Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

April 6, 2017

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Atlantic Coast Pipeline, LLC
Docket Nos. CP15-554-000 and CP15-554-001

Dear Ms. Bose,

I am writing today to transmit the attached April 4, 2017 letter from the Virginia Cave Board to you regarding comments and recommendations on the proposed Atlantic Coast Pipeline. The information presented is that of the Virginia Cave Board, an Advisory Board of the Commonwealth of Virginia under *Code of Virginia* § 10.1-1000-1008, and not that of my agency or this administration.

The Cave Board letter includes important karst features along the proposed pipeline route and recommendations on monitoring and management of surface water and runoff in karst areas.

Sincerely,

Clyde E. Cristman
Director

Molly Joseph Ward
Secretary of Natural Resources

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Director

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Re: Atlantic Coast Pipeline, LLC
Docket Nos. CP15-554-000 and CP15-554-001

VIRGINIA CAVE BOARD COMMENTS ON THE PROPOSED ATLANTIC COAST PIPELINE DRAFT ENVIRONMENTAL IMPACT STATEMENT (ROUTE VERSION 11b)

Dear Ms. Bose,

First enacted in 1966, the Virginia Cave Protection Act was established to protect the cave and karst resources of the Commonwealth of Virginia. As part of an amendment to the Act, The Virginia Cave Board was established in 1979 and charged with advising local, state, and federal governmental entities on matters concerning caves and karst lands throughout the Commonwealth. The Virginia Cave Board has the duty to make recommendations concerning any proposed rule, regulation or administrative policy that directly affects the use and conservation of caves in the Commonwealth. Therefore, the Cave Board is writing to provide input and recommendations for protection of cave and karst resources in Virginia with respect to the proposed construction of the Atlantic Coast Pipeline (ACP).

We previously submitted documentation (Submittal 20150420-5030 submitted April 18, 2015 under docket PF15-6) outlining our concerns regarding the intersection of the originally proposed pipeline route with known significant and sensitive cave and karst conservation areas in Virginia, and provided general recommendations for construction and operation of gas pipelines in karst regions. Since that time, revision of the original proposed route has occurred to the current proposed route, re-route version 11b.

We are pleased to see that the ACP has adopted many of our earlier recommendations, and that FERC has requested several of the avoidance and mitigation actions within the “Karst Terrain Assessment Construction, Monitoring and Mitigation Plan” dated Jan. 20, 2017 (FERC Accession number 20170127-5202). This plan is comprehensive, and if implemented in full will help to ensure the protection and conservation of sensitive karst ecological environments. We note that reports on the karst features encountered along the pipeline route during reconnaissance field surveying and construction will be, or have been prepared, and we request that copies of these reports be sent to the Dept. of Conservation and Recreation Karst Heritage program office.

While we strongly endorse the “Karst Terrain Assessment Construction, Monitoring and Mitigation Plan”, we nevertheless find that the proposed pipeline route (re-route version 11b) still poses a threat of deleterious impacts on known karst areas that are present within the Commonwealth, and that certain deficiencies still exist in the draft EIS with respect to the identification and monitoring of impacts on groundwater and sensitive karst features.

Foremost among our concerns is that the newly proposed pipeline route version 11b crosses one of the most significant karst regions of the Commonwealth of Virginia, the Burnsville Cove (**Fig. 1**). This is a result of the revision of the ACP route that had been proposed in 2015. The Cave Board has not yet commented on the revised route version 11b, and is providing that commentary herein.

