completed and the inadvertent return risk in the wetlands has been removed. Only if the drilling contractor suspects an inadvertent return as determined from the drilling progress and monitoring of the drilling fluids would more than one daily inspection of the wetlands for returns be performed. SPLP has also agreed to implement a vibration monitoring study at the Wetland A54/A55 drill.

7.3 BOG TURTLE OBSERVATIONS AND HANDLING

Construction personnel will be trained to report all turtle observations to the EI immediately upon siting. All bog turtle observations that are not in harm's way will be documented within project logs and reported to the USFWS/USACE/PADEP within the final report. Documentation will include dates, times, photographs, and behavior. Additional, protection measures should be considered depending on where bog turtles are observed in relation to project areas.

Bog turtles observed in harm's way shall be handled by the BT Specialist assigned to the area and only if handling is determined necessary to remove the risk of injury or death. Other project personnel are allowed to move turtles small distances, but only in cases of immediate danger. Otherwise steps to passively remove the threat and allow the turtles to continue normal behavior may be determined to be the best course of action. Bog turtles will only be moved to an area within the same wetland, only to a distance necessary to remove the threat. Additional silt fence installation may be required in the area to prevent turtles from returning to areas that presented the threat. Removal or relocation of the construction activity in that particular area will also be considered if practicable to completing the drill. Any bog turtles found within harm's way will be reported to the USFWS immediately as an incident and how it was handled.

7.4 RESPONSE TO INADVERTENT RETURNS

The HDD contractor shall immediately notify the lead Construction Inspector (CI) and Environmental Inspector (EI) of any sudden losses in returns or any inadvertent return to

the surface. If a return is observed, the HDD contractor will take reasonable measures to eliminate, reduce, or control the return. The actions to be taken will depend on the location and time of return, site specific geologic conditions, and the volume of the return. The EI or CI will notify the SPLP's Environmental Compliance Coordinator (ECC) with the initial details of the return upon discovery.

7.4.1 INADVERTENT RETURNS IN BOG TURTLE WETLANDS/STREAMS

If the return is identified within bog turtle wetlands and/or streams, drilling operations will be temporarily suspended to allow the EI and BT Specialist to appropriately quantify the return, document its location, photograph the return, assess the potential to impact to the resource(s), and report the incident to SPLP's ECC. Information about the return will be recorded and updated as necessary as a running report on the data form provided in Attachment B. SPLP's ECC is responsible for completion of the data form with the assistance of the EI, BT Specialist, and environmental compliance contractor. Each form will be updated as new information is learned about the return and as activities to restore the area occur. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return from initial discovery/notification through final restoration.

ALL inadvertent returns at the Wetland A54/A54 bog turtle HDD are to be reported to the appropriate agencies in accordance with Section 6.5 and additional notifications provided below.

Containment, clean-up, and restoration activities that would require the installation of construction matting, placement of materials in the wetland or waterway, or the entry of construction vehicles and equipment are not allowed without prior PADEP/USACE/USFWS approval. If upon reporting the incident, and under further consultation with the agencies, the return is determined to be significant enough to warrant containment, clean-up, and restoration via mechanical methods, then the following procedures will be followed:

- Draft containment and restoration plan, outlining the limits, types, and duration of disturbances, will be submitted to the PADEP/USACE/USFWS for review and approval.
- Appropriate aquatic resource encroachment permits will be applied for depending on levels and types of disturbances required to clean up the material.
- Approved activities would only be implemented under the close, full-time supervision of the assigned EI.
- Drilling operations will resume when the return is contained and successfully remediated. The return area will continue to be monitored during the daily inspection.

One exception to ceasing drilling operations would be a return of drilling fluids during the pipe pullback process. Ceasing operations would pose significant risk of causing the pulled pipe to be stuck and not able to resume.

7.4.2 CONTAINMENT & CLEAN-UP MATERIAL AND EQUIPMENT

The HDD contractor will be required to have the necessary containment and clean-up equipment on-site and/or readily available for use. At a minimum, a combination of some or all of the following material and equipment should be on site and in ample supply depending on the extent of sensitive areas:

- Spill sorbent pads and booms
- Compost filter socks

- Straw bales (certified weed-free)
- Wood stakes
- Sand bags
- Silt fence
- Plastic sheeting
- Corrugated plastic pipe
- Shovels
- Push brooms
- Centrifugal, trash and sump pumps
- Vacuum truck
- Rubber tired or wide track back hoe
- Bobcat (if needed)
- Storage tanks (if needed)
- Floating turbidity curtain (may be considered for use on large streams) Timber (enough to cross 50% of the wetland length need to be readily available)

If necessary, a 24-hour outside emergency response company may be called in for assistance (such as Enviroserve – 1-800-642-1311).

