Dominion Pipeline Monitoring Coalition: Rick Webb, 3/30/17

CLOVER CREEK: High-Hazard Pipeline Construction

Figure 1 - Clover Lick Mountain, Pocahontas County, West Virginia

Examination of the available plans for construction of the Atlantic Coast Pipeline (ACP)[1] in the Clover Creek area reveals significant deficiencies in the Draft Environmental Impact Statement (DEIS) published on 12/30/16 for the proposed project by the Federal Energy Regulatory Commission (FERC). The DEIS does not satisfy the requirements of the National Environmental Policy Act (NEPA). As indicated in the following points, the DEIS fails to address a number of substantive environmental issues, and it allows deferral of critical analysis and plan submission.

- The proposed Atlantic Coast Pipeline would cross Clover Lick Mountain (4,000 feet), descend into the upper headwater area of Clover Creek, and ascend Gibson Knob (4,400 feet) on the ridge in the foreground of Figure 1. Extensive access road construction on steep slopes will also be required in this area.
- The Clover Creek, Clover Lick Mountain, and Gibson Knob area presents extreme challenges for pipeline construction due to steep slopes, high-excavation requirements, highly erodible and slip-prone soil, and the presence of interconnected karst ground water. The same risk factors are present at many other locations along the proposed ACP route.
- Although the Draft Environmental Impact Statement (DEIS) did not provide site-specific erosion and sediment control (ESC) plans or detailed information on slope stabilization, Atlantic has

subsequently provided limited information for 0.4 miles of the proposed construction corridor at two example locations, including a 0.3-mile section of the pipeline corridor on Clover Lick Mountain. Alignment sheets, depicting ESC measures were submitted to FERC and first made available to the public on 3/24/17.[2] This information was produced well after the publication of the DEIS, thus providing insufficient time for review and informed comment during the designated comment period for the DEIS. It is not clear when or if Atlantic will provide complete ESC and slope-stabilization plans for the entire construction corridor or for access road construction.

- Atlantic has not provided stormwater management plans for pipeline corridor and access road construction in the Clover Creek area and other areas of the proposed ACP route. Atlantic has instead contended that stormwater management plans are not required because areas disturbed by pipeline-related construction will be restored to pre-development runoff condition.[3] The Forest Service responded to this claim by describing construction-related changes that will alter the runoff properties of the pipeline corridor and by asking for documentation that justifies Atlantic's intention to not prepare stormwater management plans.[4] Stormwater management, during and post-construction, is critical for prevention of long-term erosion, slope destabilization, stream channel alteration, and degradation of stream habitat. Atlantic has ignored requests for proof that stormwater management plans are not necessary, and the issue was not addressed in the DEIS.