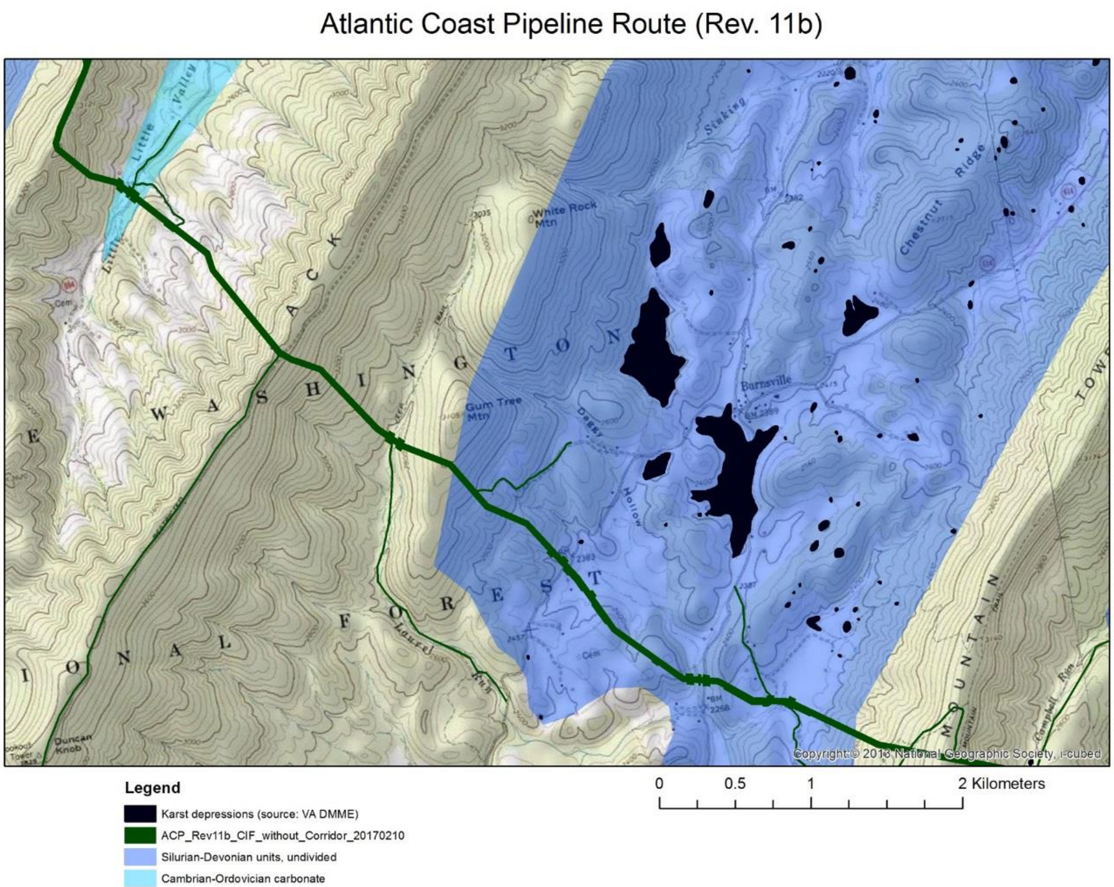

Figure 1: Proposed Dominion Atlantic Coast Pipeline route 11b and karst near the Burnsville Cove, Virginia.

The Burnsville Cove is an approximately 18 square-mile area straddling the Highland-Bath county line near the town of Burnsville, Virginia, part of which is highlighted in **Fig. 1**. The Burnsville Cove contains 97 known caves (White, 2015) which contain over 80 miles of surveyed passageways (VSS, 2016). Two of the caves have been declared National Natural Landmarks by the United States Department of the Interior, National Park Service; 14 of the caves are listed as Significant by the Virginia Speleological Survey and the Virginia Cave Board.

Caves in the Burnsville Cove contain federally endangered bats including the Indiana bat, the Northern long-eared bat, and the Virginia Big-eared bat. They also contain populations of the Tri-Colored bat and Little Brown bat. In addition, Holsinger et. al. (2013) listed no less than six invertebrate species found in the Burnsville Cove which are ranked G1 or G2. As a result, the Burnsville Cove is one of the seven most significant karst areas in Virginia. Still, many of the caves remain un-surveyed for bats and un-sampled for invertebrate fauna.

The Virginia Cave Board is concerned that the ACP construction and operation in the headwater regions of the Burnsville Cove, and along the proposed access roads may have negative environmental impacts on this significant karst area. The cove is characterized by a complex karst drainage system such that under normal flow conditions all surface water sinks into the karst bedrock, and is eventually discharged through four springs along the Bullpasture River—a stocked trout stream—at the northeast end of the cove. The recharge areas of these springs have been determined by 27 dye traces from sinking points connected to these springs by subsurface flows (Davis, 2015).

Specifically, a dye trace on March 26, 1971 from a sink point along Daggy Hollow Run demonstrated a connection to Cathedral Spring, located 7.6 km to the northeast from the sink point; the transit time of the dye was less than 15 days (Davis, 2015). This and other traces within the Burnsville Cove region illustrate the complex and intimate connection between surface runoff and groundwater in this significant karst region.

Therefore, we strongly recommend complete avoidance of areas along the proposed ACP route where surface flows within–and runoff of sediment from–the zone of pipeline construction and access roads will adversely impact high risk karst features within or inferred to receive drainage from the pipeline construction corridor and access roads. These impacts can only truly be determined through tracer tests.

