

## **Pipeline Construction Over Steep Mountains Spells: “Environmental Degradation”**

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*Editor's note: The following essay is the 13th in a five-year series on water resources stewardship in the Cowpasture River Watershed, sponsored by the Cowpasture River Preservation Association and published by The Recorder. The goal of the series is to create awareness among students, citizens and officials of the critical need to protect our surface and ground water resources, and to stimulate interest in progressive stewardship.*

WILLIAMSVILLE – When my wife, Lizzie, and I built our home in Highland County 10 years ago, we realized that the pastureland we were excavating for a foundation and basement had been untouched by humankind since this part of the world was formed millions of years ago. Certainly, over this vast period of time, the landscape changed as barren rock gave way to plant life, the woodlands we see around us took form and perhaps Native Americans burned these woodlands to create grass savannas for the American Bison. But, essentially, we were digging where nature had been doing the landscaping for a very long time.

Like every farmer, rancher and forester who understands our mountainous terrain, I know the risks of reshaping the earth we live upon and work. A simple change can cause unexpected consequences and extensive secondary damage, particularly when that change affects the direction and path of water. As water creates a new path, the result, as we know from experience, is erosion. Uncontrolled runoff can take the soil, rocks, and debris in its path right into our streams and ground water aquifers. And, this kind of damage cannot easily be repaired or restored at all.

### **Why erosion is a key pipeline issue:**

The current Atlantic Coast Pipeline (ACP) GWNF-6 Alternative Route runs up, across, and down 20 Appalachian Mountains; 19 of which are higher than 3,000 feet. However, it's not just height that matters when gauging the risk of erosion, it's also gradient, or how steep the slopes are.

According to the Dominion Pipeline Monitoring Coalition (DPMC), the pipeline will traverse *severe* slopes (with 25 to 40 percent gradient) as well as *extreme* slopes (with greater than a 40 percent gradient). Another source, the USDA Natural Resources Conservation Service, calls these mountain slopes *exceptionally* steep, varying from 10 to 80 percent. This terrain, the DPMC reports, presents severe potential for soil erosion.

The oil and gas industry recognizes the risks caused by disturbing the soil on steep terrain. According to the Intermountain Oil and Gas Best Management Practices Project, "Surface occupancy is also prohibited on slopes exceeding 30 degrees to prevent excessive soil erosion, slope failure, and mass wasting, all of which would contribute increased sediment to drainages that may affect aquatic resources."



### **Columbia Gas Pipeline Construction on Peters Mountain in Giles County.**

Note that this Columbia Gas Pipeline was a 12" in diameter project while the Atlantic Coast Pipeline project will be 42" in diameter. Further that there is no evidence in this photograph of any erosion control measures along half a mile of steep gradient.

Photographic attribution is hereby given to the Dominion Pipeline Monitoring Coalition.

The Best Management Practices Project also advises that on slopes greater than 25 percent, plans should be submitted to and approved by U.S. Bureau of Land Management (BLM) for surface disturbance in these areas.

### **Assessing the potential for damage:**

To assess the threat posed by erosion in our mountainous region, the Cowpasture River Preservation Association (CRPA) ran erosion predictions using a computer program developed by the U.S. Department of Agriculture that weighs seven key

variables influencing rain-induced erosion: slope gradient, slope length, soil type, rainfall amount, vegetation condition, and truck and equipment traffic.

The computer model predicted soil loss in tons per acre per year during construction and before the to-be-developed Best of Class mitigation measures, as follows:

- 10% slope--expected erosion is 34 tons of soil per acre per year.
- 20% slope--expected erosion is 105 tons of soil per acre per year.
- 30% slope--expected erosion is 183 tons of soil per acre per year.
- 40% slope --expected erosion is 259 tons of soil per acre per year.
- 50% slope--expected erosion is 331 tons of soil per acre per year.
- 70% slope--expected erosion is 454 tons of soil per acre per year.
- 90% slope--expected erosion is 549 tons of soil per acre per year.



