ATLANTIC COAST PIPELINE, LLC
ATLANTIC COAST PIPELINE
Docket Nos. CP15-554-000
CP15-554-001

and

DOMINION TRANSMISSION, INC.
SUPPLY HEADER PROJECT
Docket No. CP15-555-000

Horizontal Drill Plan

Updated, Rev. 1

Prepared by

July 18, 2016
TABLE OF CONTENTS

1.0 INTRODUCTION.............................................................................................................. 1
2.0 PURPOSE........................................................................................................................... 1
3.0 TRAINING.......................................................................................................................... 1
4.0 OVERVIEW OF PLAN ELEMENTS .................................................................................... 2
5.0 MATERIALS AND EQUIPMENT ........................................................................................ 2
6.0 CONDITION 1: NORMAL DRILLING CONDITIONS .............................................................. 3
   6.1 Drilling..................................................................................................................... 3
   6.2 Monitoring ............................................................................................................... 4
7.0 CONDITION 2: LOSS OF CIRCULATION ........................................................................... 4
   7.1 Drilling..................................................................................................................... 4
   7.2 Focused Monitoring ................................................................................................. 5
8.0 CONDITION 3: DRILLING FLUID RETURN AND REMEDIATION .................................. 5
   8.1 Drilling Operations .................................................................................................. 5
   8.2 Focused Monitoring ................................................................................................. 7
9.0 RESTORATION.................................................................................................................. 7
10.0 GENERAL CONTINGENCY PLANS ............................................................................... 7
    10.1 New Drill Path ......................................................................................................... 7
    10.2 Abandonment ......................................................................................................... 7
    10.3 Alternative Crossings .............................................................................................. 8
11.0 SITE-SPECIFIC CONTINGENCY PLAN .......................................................................... 8

LIST OF TABLES

Table 4-1 Overview of Plan Elements .............................................................................. 2

LIST OF ATTACHMENTS

Attachment A Site-Specific Contingency Plan (to be provided in the “issued-for-construction” version of this plan)
# LIST OF ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>Atlantic Coast Pipeline</td>
</tr>
<tr>
<td>Atlantic</td>
<td>Atlantic Coast Pipeline, LLC</td>
</tr>
<tr>
<td>DTI</td>
<td>Dominion Transmission, Inc.</td>
</tr>
<tr>
<td>DES</td>
<td>Dominion Environmental Services</td>
</tr>
<tr>
<td>EI</td>
<td>Environmental Inspector</td>
</tr>
<tr>
<td>HDD</td>
<td>Horizontal directional drill</td>
</tr>
<tr>
<td>HDD Plan</td>
<td><em>Horizontal Directional Drill Drilling Fluid Monitoring, Operations, and Contingency Plan</em></td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
</tr>
<tr>
<td>SDS</td>
<td>Safety Data Sheet</td>
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<tr>
<td>SHP</td>
<td>Supply Header Project</td>
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1.0 INTRODUCTION

Atlantic Coast Pipeline, LLC (Atlantic) – a company formed by four major energy companies – Dominion Resources, Inc.; Duke Energy Corporation; Piedmont Natural Gas Co., Inc.; and AGL Resources, Inc. – proposes to construct and operate approximately 600 miles of natural gas transmission pipelines and associated aboveground facilities in West Virginia, Virginia, and North Carolina. This Project, referred to as the Atlantic Coast Pipeline (ACP), will deliver up to 1.5 million dekatherms per day of natural gas from supply areas in the Appalachian region to demand areas in Virginia and North Carolina. Atlantic has contracted with Dominion Transmission, Inc. (DTI), a subsidiary of Dominion Resources, Inc., to construct and operate the ACP on behalf of Atlantic.

In conjunction with the ACP, DTI proposes to construct and operate approximately 37.5 miles of pipeline loop and modify existing compression facilities in Pennsylvania and West Virginia. This Project, referred to as the Supply Header Project (SHP), will enable DTI to provide firm transportation service to various customers, including Atlantic.

2.0 PURPOSE

For the ACP, the horizontal directional drill (HDD) construction method is proposed for 15 waterbody crossings, two highway crossings, and the Appalachian National Scenic Trail/Blue Ridge Parkway. Other HDD crossings for the ACP could be evaluated as a result of ongoing engineering design or consultation with permitting agencies. For the SHP, the HDD method is not currently anticipated for river crossings.