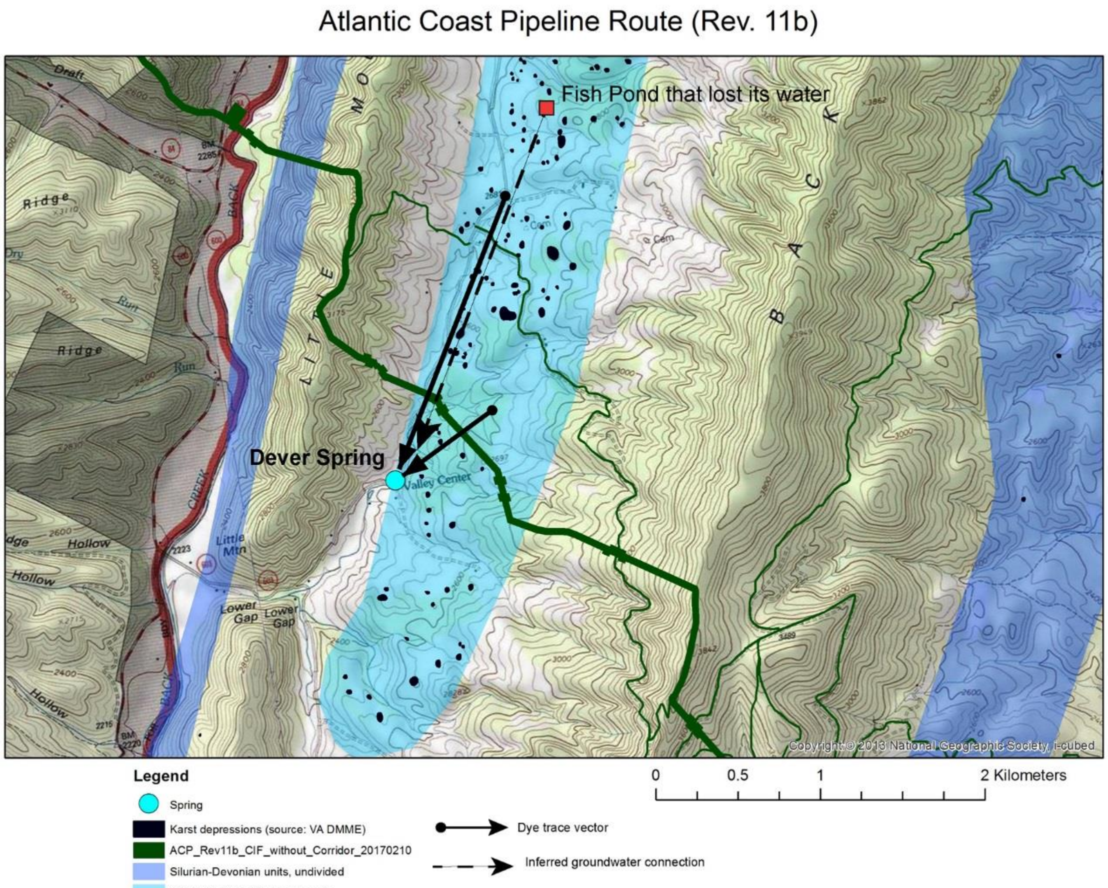

Figure 2: Map showing the ACP route 11b where it crosses Valley Center, Virginia. Note the locations of Dever Spring, and the dye trace vectors indicating subsurface flow connecting the spring and surface swallets. The Smith Fish Pond that lost water in November 2004 is also shown.

We further note that the ACP route revision 11b crosses a belt of karst at Valley Center, Virginia (**Fig. 2**), which is an area where the karst drainage is only partly understood. Specifically, in November 2004, the Smith Fish Pond (SH6119) just northeast of Valley Center lost its water and fish, and Dever Spring (located a mile and a half to the southwest), then ran muddy for a week (J. Brock, pers. comm. to R.A. Lambert, December 2004). As a result, the Virginia Department of Conservation and Recreation Natural Heritage Program (DCR-DNH) conducted multiple dye traces in the Valley Center/Mill Gap areas in an attempt to delineate the Dever Spring recharge area. The positive traces indicate flow that would cross the proposed ACP route 11b (**Fig.2**). Moreover, the karst assessment survey conducted by GeoConcepts Engineering, Inc. (FERC Accession Number 20170224-5149) indicates a greater concentration of karst depressions and caves than previously known (**Fig. 3**), many of which are directly intersected by the proposed ACP route version 11b (**Fig. 4**).