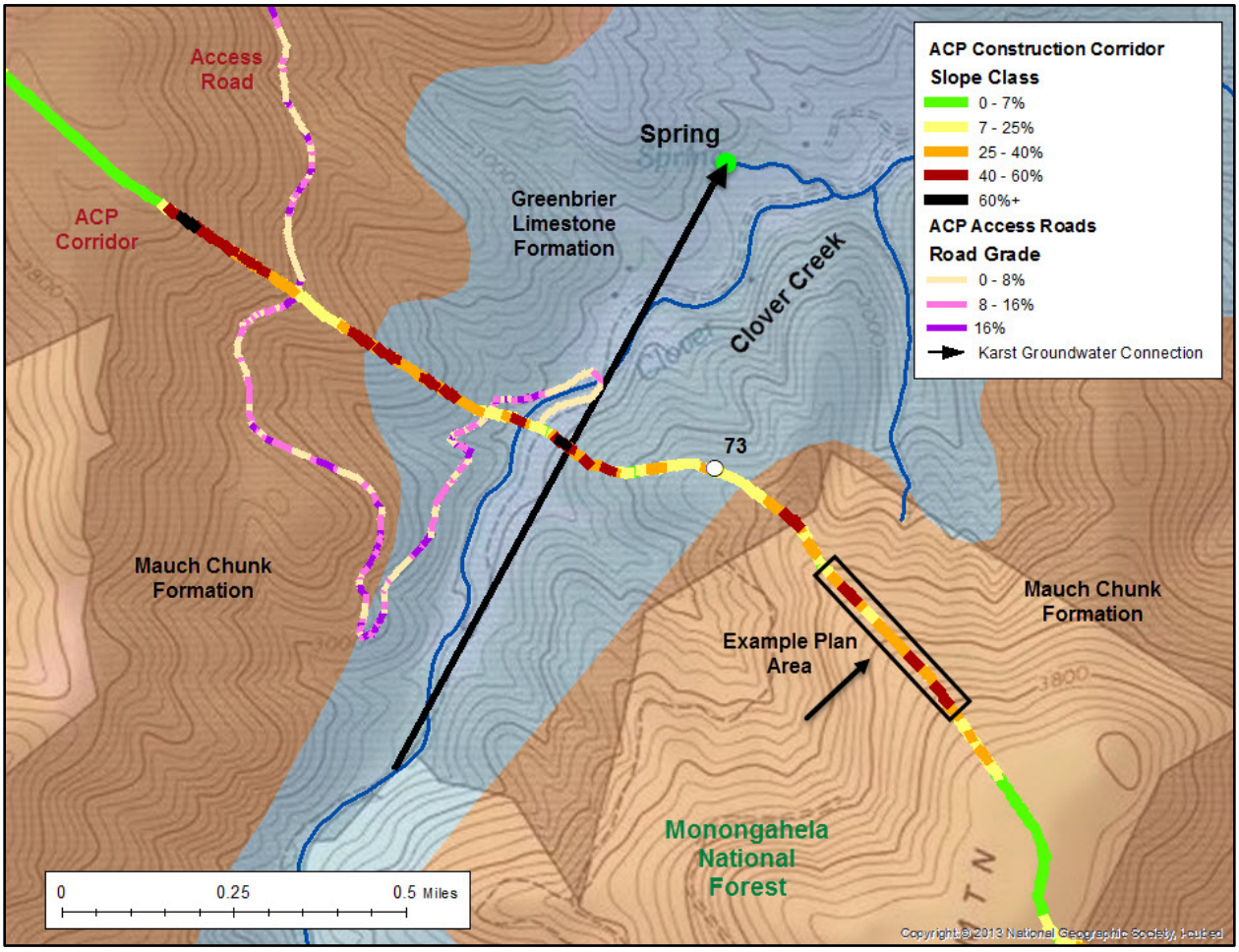

Figure 2 – Proposed pipeline construction in the Clover Creek area (steepness)

- Figure 2 shows the location of the primary 125-foot-wide pipeline construction corridor (not including additional workspace and stockpile areas), the location of new access road, the location of the 0.3-mile example plan area, and critical environmental factors.

- Construction corridor steepness is indicated in Figure 2 as percent slope, with slope classes based on requirements for spacing of cross-corridor water diversions or slope breakers, which are crucial ESC structures designed to intercept runoff and direct it off of disturbed areas before it has a chance to concentrate, run down the corridor, and cause erosion and off-site sediment transport. Virginia ESC requirements specify placement of slope breakers at 25-foot intervals for slopes of 40% or greater.[5] West Virginia ESC requirements specify placement of slope breakers at 75-foot intervals for slopes greater than 25%, but acknowledge that installation is difficult on slopes greater than 35%.[6] A substantial part of the ACP construction corridor, including in the Clover Creek area, has slopes exceeding 40% where installation of slope breakers is not practicable. Atlantic's methods for controlling runoff on such steep slopes has not been disclosed to the public. Preliminary examination of limited ESC diagrams provided on 3/24/17 for example plan areas raises further concerns about installation of slope breakers on steep slopes, given complications associated with excess spoil and proposed waivers of open-trench limits.

- Access road steepness or gradient is indicated in Figure 2 as percent steepness. The classification is based on guidance developed by the Forest Service to minimize environmental effects of oil and gas roads. This guidance calls for closely following contours to the extent possible, and it states that: *"In mountainous or dissected terrain, grades greater than 8 percent up to 16 percent may be permissible with prior approval of the surface management agency."*[7] Most of the proposed access road in the Clover Creek watershed exceeds 8%, and much of it exceeds 16%. In accordance with the cited guidance, construction of this access road would be prohibited or only allowed after study and planning by an interdisciplinary expert team.