This Horizontal Directional Drill Drilling Fluid Monitoring, Operations, and Contingency Plan (HDD Plan) describes the procedures to be implemented by Atlantic/DTI and their Contractors 1 for monitoring drilling operations and responding to inadvertent returns of drilling fluid to the surface. It also provides contingency plans in the event that an HDD cannot be completed during construction (e.g., due to repeated collapse of the drill hole).

Each HDD will have a customized plan that will be prepared and in place prior to commencement of HDD operations. 2 This HDD Plan serves as a template for the individual plans. Each individual plan will identify the appropriate agency contacts and reporting timelines in the event of an inadvertent return of drilling fluid to the surface and provide a list of the information which needs to be reported to the agency.

3.0 TRAINING

Prior to the start of construction, Atlantic and DTI will conduct environmental and safety training for Company and Contractor personnel. The training program will focus on the Federal Energy Regulatory Commission’s Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures; other construction,

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1 Contractor refers to the company or companies retained by Atlantic/DTI or another contractor to complete the HDD installations.
2 A draft contingency plan for the crossing of the Appalachian National Scenic Trail/Blue Ridge Parkway was filed on May 13, 2016 (FERC Accession Number 20160513-5223).
restoration, and mitigation plans, including this HDD Plan; and applicable permit conditions. In addition, Atlantic and DTI will provide large-group training sessions before each work crew commences construction with periodic follow-up training for groups of newly assigned personnel.

4.1 OVERVIEW OF PLAN ELEMENTS

The elements of the HDD Plan consist of three operational conditions as follows:

- Condition 1 – Normal Drilling Conditions;
- Condition 2 – Loss of Circulation; and
- Condition 3 – Drilling Fluid Return and Remediation

An overview of the corresponding monitoring and operational actions for each condition is provided in Table 4-1. Subsequent sections of this plan provide additional detail regarding each of the three conditions described in the table.

<table>
<thead>
<tr>
<th>Condition 1- Normal Drilling Conditions</th>
<th>Condition Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal drilling fluid circulation is maintained</td>
<td>Perform routine collection of drilling fluid at drill entry and exit points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perform routine drilling data collection</td>
<td></td>
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<tr>
<td></td>
<td>Conduct routine visual monitoring</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition 2- Loss of Circulation</th>
<th>Condition Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss or significant reduction of fluid circulation</td>
<td>Discontinue drilling; continue pumping and rotating and slowly swab the drill string, if appropriate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immediately notify an Environmental Inspector, Atlantic/DTI representative, and Dominion Environmental Services</td>
<td></td>
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<tr>
<td></td>
<td>Adjust drilling fluid and parameters in an effort to regain circulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perform focused visual monitoring</td>
<td></td>
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<tr>
<td></td>
<td>Continue drilling if no return to the surface is detected</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition 3- Drilling Fluid Return and Remediation</th>
<th>Condition Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling fluid return to the surface is confirmed</td>
<td>Notify regulatory agencies and authorities having jurisdiction</td>
<td></td>
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<tr>
<td></td>
<td>Discontinue pumping; continue rotating and slowly swab the drill string, if appropriate</td>
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</tr>
<tr>
<td></td>
<td>Monitor and document the return area</td>
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<tr>
<td></td>
<td>Contain and collect the return, if practical</td>
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<tr>
<td></td>
<td>If the return is contained and collected, resume pumping and drilling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If containment and collection is not practical, suspend HDD operations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlantic or DTI, in consultation with the appropriate regulatory agencies, will issue a notice to proceed, notice to relocate, or notice to shutdown</td>
<td></td>
</tr>
</tbody>
</table>

5.1 MATERIALS AND EQUIPMENT

Equipment and materials required to contain inadvertent returns of drilling fluid will be available at the drilling sites. Each individual involved in drilling operations will be familiar with the locations of containment equipment and the specific procedures for handling inadvertent returns of drilling fluid. The following materials and equipment will be on site in ample supply depending on the extent of sensitive resources at each crossing:

- spill sorbent pads and booms;
- straw bales (certified weed-free);
• wood stakes;
• sandbags;
• silt fence;
• plastic sheeting;
• corrugated plastic pipe;
• shovels;
• push brooms;
• centrifugal, trash, and sump pumps;
• vacuum truck;
• rubber-tired or wide-track backhoe;
• bobcat (if needed);
• storage tanks (if needed); and
• floating turbidity curtain (may be considered for use on large streams).