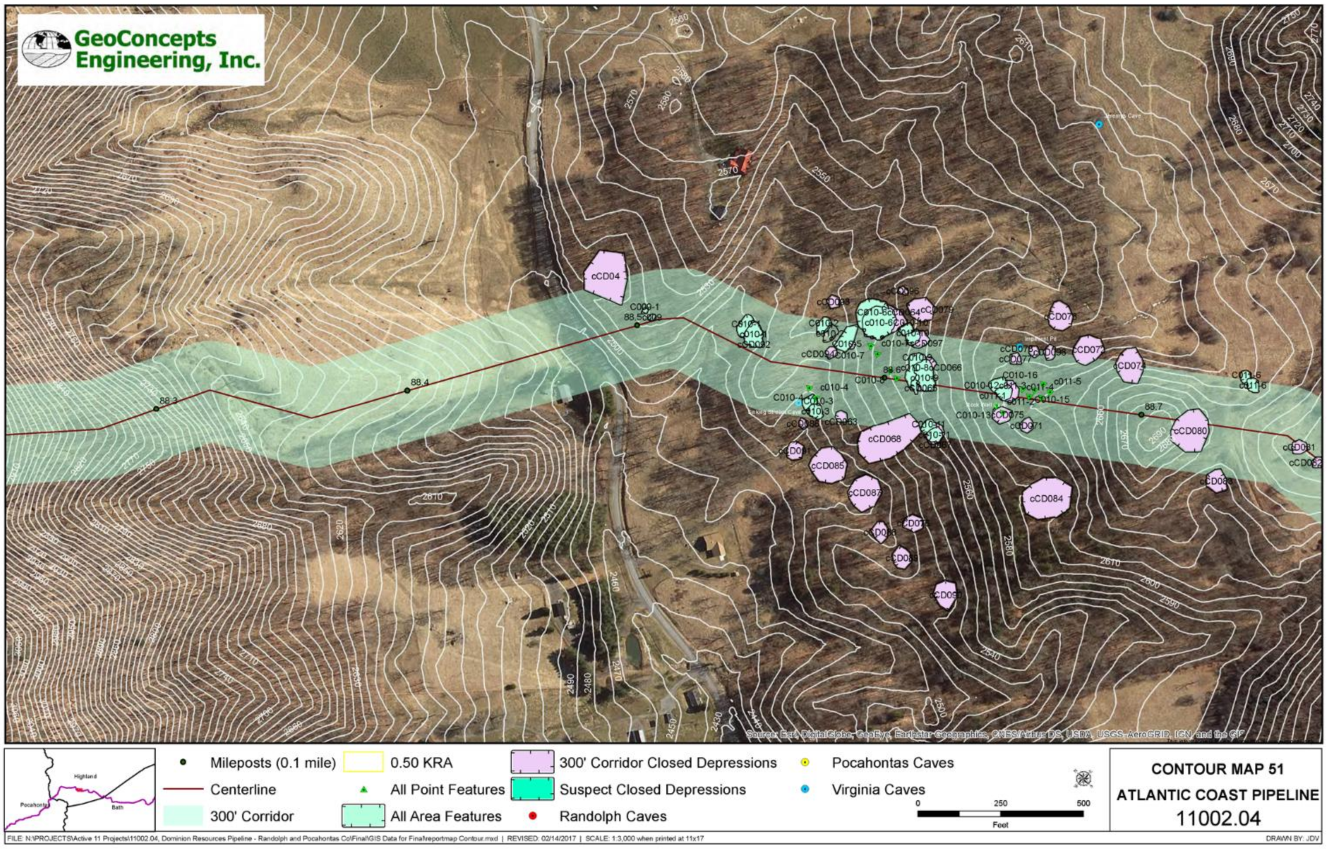

Figure 3: Map of the Valley Center area showing the proposed ACP route version 11b directly intersecting a high concentration of karst features (closed depressions, caves, etc.), within the recharge area of Dever Spring (the spring is not shown on the map—see Figure 4).