7.4.3 NOTIFICATIONS

Notifications will be carried out in accordance with Section 6.5, however all returns at the HDD of Wetland A55/A54 will also be reported to the following agencies:

<p>Pamela Shellenberger U.S. Fish & Wildlife Service Pennsylvania Field Office 110 Radnor Rd; Suite 101 State College, PA 16801 814 234-4090 x7459 Pamela_shellenberger@fws.gov</p>	<p>Brian Scofield U.S. Fish & Wildlife Service Pennsylvania Field Office 110 Radnor Rd; Suite 101 State College, PA 16801 814 234-4090 Brian_scofield@fws.gov</p>
<p>Andrew McDonald Department of Environmental Protection Waterways and Wetlands Program South-central Regional Office 909 Elmerton Avenue Harrisburg, PA 17110 Phone: 717.705.4776 anmcdonald@pa.gov</p>	<p>Kathy Gipe Pennsylvania Fish and Boat Commission c-kgipe@pa.gov</p>
<p>Cumberland County Debby Nizer U. S. Army Corps of Engineers Baltimore Dist., Regulatory Branch, PA Section P. O. Box 1715 Baltimore, MD 21203-1715 Phone: 410-962-6085 DEBBY.NIZER@usace.army.mi</p>	<p>Berks (Baltimore District), York Counties Mike Danko U. S. Army Corps of Engineers Carlisle Regulatory Field Office 401 Louthier Street, Suite 205 Carlisle, PA 17013 Phone: 717-249-8730</p>

<p>Berks (Philadelphia District), Chester (Philadelphia District), Delaware, Counties Bill Jenkins, Chief, Applications Section U. S. Army Corps of Engineers Wanamaker Building 100 Penn Square East Philadelphia, PA 19107-3390 Phone: 215-656-6726</p>	<p>Chester (Baltimore District), Lancaster, Lebanon Counties Pat Strong U. S. Army Corps of Engineers Baltimore Dist., Regulatory Branch, PA Section P. O. Box 1715 Baltimore, MD 21203-1715 Phone: 410-962-1847</p>
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8.0 OTHER SPECIAL AREA PROCEDURES

In Cambria County a northeastern bulrush population is located in the vicinity of the HDD of Wetland L62 and M59. The proposed HDD will begin on the southeast side of the access road approximately 150-ft southeast of the northeastern bulrush population, continue for approximately 1684-ft, and end approximately 1534-ft northwest of the northeastern bulrush population location. There will be no travel through or tree clearing between the exit and entry points at this HDD. An EI will ensure the contractor is well aware of that the drill is under and the drill activities are nearby a sensitive population of plants. The EI will ensure construction fencing will be installed and no access signs placed on the northwest side off the access road to avoid potential inadvertent use of the area for travel through or other unplanned activities. Access will be limited between the HDDs to foot-travel for inspection of inadvertent returns and any professional land survey that may be required. The area will be regularly inspected for compliance. Notifications in accordance with Section 5.4 will be required, which includes the USFWS. Some HDDs are designed to avoid cultural resources. Notification to the PHMC will be made if ground disturbance is require of any remedial actions that occur in these areas as a result of an inadvertent return.

9.0 FINAL SUMMARY REPORT

A final summary report will be prepared at the end of the project to document the implementation of the drilling method and the IR Plan. Number of drills, duration of drills, number of returns, return characteristics, inspection results and observations, lessons learned, and recommendations will all be discussed within this report.