- Figure 3 identifies high-excavation areas of the proposed pipeline and access road construction corridors. The indicated classes are based on the depth of earth material that may need to be removed to cut the original land surface down to a level construction area width of 125 feet for the pipeline corridor and 40 feet for the access road corridor. Much of the proposed pipeline and access road construction in the Clover Creek area will involve steep slopes and high levels of excavation. Specific information concerning the disposition and stabilization of excess spoil has not been provided.

- Much of the high-excavation and steep-slope construction in the Clover Creek area will involve the Mauch Chunk formation. The shales and siltstones of the Mauch Chunk form expansive-clay soils that are highly erodible, producing a suspension of clay-sized particles that are slow to settle-out from runoff and receiving waters. The Mauch Chunk also has the highest potential for slippage of any geology found on the Monongahela National Forest (MNF).[8] Large-scale excavation involving Mauch Chunk soils on steep slopes above and adjacent streams thus presents a high risk of environmental damage and violation of water quality standards. Questions were submitted to FERC during the NEPA scoping period concerning the effectiveness of available Best Management Practices (BMPs) for mitigating pipeline construction impacts in extreme geophysical conditions.[9] FERC did not address these issues and questions in the DEIS.

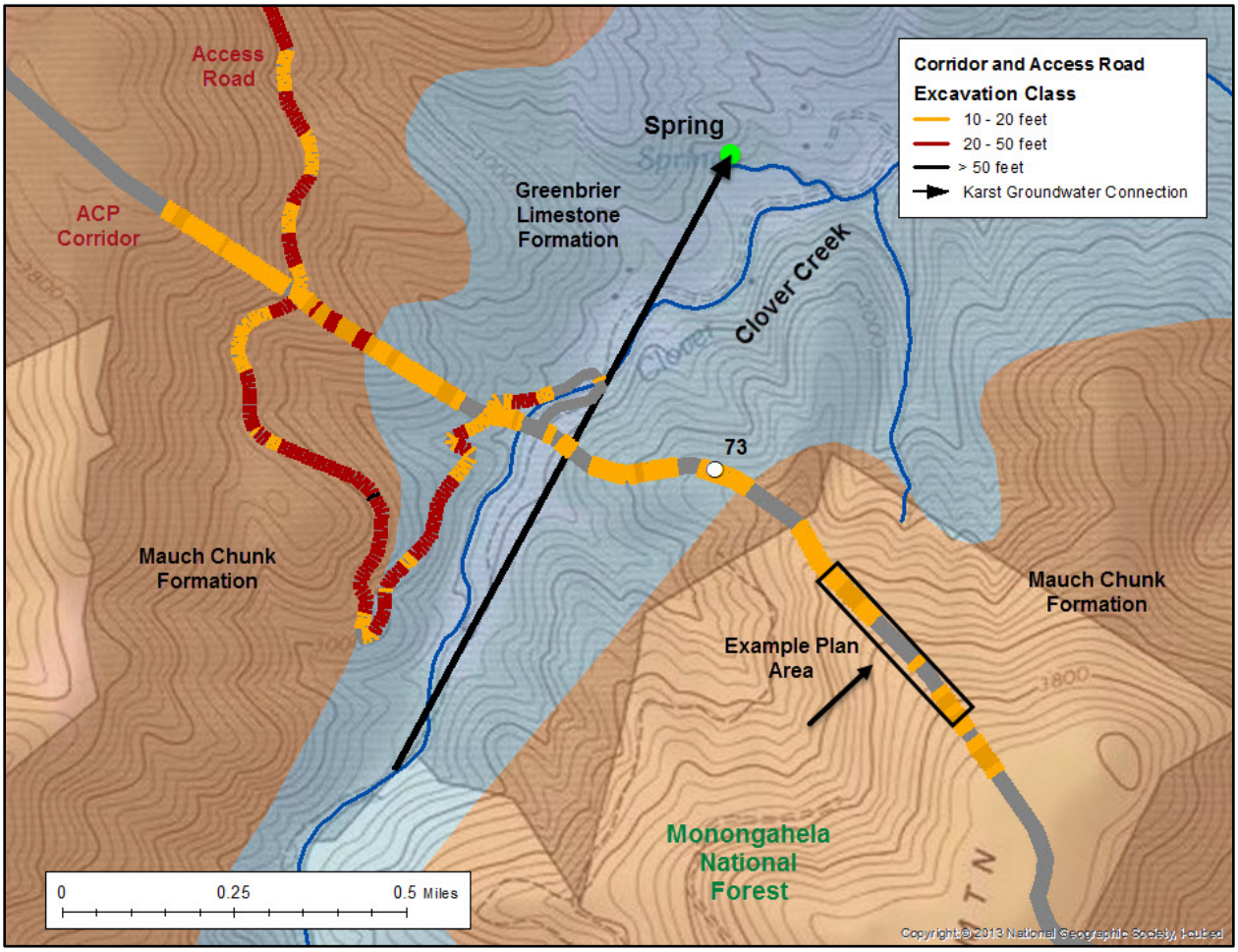

Figure 3 – Proposed pipeline construction in the Clover Creek area (excavation)

- Atlantic conducted a high-resolution Order 1 Soil Survey on the National Forests that should contribute to informed evaluation of erosion, sediment transport, and slippage potential associated with earth disturbance during construction of the pipeline corridor, access roads, and related infrastructure in the Mauch Chunk region and other areas with steep slopes and problem soils. However, there is no evidence that Atlantic has actually incorporated the Order 1 Soil Survey data in the analysis of risks or mitigation planning.