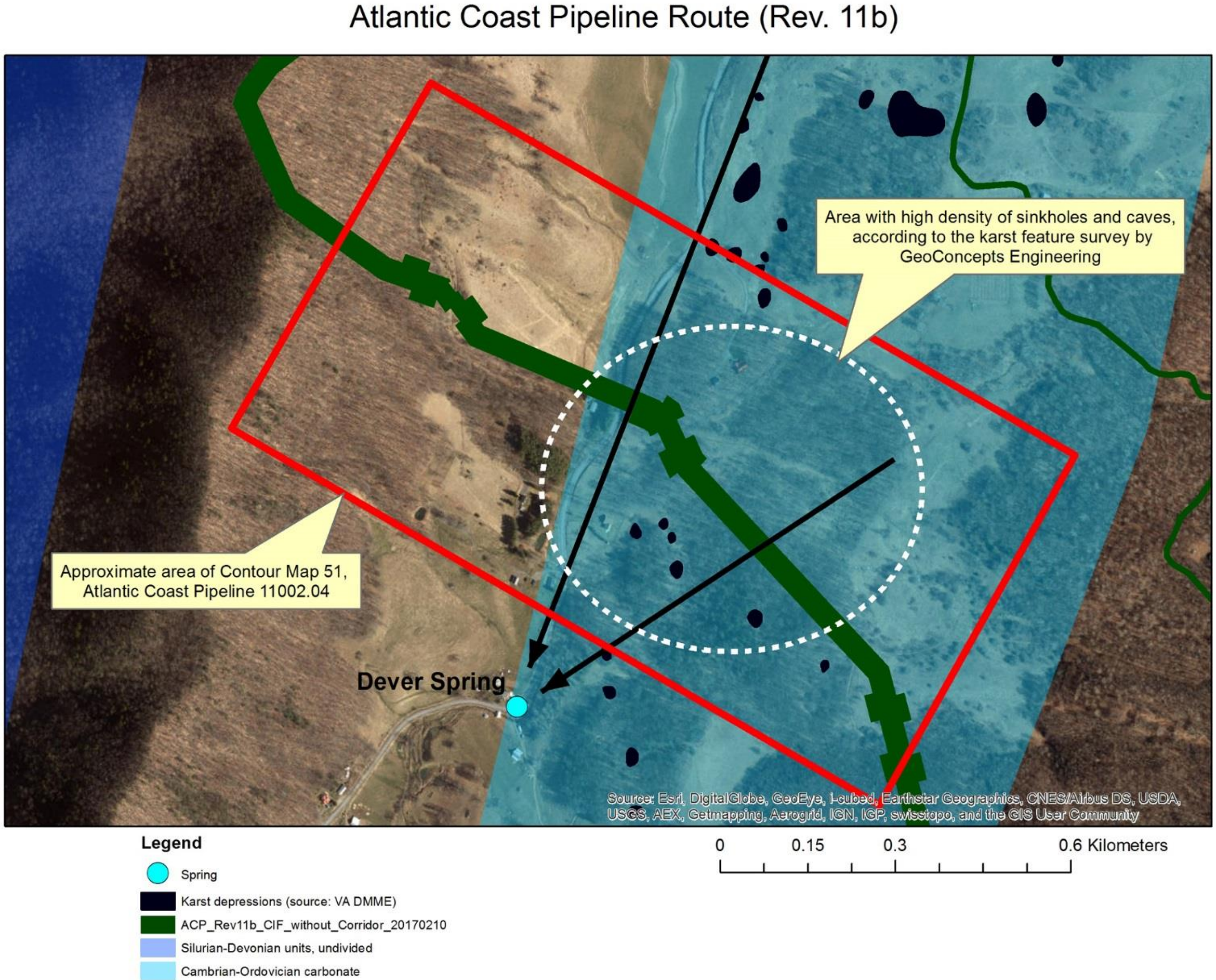

Figure 4: Map showing the dye trace vectors crossing the proposed ACP route 11b within the zone of high concentration of karst features documented by GeoConcepts Engineering, Inc. The area within the red box is the region shown on the map in Figure 3 that illustrates the high concentration of karst features located within the dashed circle.

Unfortunately, dye traces by DCR-DNH were curtailed before the resurgences of all the known sinking points within the suspected recharge area for Dever Spring were definitively determined. Nonetheless, knowing that the water from the Smith Fish Pond went south to Dever Spring, and that a later dye trace confirmed flow to south across the proposed ACP route version 11b (see **Fig. 2**), we infer that pipeline construction may adversely impact Dever Spring. Trenching a few hundred feet north of Dever Spring within a zone of high karst feature density will potentially result in underground passageways carrying water and sediment recharged from the surface karst features to the spring. Disturbance of karst features through this area should be avoided.