APPENDIX A

HDD Table

HDD	Aquatic Resource Crossed	County	PADEP Region	Travel and Clearing LOD/Travel LOD	EV Wetland	Bog Turtle Occupied Wetland
PA-WA-0072.0000-SR	No Aquatic Resources Impacted	Washington	Southwest			
PA-WA-0074.0000-RR	S7	Washington	Southwest			
PA-WA-0102.0000-SR	No Aquatic Resources Impacted	Washington	Southwest			
PA-WA-0103.0000-RD	S250, S16	Washington	Southwest	ROW - Travel and Clearing LOD		
PA-WA-0106.0000-SR	No Aquatic Resources Impacted	Washington	Southwest	ROW - Travel LOD		
PA-WA-0111.0000-SR	No Aquatic Resources Impacted	Washington	Southwest	ROW - Travel LOD		
PA-WA-0119.0000-RD	S129, S280	Washington	Southwest			
PA-WA-0119.0003-RD	No Aquatic Resources Impacted	Washington	Southwest			
PA-WA-0127.0000-RR	S131, S130, W43	Washington	Southwest			
PA-WA-0164.0000-RD	No Aquatic Resources Impacted	Washington	Southwest	ROW - Travel LOD		
PA-WA-0171.0000-RR	S28, S27, S142	Washington	Southwest	ROW - Travel LOD		
PA-WA-0172.0000-RD	S29	Washington	Southwest			
PA-WA-0176.0000-RR	S121	Washington	Southwest			
PA-AL-0001.0000-RR	No Aquatic Resources Impacted	Allegheny	Southwest	ROW - Travel and Clearing LOD		
PA-AL-0033.0000-RD	S163	Allegheny	Southwest			
PA-WM1-0012.0000-RR	S122, S222	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0020.0000-WX	S224	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0023.0000-RD	S172	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0039.0000-RD	S181, S226	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0042.0000-WX	S182	Westmoreland	Southwest			
PA-WM1-0044.0000-RD	S184	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0054.0000-RD	S228, S227, W68	Westmoreland	Southwest			
PA-WM1-0072.0000-RD	S198	Westmoreland	Southwest	ROW - Travel and Clearing LOD		

PA-WM1-0088.0000-RR	S199	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0111.0000-RD	S202, S201	Westmoreland	Southwest			
PA-WM1-0144.0000-RD	S215, W61	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM1-0157.0000-RD	No Aquatic Resources Impacted	Westmoreland	Southwest			
PA-WM2-0021.0000-RD	S-Q5, S-Q8, S-Q7, S-Q9, Q6, Q7, Q8	Westmoreland	Southwest			
PA-WM2-0021.0000-RD-16	S-Q5, S-Q8, S-Q7, S-Q9, Q6, Q7, Q8, Q4	Westmoreland	Southwest			
PA-WM2-0064.0000-WX	Pond-O4	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM2-0064.0000-WX-16	Pond-O4	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM2-0090.0000-RD	S-P20, S-P19, P13, P14, Pond-P3	Westmoreland	Southwest	ROW - Travel LOD		
PA-WM2-0090.0000-RD-16	S-P20, Pond-P3	Westmoreland	Southwest	ROW - Travel LOD		
PA-WM2-0093.0000-RD	S-O61, O45	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-WM2-0093.0000-RD-16	S-O61, O45	Westmoreland	Southwest	ROW - Travel and Clearing LOD		
PA-IN-0000.0001-WX	S-J55, N28, J52	Indiana	Southwest			
PA-IN-0000.0001-WX-16	S-J55, S-J56, N28	Indiana	Southwest			
PA-IN-0002.0000-RR	S-J57	Indiana	Southwest	ROW - Travel LOD		
PA-IN-0002.0000-RR-16	S-J57, P1	Indiana	Southwest	ROW - Travel LOD		
PA-IN-0019.0000-RR	S-J58, J53	Indiana	Southwest			
PA-IN-0019.0000-RR-16	S-J58, J53	Indiana	Southwest			
PA-IN-0022.0000-RD	S-O113, O77	Indiana	Southwest			
PA-IN-0022.0000-RD-16	S-O113, O77, N61	Indiana	Southwest			
PA-IN-0025.0000-RD	No Aquatic Resources Impacted	Indiana	Southwest			
PA-IN-0025.0000-RD-16	No Aquatic Resources Impacted	Indiana	Southwest			
PA-IN-0048.0000-RD	N57, N56	Indiana	Southwest			
PA-IN-0048.0000-RD-16	N57, N56	Indiana	Southwest			
PA-IN-0086.0000-RD	S-N66, N34	Indiana	Southwest		EV	
PA-IN-0086.0000-RD-16	S-N65, S-N66, N34, N35	Indiana	Southwest		EV	
PA-CA-0016.0000-RD*	S-N42, S-N41, N25, N26, N27	Cambria	Southwest			