[10] For much of the route, high-resolution soil surveys were not even conducted. Despite the presence of highly erodible and slip-prone soils, Atlantic has not taken the basic steps of collecting and using high-quality soils data to inform route selection and mitigation planning.

- The presence of the Greenbrier Limestone in the path and downslope of the proposed pipeline and access road corridors presents a high risk of damage to interconnected hydrologic systems. Hydrologic connections have been studied to some extent throughout the larger Mauch Chunk and Greenbrier Limestone area that includes the Clover Creek watershed. The karst groundwater connection indicated on the maps in Figures 1 and 2 is one of many karst groundwater connections that have been identified in or near the pipeline path through the use of dye tracing.[11] Although

dye-tracing methods are available for identifying karst recharge zones and interconnections, Atlantic has chosen not to use this well-established technology for identifying high-risk locations when planning the pipeline route. Comments were submitted to FERC during the NEPA scoping period that identified the need to delineate karst recharge zones and hydrologic connections.[12] Atlantic and FERC, however, failed to address the issue of risk to karst groundwater systems in the DEIS. Instead, Atlantic has simply identified surface karst features in a 300 to 500-foot corridor centered on the pipeline path.[13] Given that there is minimal discussion of the karst recharge issue in the DEIS or supplemental submissions, it seems that Atlantic's nearly exclusive focus concerns pipeline construction problems rather than risk of harm to water supplies or dependent ecosystems. Given the long-distance hydrologic connections (multiple miles) that have been identified in the Appalachian karst region, a 500-foot study area is insufficiently informative. More importantly, it does not appear that ACP pipeline or access road routing decisions have accounted for the location of wells and springs or karst features and groundwater connections.