6.1 CONDITION 1: NORMAL DRILLING CONDITIONS

6.2 Drilling

Documentation of the composition and properties of drilling fluids will be maintained at the jobsite and will be available for review by Atlantic/DTI and its designated representatives. Documentation will include manufacturer’s literature and Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets (or MSDSs) for additives, such as thickening agents, if used (Atlantic’s/DTI’s standard practice is to not utilize additives). Prior to the use of additives, Atlantic and DTI will consult with and obtain permission from the appropriate State/Commonwealth regulatory agencies regarding the use of additives, and confirm that the additives will not violate water quality standards if inadvertently released into the water. Additives that do not comply with permit requirements and environmental regulations will not be used during drilling.

The HDD Contractor will maximize the reuse of drilling fluid surface returns by providing solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.

The Contractor at all times will provide and maintain instrumentation that will:

• locate the pilot hole;
• measure drill string axial and torsional loads;
• measure annulus pressures; and
• measure drilling fluid discharge rate and pressure.

Atlantic/DTI and its designated representatives will have access to these instruments and readings at all times. If requested, Atlantic/DTI will provide this information to agencies with regulatory jurisdiction over the crossing. A log of all recorded readings will be maintained at the jobsite and become a part of the “As-Built” information to be supplied by the Contractor to Atlantic/DTI.
6.3 Monitoring

Routine monitoring under Condition 1 will consist of visual inspection by the Contractor and/or an Environmental Inspector (EI) along the drilled alignment on land and on the waterbody bed where visible from land or by boat. These examinations will be made periodically on a time interval no less than every four hours, except during hours of darkness. Additionally, Atlantic and DTI will monitor source waters, such as seeps and springs, along or near the drill path for possible inadvertent returns on a time interval no less than every four hours, except during hours of darkness. The name of the inspector, time of the examination, and observations of the inspector will be kept in a separate log at the jobsite and be available for inspection by Atlantic/DTI and its designated representatives. Upon request, Atlantic/DTI will make the logs available to agencies with regulatory jurisdiction over the crossing. If loss of circulation and a possible return of drilling fluid to the surface are detected, Condition 2 will be implemented.

7.1 CONDITION 2: LOSS OF CIRCULATION

7.2 Drilling

The following procedures will be implemented if a loss or significant reduction of drilling fluid circulation occurs.

- The Contractor will discontinue drilling or reaming activities as soon as possible. The contractor will continue pumping and rotating and slowly swab the drill string, if appropriate. Swabbing involves withdrawing the drill string to mechanically clean the drilled hole, which reduces the chances of the drill string getting stuck in the hole.

- The Contractor will immediately notify an EI (the lead EI, if possible), an Atlantic/DTI representative, and Dominion Environmental Services (DES) that operations are continuing under Condition 2.

- The Contractor will immediately take steps to restore circulation. These steps will include, but not be limited, to the following.

  o Adjusting drilling fluid properties and parameters to encourage annular flow by weighting up or down, increasing viscosity, or adding lost circulation material to plug the seam where fluid is being lost. Flow will be maintained such that annular velocities promote returns to the drilling rig tanks.

  o Employing lost circulation materials provided such materials are approved by Atlantic or DTI and comply with permit requirements and environmental regulations.

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3 The role and responsibilities of an EI are defined in the Federal Energy Regulatory Commission’s Upland Erosion Control, Revegetation, and Maintenance Plan.
• Focused monitoring will be performed along the drill path for a drilling fluid return to the surface.

• If circulation is restored or drilling fluid is not observed on the surface, drilling will continue under Condition 2 for a period of no less than eight drilling hours. If a return is not identified and either loss or significant reduction of drilling fluid circulation does not occur during this eight-hour period, the Contractor will notify Atlantic/DTI that drilling under Condition 1 has resumed.