PA-CA-0016.0000-RD-16*	S-N41, N25, N26, N27	Cambria	Southwest			
PA-CA-0023.0000-RD	S-N39, S-O43, S-N36, S-O44, N20, N24	Cambria	Southwest			
PA-CA-0023.0000-RD-16	S-N39, S-O43, S-N36, S-O44, N20, N24, O35	Cambria	Southwest			
PA-CA-0047.0000-SR	S-CC8, CC16, CC19, CC17	Cambria	Southwest	ROW - Travel LOD		
PA-CA-0047.0000-SR-16	S-CC8, CC16, CC19, CC17	Cambria	Southwest	ROW - Travel LOD		
PA-CA-0069.0000-RD	S-N34, S-N17, N18	Cambria	Southwest	ROW - Travel and Clearing LOD		
PA-CA-0069.0000-RD-16	S-N34, S-N17, N18	Cambria	Southwest	ROW - Travel and Clearing LOD		
PA-CA-0089.0000-RR	S-K33, K31	Cambria	Southwest			
PA-CA-0089.0000-RR-16	S-K33, K31	Cambria	Southwest			
PA-CA-0091.0016-RD	M59, L62	Cambria	Southwest		EV	
PA-CA-0091.0016-RD-16	M59, L62	Cambria	Southwest		EV	
PA-BL-0001.0021-RD	BB120	Blair	Southcentral	ROW - Travel LOD	EV	
PA-BL-0001.0021-RD-16	BB120	Blair	Southcentral	ROW - Travel LOD	EV	
PA-BL-0001.0027-RD	S-M69, M49, M79	Blair	Southcentral		EV	
PA-BL-0001.0027-RD-16	S-M69, M49, M79	Blair	Southcentral		EV	
PA-BL-0001.0032-RD	No Aquatic Resources Impacted	Blair	Southcentral	ROW - Travel and Clearing LOD		
PA-BL-0001.0032-RD-16	No Aquatic Resources Impacted	Blair	Southcentral	ROW - Travel and Clearing LOD		
PA-BL-0001.0048-RR	S-BB48, BB58	Blair	Southcentral	ROW - Travel and Clearing LOD	EV	
PA-BL-0001.0048-RR-16	S-BB48, BB58	Blair	Southcentral	ROW - Travel and Clearing LOD	EV	
PA-BL-0001.0094-WX	S-L77, S-L76, S-BB95, S-BB92, L55, L54, L56	Blair	Southcentral		EV	
PA-BL-0001.0094-WX-16	S-L77, S-L76, S-BB95, S-BB92, L55, L54, BB125, L56	Blair	Southcentral		EV	
PA-BL-0122.0000-WX	S-M31, S-M32, S-M38, M24, M29	Blair	Southcentral	ROW - Travel and Clearing LOD	EV	
PA-BL-0122.0000-WX-16	S-M31, S-M32, S-M38, M24, M29	Blair	Southcentral	ROW - Travel and Clearing LOD	EV	
PA-BL-0126.0000-RD	S-M33, S-M30, M26	Blair	Southcentral		EV	
PA-BL-0126.0000-RD-16	S-M33, S-M30	Blair	Southcentral			