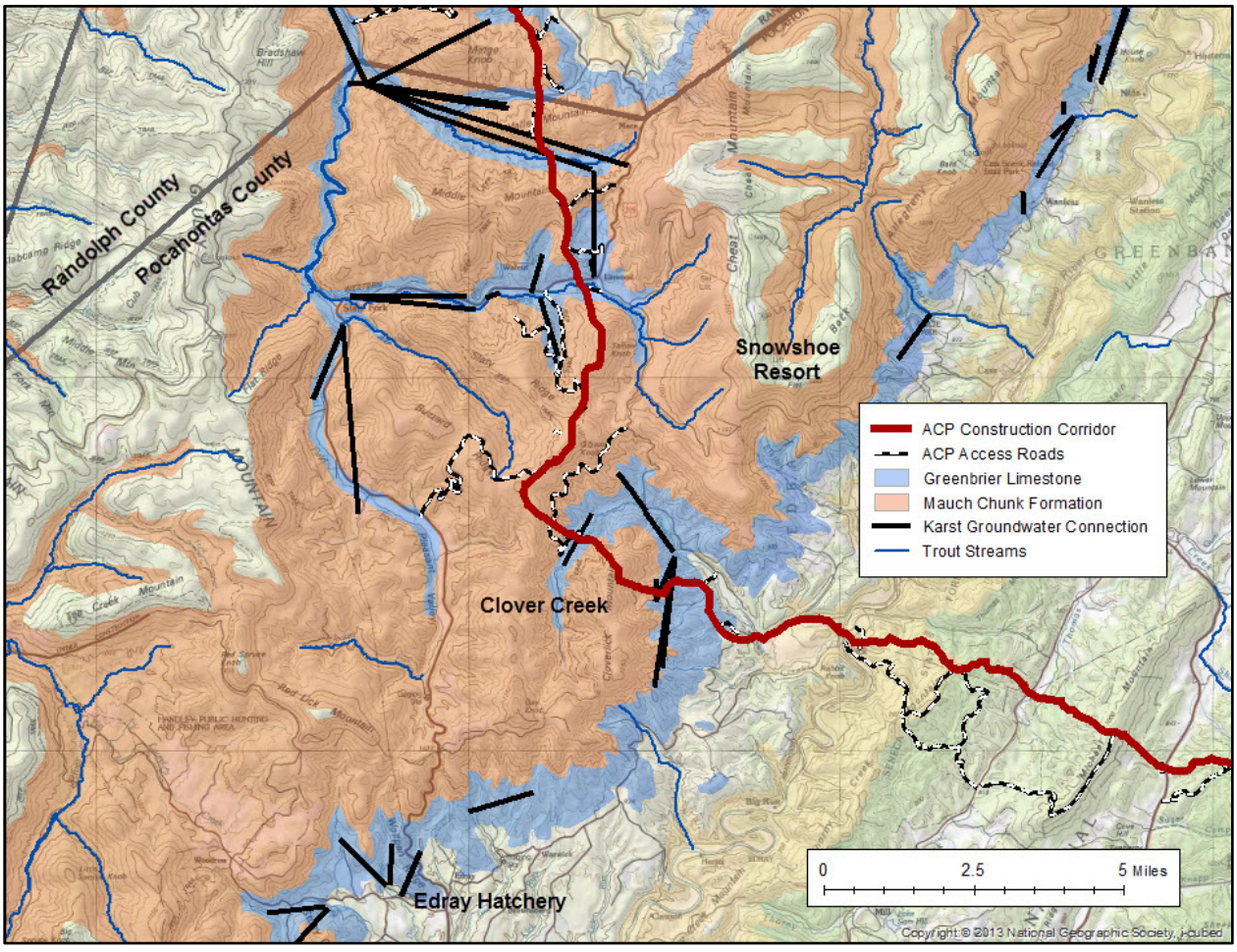

Figure 4 – ACP routing across the Mauch Chunk and Greenbrier Limestone formations

- As indicated in Figure 4, the proposed ACP crosses a large region of Mauch Chunk and Greenbrier Limestone. A number of dye traces have been conducted in this region, including many that have

shown karst groundwater connections in areas that will be crossed by the pipeline.[14] Previous experience indicates a risk of karst system contamination and reduced spring flows following large-scale earth disturbance in or adjacent to karst terrain. During construction of the Highland Scenic Highway in the late 1970s the major spring that supplies water to the Edray Trout Hatchery, was contaminated by suspended sediment, resulting in a large fish kill and reduced spring yield.[15] In this case, sediment-laden drainage from highway construction on the Mauch Chunk travelled two miles before emerging in springs associated with the Greenbrier Limestone, first by surface water in two sinking streams and then via subsurface flow passing under a topographic divide. Construction of the proposed ACP and related access roads will affect multiple locations with similar geology and hydrology in western Pocahontas County and in other karst areas in the path of the proposed pipeline. The DEIS does not address the associated risk of significant damage to water supplies and dependent aquatic ecosystems.