• If a drilling fluid return is identified through focused monitoring during the eight-hour period or after, Condition 3 will be implemented.

7.3 Focused Monitoring

Focused monitoring under Condition 2 will consist of visual observation along the drilled alignment and at source waters such as seeps and springs along and near the drill path by the Contractor and/or an EI with no other jobsite responsibilities. The EI will ensure that a sufficient number of individuals are assigned to monitoring given the size of the HDD and the number of seeps or springs along or near the drill path. Focused monitoring will occur over the minimum eight-hour Condition 2 drilling timeline, as indicated above. The time and results of drilled alignment observations will be kept in a log at the jobsite and be available for inspection by Atlantic/DTI and its designated representatives. Upon request, Atlantic/DTI will make the logs available to agencies with regulatory jurisdiction over the crossing. If a drilling fluid return to the surface is confirmed, Condition 3 will be implemented.

8.1 CONDITION 3: DRILLING FLUID RETURN AND REMEDIATION

8.2 Drilling Operations

The following procedures will be implemented if an inadvertent return of drilling fluid to the surface is confirmed.

• The Contractor will cease drilling and immediately notify an EI (lead, EI if possible), an Atlantic/DTI representative, and DES.

• In the event of an inadvertent return within a waterbody or wetland, or an upland return that results in drilling fluid entering a waterbody or wetland, the Atlantic/DTI representative will immediately notify the agencies with regulatory jurisdiction over the crossing.

• The Contractor will discontinue pumping and will rotate and slowly swab the drill string, if appropriate. Swabbing involves withdrawing the drill string to mechanically clean the drilled hole, which reduces the chances of the drill string getting stuck in the hole.

• If public health, safety, and/or the environment are threatened by an inadvertent return, drilling operations will be shut down and the drill string removed from the hole until the threat is eliminated.
• If the return occurs on land or within a wetland, it will be contained with hand placed barriers (e.g., hay bales, sand bags, silt fences, etc.) and collected for disposal or reuse. If the amount of the return exceeds that which can be contained with hand placed barriers, a small pit will be excavated at the return site to contain the spread of the fluid, and a pump will be used to transfer the fluid from the pit into a containment vessel. Drilling may resume under Condition 2 as long as the return is being contained and collected.

• If the amount of return occurring on land or within a wetland exceeds that which can be contained and collected using small sumps, drilling operations will be suspended until return volumes can be brought under control.

• If an inadvertent return occurs in a waterbody it will be more difficult to contain because the fluid will be dispersed into the water and carried downstream. In those areas that can be contained (e.g., in shallow, standing or slow moving water), the underwater return will be collected using pumps. Drilling may resume under Condition 2 as long as the return is being contained and collected.

• If the return cannot be contained using the methods described above, an attempt may be made to plug the flow path by adding thickening agents to the drilling fluid, such as additional bentonite, cottonseed hulls, or other non-hazardous materials. As noted above, Atlantic/DTI will consult with and obtain permission from the appropriate State/Commonwealth regulatory agencies regarding the use of additives and confirm that the additives will not violate water quality standards if inadvertently released into the water.

• If the amount of a drilling fluid return, either on land or within a waterbody or wetland, exceeds that which can be practically contained and collected, drilling operations will be suspended, and the Contractor will notify Atlantic/DTI that drilling cannot continue without a continuous return of drilling fluid. Atlantic/DTI, in consultation with the appropriate regulatory agencies, will issue a notice to proceed, notice to relocate, or notice to shut down until further notice.

• If impacts to fish or wildlife are observed due to exposure to drilling fluids, drilling operations will be suspended and the Contractor will notify Atlantic/DTI immediately. Atlantic/DTI, in consultation with the appropriate regulatory agencies, will issue a notice to proceed, notice to relocate, or notice to shut down until further notice.

• If an inadvertent return occurs within a source water, such as a seep or spring, Atlantic/DTI will test the water for water quality and provide an alternate supply of water to affected landowners until the inadvertent return is remediated.