PA-HU-0019.0002-RD	S-Y7, S-Y6, S-Y5, Y7, Y6	Huntingdon	Southcentral			
PA-HU-0019.0002-RD-16	S-Y6, S-Y5, Y7, Y6	Huntingdon	Southcentral			
PA-HU-0020.0007-RD	No Aquatic Resources Impacted	Huntingdon	Southcentral			
PA-HU-0020.0007-RD-16	No Aquatic Resources Impacted	Huntingdon	Southcentral			
PA-HU-0020.0008-SS2	S-Y3, S-Y2, S-Y1, Y1, Y3, Y2, Y4	Huntingdon	Southcentral	ROW - Travel and Clearing LOD		
PA-HU-0020.0008-SS2-16	S-Y3, S-Y2, S-Y1, Y1, Y3, Y2, Y4	Huntingdon	Southcentral	ROW - Travel and Clearing LOD		
PA-HU-0020.0008-WX	LK-2	Huntingdon	Southcentral			
PA-HU-0020.0008-WX-16	LK-2	Huntingdon	Southcentral			
PA-HU-0025.0000-RD3	No Aquatic Resources Impacted	Huntingdon	Southcentral			
PA-HU-0025.0000-RD3-16	No Aquatic Resources Impacted	Huntingdon	Southcentral			
PA-HU-0047.0000-RD	S-L46, L27	Huntingdon	Southcentral			
PA-HU-0047.0000-RD-16	S-L46, S-L45, L27, Pond I4	Huntingdon	Southcentral			
PA-HU-0078.0000-WX	S-L28, S-L29	Huntingdon	Southcentral			
PA-HU-0078.0000-WX-16	S-L28, S-L29	Huntingdon	Southcentral			
PA-HU-0106.0000-RD	S-K94, K70, K69	Huntingdon	Southcentral			
PA-HU-0106.0000-RD-16	S-K94, K70, K69	Huntingdon	Southcentral			
PA-HU-0110.0000-SR	S-K93, S-K91, K68	Huntingdon	Southcentral			
PA-HU-0110.0000-SR-16	S-K93, S-K91, K68	Huntingdon	Southcentral			
PA-JU-0004.0000-WX	S-K74, K60, K59	Juniata	Southcentral			
PA-JU-0004.0000-WX-16	S-K74, K60, K59	Juniata	Southcentral			
PA-PE-0002.0000-RD	S-L6, L2, L1	Perry	Southcentral		EV	
PA-PE-0002.0000-RD-16	S-L6, L2, L1	Perry	Southcentral		EV	
PA-CU-0015.0000-RD	S-I89, J40, I63, J40	Cumberland	Southcentral			
PA-CU-0015.0000-RD-16	S-I89, J40, I63, J40	Cumberland	Southcentral			
PA-CU-0053.0000-RD	S-BB120, W177	Cumberland	Southcentral	ROW - Travel LOD		
PA-CU-0053.0000-RD-16	S-BB120, W177	Cumberland	Southcentral	ROW - Travel LOD		
PA-CU-0062.0000-WX	S-J37A, S-J36, S-J37B, S-J41, J35, J35	Cumberland	Southcentral			
PA-CU-0062.0000-WX-16	S-J37A, S-J36, S-J37B, S-J41, J35	Cumberland	Southcentral			
PA-CU-0067.0000-RD	S-J34, J31	Cumberland	Southcentral			
PA-CU-0067.0000-RD-16	S-J34, J31	Cumberland	Southcentral			
PA-CU-0125.0001-WX	S-J18	Cumberland	Southcentral			
PA-CU-0125.0001-WX-16	S-J18	Cumberland	Southcentral			
PA-CU-0128.0000-WX	S-I53, S-I54, S-K45, K44, J9, J10	Cumberland	Southcentral			

PA-CU-0128.0000-WX-16	S-I53, S-I54, S-K45, K44, I36, J9, J10	Cumberland	Southcentral			
PA-CU-0136.0000-RD	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0136.0000-RD-16	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0136.0002-WX	S-I48, I32, I31	Cumberland	Southcentral		EV	
PA-CU-0136.0002-WX-16	S-I48, S-I50, I32, I31	Cumberland	Southcentral		EV	
PA-CU-0136.0003-RD	S-I47, I30	Cumberland	Southcentral		EV	
PA-CU-0136.0003-RD-16	S-I47, I30	Cumberland	Southcentral		EV	
PA-CU-0136.0012-RD*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0136.0012-RD-16*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0136.0020-RR*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0136.0020-RR-16*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0176.0014-RD*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0176.0014-RD-16*	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0176.0019-RD	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0176.0019-RD-16	No Aquatic Resources Impacted	Cumberland	Southcentral			
PA-CU-0189.0000-RD	S-I43, S-I41, S-I40, I27, I26, I25	Cumberland	Southcentral			
PA-CU-0189.0000-RD-16	S-I43, S-I41, S-I40, I27, I26, I25	Cumberland	Southcentral			
PA-CU-0203.0000-WX	S-I36, S-I34, I24	Cumberland	Southcentral			
PA-CU-0203.0000-WX-16	S-I36, S-I34, I24	Cumberland	Southcentral			
PA-YO-0016.0000-RD*	No Aquatic Resources Impacted	York	Southcentral	ROW - Travel LOD		
PA-YO-0016.0000-RD-16*	No Aquatic Resources Impacted	York	Southcentral	ROW - Travel LOD		
PA-YO-0040.0002-RD	No Aquatic Resources Impacted	York	Southcentral	ROW - Travel and Clearing LOD		
PA-YO-0040.0002-RD-16	No Aquatic Resources Impacted	York	Southcentral	ROW - Travel and Clearing LOD		
PA-YO-0063.0000-RR	S-A22, A18, BB1	York	Southcentral	ROW - Travel and Clearing LOD		
PA-YO-0063.0000-RR-16	S-A22, A18, BB1	York	Southcentral	ROW - Travel and Clearing LOD		
PA-DA-0005.0000-RD	No Aquatic Resources Impacted	Dauphin	Southcentral			