We strongly recommend more stringent watershed basin delineation and water quality monitoring within the within all karst areas crossed by the ACP. Such delineations and monitoring should include a detailed and comprehensive inventory of all karst features (including caves, closed depressions, sinkholes, solutionally-enhanced fracture traces, and springs) within a zone of influence of surface runoff within and extending beyond the primary (150 ft) and secondary (1/4 mile) buffers of the ACP route. Special consideration is warranted of the drainage areas across and along the corridors of the access roads and the proposed pipeline route. The zone of influence of surface runoff should be determined via a standard surface watershed delineation procedure. This would specifically be one that utilizes high-resolution (1 m or less horizontal resolution, 10 cm or less vertical resolution) topographic information obtained via LiDAR (light detection and ranging) surveys, and which would extend from areas of highest topographic relief to outlets of channelized runoff, and which especially would be considering focused perennial and ephemeral stream flows. Such watershed delineation must include a determination of karst features (swallets) that actively take surface runoff and route it into underground pathways. These features must be subject to a greater degree of investigation so as to unequivocally determine where the subsurface flow goes. This determination should be made using tracer tests that employ non-toxic dyes (dye-tracing) that can be easily detected at low concentration at monitoring points.

We wish to emphasize that such detailed hydrological assessments in karst terrains crossed by the ACP are necessary to serve three critically important purposes: 1) avoidance of (and thus protection of) sensitive cave and karst resources, and 2) prevention of costly mitigation measures to the ACP resulting from deleterious impacts, and/or 3) the ability to mount a rapid response to mitigate against any future unintentional releases of sediment or contaminants along the ACP route.

An informative and valuable example of how such knowledge of surface and subsurface flow pathways could and probably would have prevented degradation of an important karst resource occurred in July of 2016, when a fuel spill at a recent natural gas pipeline construction project in Giles County, Virginia may have contaminated the public drinking water supply of Peterstown, West Virginia (http://www.roanoke.com/business/pipeline-opponents-cite-contamination-of-drinking-water-supply-as-cautionary/article_1172b929-8960-54a6-abdc-1784023dd5b9.html). Had Columbia Gas of Virginia performed proactive hydrological studies such as those that we are recommending herein for the ACP project, there would have been prior knowledge as to where the spill potentially could would go, and such knowledge could have made it possible for Columbia Gas of Virginia to inform the water system operator immediately as to the impending presence of spilled fuel, thereby providing the water system operator with critical time to decide how best to mitigate the problem. In addition, more detailed knowledge of flow pathways would have made it possible for private well owners along the delineated groundwater basin to have been notified immediately after the spill occurrence.

In addition, we find that provisions made in the draft EIS for water quality monitoring are insufficient. The karst assessment plan prescribes a buffer of only 500 ft of the pipeline work areas for wells and water supply springs; such a buffer distance is inadequate and quite arbitrary, especially in a karst region where groundwater can travel at velocities that in some instances are measured in miles per day. As cited above, the fuel spill incident along a pipeline route may have impacted a spring used for the Peterstown, West Virginia public water supply, and that spring is located about 2000 ft (straight line distance) from the pipeline corridor. Distances of this type are not at all uncommon in karst regions, which are typically characterized by subsurface drainage divides that do not match surface drainage divides. We concur with DCR-DNH recommendation that dye tracing studies should be performed wherever both 1) the ACP crosses karst terrain AND 2) prior dye tracing information does not exist or is insufficient. We also recommend expanding the current 500’ assessment buffer for wells and water supply springs to monitor water sources for dye recovery within karst drainage basins that could potentially be impacted by a spill or sediment release in the construction work zones, regardless of distance from the work area.

We also recommend that the following specific measures be taken along the ACP route:

- Water quality monitoring in all karst areas, and this monitoring should include all springs and wells within topographically-delineated catchments crossed by the pipeline right of way that drain surface runoff to active or ephemeral channels, and to closed depressions (swallets);

- Dye-tracing should be employed to delineate boundaries of groundwater drainage basins that gain recharge from within those catchments of surface runoff as outlined above, including the drainage divide boundaries that delineate storm-flow (high water) overflow routes, which are commonly quite different than fair-weather low-flow routes;

- Water quality monitoring at springs affected by the catchments of surface runoff areas outlined above should include continuous measurements of turbidity, temperature, dissolved oxygen, and specific electrical conductance using datalogging sensors, in order to adequately assess the rapid changes that can occur in karst regions due to land disturbance.

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