- The extreme topographic, geophysical, and hydrologic conditions present in the Clover Creek area occur in much of the approximately 200 miles of proposed pipeline path in the mountainous region of West Virginia and western Virginia. Within this area:
    - The pipeline corridor would cross about 73 miles of karst terrain.
    - The original pre-excavation ground slope would equal or exceed 30% for about 44 miles of pipeline construction corridor and about 69 miles of access road corridor.
    - High-excavation areas, where up to 30 feet of the original ground surface would be removed, total about 16 miles of pipeline construction corridor and about 36 miles of access road corridor.
    - Long steep slopes, where the slope equals or exceeds 30% for at least 100 feet, total about 21 miles for the pipeline construction corridor.
    - Access road gradients equal or exceed 8% for about 55 miles and equal or exceed 16% for about 25 miles.

The public has not had access to detailed and site-specific construction plans and proposed mitigation measures that address these and other environmental risk factors. Proper implementation of NEPA requires an opportunity for public review and comment. The DEIS for the ACP, however, repeatedly fails to address or provide the critical information required for meaningful review.

NOTES AND CITATIONS

[1] Atlantic Coast Pipeline, LLC, formed by four companies, Dominion, Duke Energy, Piedmont Natural Gas, and Southern Company Gas, is herein referenced as "Atlantic."

[2] Site-Specific Designs of Representative Steep Slope Crossings on U.S. Forest Service Lands, Atlantic Coast Pipeline, LLC Supplemental Filing, 3/24/17 (FERC Dockett CP15-554-000, Accession No. 20170324-5283).

[3] Construction, Operations, and Maintenance Plans, Draft, Prepared by ERM, August 2016. First submitted by Atlantic to the U.S. Forest Service and FERC, 8/22/16 (FERC Dockett CP15-554-000, Accession No. 20160824-5160).

[4] Forest Service Comments on the Construction, Operation, Maintenance Plan for the Proposed Atlantic Coast Pipeline Project. Forest Service submission to FERC, 11/10/16 (FERC Docket CP15-554-000, Accession No. 20161110-5195).

[5] Virginia Erosion and Sediment Control Handbook, Standards and Specification 3.11, 1992.

[6] West Virginia West Virginia Erosion and Sediment Control Best Management Practice Manual, Standards and Specifications 3.18, 2006.

[7] Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Bureau of Land Management and U.S. Forest Service, 2007.

[8] Forest Service Analysis of Landslide Data from a Recent Flood Event in the Monongahela National Forest. Submitted to FERC by the U.S. Forest Service, 12/23/16 (FERC Docket CP15-554-000, Accession No. 20161227-5025).

[9] Dominion Pipeline Monitoring Coalition, 6/2/16. Submitted in response to the Supplemental Notice of Intent to Prepare an Environmental Impact Statement and Proposed Land and Resource Plan Amendment(s) for the Proposed Atlantic Coast Pipeline, Request for Comments on Environmental Issues Related to New Route and Facility Modifications, and Notice of Public Meetings. Published by FERC, 5/1/16 (FERC Docket CP15-554-000, Accession No. 20160602-5208).

[10] Letter from James A. Thompson, Ph.D. Professor of Pedology and Land Use, West Virginia University, to Clyde N. Thompson, Forest Supervisor, Monongahela National Forest, 2/22/17 FERC Docket CP15-554-000, Accession No. 20170224-5030).

[11] West Virginia Water Resources Management Plan Mapping Tool, West Virginia Department of Environmental Protection, http://tagis.dep.wv.gov/WVWaterPlan/ (accessed 3/29/17).

[12] Dominion Pipeline Monitoring Coalition, 6/2/16. Submitted in response to the Supplemental Notice of Intent to Prepare an Environmental Impact Statement and Proposed Land and Resource Plan Amendment(s) for the Proposed Atlantic Coast Pipeline, Request for Comments on Environmental Issues Related to New Route and Facility Modifications, and Notice of Public Meetings. Published by FERC, 5/1/16 (FERC Docket CP15-554-000, Accession No. 20160602-5208)

[13] Supplemental Information submitted by Atlantic to FERC, 3/24/17 (FERC Docket CP15-554-000, Accession No. 20170324-5283).

[14] West Virginia Water Resources Management Plan Mapping Tool, West Virginia Department of Environmental Protection, http://tagis.dep.wv.gov/WVWaterPlan/ (accessed 3/29/17).

[15] Environmental Impact Statement, Extension of the Highland Scenic Highway West Virginia Route 150 from U.S. Route 219 to U.S. Route 250, Monongahela National Forest, 1982.