PA-DA-0005.0000-RD-16	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0019.0000-RD	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0019.0000-RD-16	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0020.0000-RD	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0020.0000-RD-16	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0030.0000-RR	S-C54, S-B70	Dauphin	Southcentral	ROW - Travel and Clearing LOD		
PA-DA-0030.0000-RR-16	S-C54, S-B70	Dauphin	Southcentral	ROW - Travel and Clearing LOD		
PA-DA-0039.0000-RD	S-A75, CC22	Dauphin	Southcentral			
PA-DA-0039.0000-RD-16	S-A75, CC22	Dauphin	Southcentral			
PA-DA-0056.0000-RD*	S-B63, S-B62, S-B61, S-B60, C26, B58, B57	Dauphin	Southcentral			
PA-DA-0056.0000-RD-16*	S-B63, S-B62, S-B61, S-B60, C26, B58, B57	Dauphin	Southcentral			
PA-DA-0063.0000-RD*	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-DA-0063.0000-RD-16*	No Aquatic Resources Impacted	Dauphin	Southcentral			
PA-LE-0001.0000-SR	S-A47, S-K18, J47	Lebanon	Southcentral			
PA-LE-0001.0000-SR-16	S-A47, S-K18, J47	Lebanon	Southcentral			
PA-LE-0005.0000-RD	S-A49	Lebanon	Southcentral			
PA-LE-0005.0000-RD-16	S-A51, S-A49	Lebanon	Southcentral			
PA-LE-0009.0000-RD	No Aquatic Resources Impacted	Lebanon	Southcentral	ROW - Travel LOD		
PA-LE-0009.0000-RD-16	No Aquatic Resources Impacted	Lebanon	Southcentral	ROW - Travel LOD		
PA-LE-0055.0000-RD	S-A17	Lebanon	Southcentral			
PA-LE-0055.0000-RD-16	S-A17	Lebanon	Southcentral			
PA-LE-0117.0000-WX	S-C86, H13, H14	Lebanon	Southcentral			
PA-LE-0117.0000-WX-16	S-C86, H13, H14	Lebanon	Southcentral			
PA-LA-0004.0000-SR	S-K35, S-K34, K32	Lancaster	Southcentral		EV	
PA-LA-0004.0000-SR-16	S-K35, S-K34, K32	Lancaster	Southcentral		EV	
PA-LA-0014.0000-SR*	S-A82, S-A83, S-A79, S-A78, S-A77, A55, A54	Lancaster	Southcentral		EV	BT
PA-LA-0014.0000-SR-16*	S-A82, S-A83, S-A79, S-A78, S-A77, A55, A54	Lancaster	Southcentral		EV	BT
PA-BR-0032.0000-RD	No Aquatic Resources Impacted	Berks	Southcentral	ROW - Travel LOD		
PA-BR-0032.0000-RD-16	No Aquatic Resources Impacted	Berks	Southcentral	ROW - Travel LOD		
PA-BR-0075.0000-RD	No Aquatic Resources Impacted	Berks	Southcentral			