• If necessary, an Emergency Response Contractor will be deployed for assistance containing and remediating large returns. Emergency Response Contractors will be identified in the individual plans prepared for each crossing.
8.3 **Focused Monitoring**

Focused monitoring under Condition 3 will consist of visual observation along the drilled alignment, at source waters such as seeps and springs along and near the drill path, and at the location of the inadvertent return. Focused monitoring will be conducted by the Contractor and/or an EI with no other jobsite responsibilities. The EI will ensure that a sufficient number of individuals are assigned to monitoring given the size of the HDD, the number of seeps or springs along or near the drill path, and the location of the inadvertent return. The time and results of focused monitoring observations will be kept in a written log at the jobsite. The log will be available for inspection by Atlantic/DTI and its designated representatives. Upon request, Atlantic/DTI will make the logs available to agencies with regulatory jurisdiction over the crossing.

9.0 **RESTORATION**

All areas affected by inadvertent returns will be restored to pre-existing condition and contours to the extent practicable. Upland areas will be restored through typical right-of-way restoration procedures, such as grading, seeding, and temporary and permanent stabilization. Restoration of wetlands and waterbodies will vary depending on the extent of disturbance during the initial response to the inadvertent return. Recommendations from the appropriate regulatory agencies (e.g., the U.S. Army Corps of Engineers) will be solicited and followed for restoration activities in regulated wetlands and waterbodies.

10.1 **GENERAL CONTINGENCY PLANS**

If the actions described above do not address the problem with the HDD, Atlantic/DTI may opt to select a new drill path, abandon the drill hole, or consider alternate crossing measures. Abandonment procedures and alternative crossing measures will be discussed with appropriate permitting and regulatory agencies, and required approvals will be obtained prior to implementing alternative crossing measures.

10.2 **New Drill Path**

Depending on the nature of the problem, Atlantic/DTI may identify a new drill path that mitigates the cause of the problem. This could result in an altered path, deeper path, or shallower path, and may retain sections of the original drilled path that are not at risk to the problem. For sections of abandoned hole, the abandonment procedures identified below will apply to the abandoned section of the hole.

10.3 **Abandonment**

In the event a drill hole is abandoned, the following procedures will be implemented:

- Heavy drilling fluid or a cement mixture will be pumped into the hole as the drill assembly is extracted to seal the abandoned drill hole.
- The drill end points within approximately 5 feet of the surface will be filled with soil and the location will be graded to the original contour.
10.4 Alternative Crossings

Before implementing alternative crossing measures, an attempt will be made to identify and assess the reason for the drill failure as this may be critical for selection of an appropriate alternate crossing. Potential alternative measures could include:

- changing the drill entry and exit points;
- changing of the profile (depth) of the drill;
- changing drill procedures (e.g., fluid viscosity/pressure/flow velocity, bit rotation/velocity, etc.);
- conducting an open cut from the banks with the pipe pulled across the trench;
- conducting an open cut from the banks and a barge with the pipe laid from the barge; or
- implementing a dry crossing method (e.g., conducting a partial stream diversion using a cofferdam).

In developing an appropriate alternate measure, consideration will be given to:

- stream bank type, flow, width, depth, velocity, and volume;
- surrounding topography;
- condition of riparian areas;
- condition and extent of wetlands, if present, on each side of the crossing; and
- aquatic biota present.

These and other factors will be considered and discussed with the appropriate regulatory agencies to minimize environmental impact and secure appropriate approvals. No in-stream work will occur until approval from the appropriate regulatory agencies is obtained. Final selection of an alternative crossing measure will be submitted to the Federal Energy Regulatory Commission with supporting data.

11.0 SITE-SPECIFIC CONTINGENCY PLAN

A site-specific contingency plan for the Appalachian National Scenic Trail and Blue Ridge Parkway is currently being developed. This plan will be provided to FERC upon completion and subsequent consultation with applicable agencies, such as the U.S. Forest Service and National Park Service. Atlantic and DTI anticipate filing a copy of this plan in December 2016. The site-specific contingency plan will be appended to the “issued-for-construction” version of this HDD Plan.
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SUPPLY HEADER PROJECT

Horizontal Directional Drill Drilling, Operations, and Contingency Plan

ATTACHMENT A
Site-Specific Contingency Plan
(to be provided in the “issued-for-construction” version of this plan)