PA-BR-0075.0000-RD-16	No Aquatic Resources Impacted	Berks	Southcentral			
PA-BR-0079.0000-RD*	No Aquatic Resources Impacted	Berks	Southcentral			
PA-BR-0079.0000-RD-16*	No Aquatic Resources Impacted	Berks	Southcentral			
PA-BR-0138.0001-RD	Pond-B3	Berks	Southcentral	ROW - Travel and Clearing LOD		
PA-BR-0138.0001-RD-16	Pond-B3	Berks	Southcentral	ROW - Travel and Clearing LOD		
PA-BR-0181.0000-RD	S-J51, S-A58, S-A57, J48	Berks	Southcentral			
PA-BR-0181.0000-RD-16	S-J51, S-A58, S-A57, J48, A37	Berks	Southcentral			
PA-CH-0088.0000-RD	S-Q86, S-Q83, Q77	Chester	Southeast			
PA-CH-0088.0000-RD-16	S-Q86, S-Q83, Q77, Q76	Chester	Southeast			
PA-CH-0100.0000-RD	S-H10, H17	Chester	Southeast	ROW - Travel LOD		
PA-CH-0100.0000-RD-16	S-H11, S-H10, H17	Chester	Southeast	ROW - Travel LOD		
PA-CH-0111.0000-RD	S-C89, S-C90, S-C87, S-C92, C43	Chester	Southeast			
PA-CH-0111.0000-RD-16	S-C89, S-C90, S-C87, S-C91, S-C92, C43	Chester	Southeast			
PA-CH-0124.0000-RD	S-H3, S-C69, S-C68, S-C67, S-H4, C37	Chester	Southeast		EV	
PA-CH-0124.0000-RD-16	S-H3, S-C69, S-C68, S-C67, S-H4, C37	Chester	Southeast		EV	
PA-CH-0127.0000-RD	S-H5	Chester	Southeast			
PA-CH-0127.0000-RD-16	S-H5	Chester	Southeast			
PA-CH-0135.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0135.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0138.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0138.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0167.0000-RD	S-C63, S-C64	Chester	Southeast			
PA-CH-0167.0000-RD-16	S-C63, S-C64	Chester	Southeast			
PA-CH-0199.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0199.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0212.0000-RD*	S-C60, S-C59, S-C61	Chester	Southeast			
PA-CH-0212.0000-RD-16*	S-C60, S-C59, S-C61	Chester	Southeast			
PA-CH-0219.0000-RD	S-B81, S-B79, B71	Chester	Southeast			
PA-CH-0219.0000-RD-16	S-B81, S-B79, B71	Chester	Southeast			

PA-CH-0256.0000-RR	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0256.0000-RR-16	K21	Chester	Southeast			
PA-CH-0261.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0261.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0277.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0277.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0290.0000-RD	S-H30	Chester	Southeast			
PA-CH-0290.0000-RD-16	S-H30	Chester	Southeast			
PA-CH-0326.0000-RD*	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0326.0000-RD-16*	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0326.0004-SR	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0326.0004-SR-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0326.0006-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0326.0006-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0355.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0355.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0370.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0370.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0383.0003-SR	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0383.0003-SR-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0413.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0413.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0420.0000-RD	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0420.0000-RD-16	No Aquatic Resources Impacted	Chester	Southeast			
PA-CH-0421.0000-RD	S-B35	Chester	Southeast			
PA-CH-0421.0000-RD-16	S-B35	Chester	Southeast			
PA-DE-0008.0000-RD	No Aquatic Resources Impacted	Delaware	Southeast			
PA-DE-0008.0000-RD-16	No Aquatic Resources Impacted	Delaware	Southeast			
PA-DE-0016.0000-RD	S-B52, S-B54, B51	Delaware	Southeast		EV	

PA-DE-0016.0000-RD-16	S-B55, S-B54	Delaware	Southeast			
PA-DE-0032.0000-RD	No Aquatic Resources Impacted	Delaware	Southeast			
PA-DE-0032.0000-RD-16	No Aquatic Resources Impacted	Delaware	Southeast			
PA-DE-0046.0000-RD	S-C40, S-C42, C21	Delaware	Southeast			
PA-DE-0046.0000-RD-16	S-C40, S-C42	Delaware	Southeast			
PA-DE-0074.0000-RD	S-C23, S-C25, S-C24, S-C26, C10	Delaware	Southeast			EV
PA-DE-0074.0000-RD-16	S-C23, S-C25, S-C24, S-C26, C10	Delaware	Southeast			EV
PA-DE-0100.0000-RR	S-I2, I1	Delaware	Southeast	ROW - Travel LOD		EV
PA-DE-0100.0000-RR-16	S-I2, I1	Delaware	Southeast	ROW - Travel LOD		EV
PA-DE-0104.0008-WX	S-H37, S-H41, S-H39	Delaware	Southeast	ROW - Travel and Clearing LOD		
PA-DE-0104.0008-WX-16	S-H37, S-H41, S-H39	Delaware	Southeast	ROW - Travel and Clearing LOD		
PA-DE-0104.0023-RR	S-I18, I16, BA5, BA6	Delaware	Southeast			
PA-DE-0104.0023-RR-16	S-I18, I16, BA5, BA6	Delaware	Southeast			
PA-DE-0104.0025-RD	S-H43, S-H44	Delaware	Southeast	ROW - Travel and Clearing LOD		
PA-DE-0104.0025-RD-16	S-H43, S-H44	Delaware	Southeast	ROW - Travel and Clearing LOD		

*Indicates a private water well is within 150 ft of the HDD. Wells were identified using DCNR's PAGWIS data. See Water Supply Assessment Plan in Attachment 12B for additional actions related to water wells.

APPENDIX B

Inadvertent Return Data Form

SPLP PENNSYLVANIA PIPELINE PROJECT

HORIZONTAL DIRECTIONAL DRILLING – INADVERTENT RETURN REPORT FORM

IR TRACKING ID	
REPORT DATE:	
REPORT INITIAL/UPDATE/FINAL:	
PADEP PERMIT NO:	
USACE PERMIT NO:	
RESOURCE(S):	
LOCATION COORDINATES:	
LOCATION DESCRIPTION:	
MATERIAL(s) RELEASED:	
DESCRIPTION OF THE RELEASE:	
QUANTITY:	
AERIAL EXTENT:	
T&E / BOG TURTLE SUMMARY:	
TROUT STREAM / EV WATER:	
PADEP EMERGENCY NOTIFICATION:	
NUMBER:	
DATE:	
TIME:	
PERSON:	
CASE NO:	
NOTES:	
PADEP WATERWAYS NOTIFICATION:	
PHONE / EMAIL:	
DATE:	
TIME:	
PERSON:	
NOTES:	
USACE REGULATORY NOTIFICATION:	
PHONE / EMAIL:	
DATE:	
TIME:	

PERSON:	
NOTES:	
USFWS NOTIFICATION:	
PHONE / EMAIL:	
DATE:	
TIME:	
PERSON:	
NOTES:	
IMMEDIATE ACTION:	
CORRECTIVE MEASURES SUMMARY:	
MONITORING PLAN:	
RESTORATION PLAN:	
MAP:	See attached
PHOTOGRAPH(S):	See attached
SPLP POC:	
RESTORATION STATUS:	
ROOT CAUSE:	
IR PLAN REVISIONS:	

MAP:

PHOTOS:

APPENDIX C

Inadvertent Return Risk Assessments *(provided under separate cover)*

The table below lists the drills on ME1 projects that had returns and indicates whether or not there is an associated ME2 drill. The corresponding risk assessment reports state that there was an inadvertent return on ME1 and describes the nature of the return. The risk assessment reports speak to the inadvertent return likelihood, potential impacts and severity, and mitigation measures.

ME1 Drill #	ME1 Drill Size	ME2 Drill	ME2 Drawing	Drill Name	Township	County	Latitude	Longitude
HDD 4	8"	No			Upper Frankford	Cumberland	40.2451	-77.3619
HDD 5	8"	No			Upper Frankford	Cumberland	40.2451	-77.3497
HDD 10	8"	Yes	PA-LE-0117.0000	Creek & T307	Heidelberg	Lebanon	40.2854	-76.2394
HDD 13	8"	No			West Cocalico	Lancaster	40.2827	-76.1580
HDD 14	8"	No			West Cocalico	Lancaster	40.2838	-76.1112
HDD 22	8"	Yes	PA-CH-0088.0000	Pennsylvania Turnpike 76	Upper Uwchlan	Chester	40.0896	-75.7300
HDD 23	8"	Yes	PA-CH-0111.0000	Park Road	Upper Uwchlan	Chester	40.0751	-75.7024
HDD 23	8"	Yes	PA-CH-0124.0000		Upper Uwchlan	Chester	40.089910	-75.730608
HDD 24	8"	No			Edgmont	Delaware	39.9406	-75.4943
	12"	Yes	PA-WA-0103.0000	Linden Creek Rd	North Strabane	Washington	40.2354	-80.1373
	12"	Yes	PA-AL-0033.0000	Hayden Blvd	Elizabeth	Allegheny	40.2210	-79.8480
	12"	Yes	PA-WM1-0088.0000-RR	Northern Southern Railway	Jeanette	Westmoreland	40.3300	-79.6326
	12"	Yes	PA-WM1-0039.0000-RD	Kalamazoo Road	Sewickley	Westmoreland	40.2585	-79.6987
	12"	Yes	PA-WA-0127.0000-RR	Allegheny Valley RR	Nottingham	Washington	40.2356	-80.0907
	12"	Yes	PA-WA-0171.0000-RR	Wheeling and Lake Erie RR	Union	Washington	40.2308	-79.9966

The following is presentation of individual inadvertent return risk assessments for each area planned for HDD with either a single 20-inch pipeline (Houston to Delmont section) or both the 20-inch and 16-inch pipeline. Final HDD drawings are found within Attachment 7 of the PADEP Joint Application for Permit