**Stonewall Gathering Pipeline Construction in Rugged Mountainous Terrain –  
Up One Side, Across the Top and DOWN the Other Side.**

Note that this Stonewall Gathering Pipeline in West Virginia is 36” in diameter. Now imagine that the pipeline right-of-way on either side of this steep ridge then crosses a narrow V-shaped valley. Note the next photograph which shows erosion and

stream sedimentation at a stream crossing in a flat valley. Photographic attribution is hereby given to the Dominion Pipeline Monitoring Coalition.

The findings are discouraging and do not bode well for protecting our surface waters and underground karst aquifers. As the percent of slope increases from 10 percent to 20 percent, the predicted erosion more than triples; as the slope increases from 10 to 30 percent, the predicted erosion increases more than fivefold; and as the slope increases from 10 to 40 percent, the predicted erosion approaches an almost eightfold increase. On steeper slopes the environmental threat becomes increasingly more severe, reaching as much as 549 tons of soil per acre per year.

### **Narrow V-shaped valleys breached by the pipeline:**

The GWNF-6 Alternative Route breaches 21 narrow V-shaped valleys where effective mitigation measures become highly problematical or down-right impossible. The pipeline trench (depicted in a earlier photograph) down the steep slopes of Peters Mountain, even after back-filling and compaction, will act as the gutter-of-least-resistance for water flowing down the mountain for decades to come. The construction of access roads, equipment staging areas, fuel and lubricant storage areas in narrow valleys is virtually impossible without environmental destruction primarily because there is insufficient space to properly design, construct and maintain riparian and karst buffer areas. And remember that native brook trout habitat is destroyed by sedimentation.

### **Require mitigation measures before FERC approval:**

Dominion Resources is asking permission to build its pipeline through some of the most rugged mountains in the Eastern United States, a region that includes 74 miles of terrain classified as highly erodible by water and 24 miles of terrain classified as slopes greater than 30 percent. Yet, they have dismissed and disregarded repeated requests by federal agencies and non-governmental organizations to address the impact of pipeline construction on soil erosion and the secondary effects on rivers and streams, on ground water aquifers, on wells and springs and on wildlife habitat.

What Dominion has said is that it "has assembled a team of subject matter experts to provide input and review during the design, assessment and implementation of the best-in-class measures in steep slope portions of the project." For those of us living close to the proposed pipeline and for those who value our National Forests, this statement doesn't provide much comfort.

First, there is as yet no such thing as "best-in-class" pipeline construction measures or protocols for steep terrain. The ACP in briefing the Virginia Department of Environmental Quality asserts that it will (i.e., in the future) develop best-in-class construction protocols for steep slopes.

Second, Dominion implies that these best-in-class protocols will be developed after FERC awards the “Certificate of Public Convenience and Necessity.”

Third, common sense dictates that mitigation measures for erosion in rugged mountainous terrain must be designed, tested for effectiveness and publicly reviewed or vetted in advance of FERC's award.

**Why does this all matter:**

There's no doubt that erosion in rugged mountain terrain is a significant environmental threat, and the loss of soil is just the beginning. Other environmental damage includes heavy storm water runoff, river and stream bank scouring, sedimentation in karst terrain features, sedimentation in public and private water supplies, slope failures, landslides and damage to wildlife habitats. The list goes on and on.



**Stonewall Gathering Pipeline Construction in a Flat Valley with the Stream Crossing Shown in the Lower Left-hand Corner and Heavy Stream Sedimentation Flowing Eastward Towards the Upper Right-hand Corner.**

Note that this Stonewall Gathering Pipeline a 36” in diameter project. Further that the stream crossing location and the extensive construction staging areas are in a flat valley. Observe mud everywhere. What do you think will happen in a narrow V-shaped valley with steep gradients both east and west? Photographic attribution is hereby given to the Dominion Pipeline Monitoring Coalition.

Anyone who understands this landscape knows that building a pipeline up, across and down 20 tall, steep Appalachian Mountains creates unacceptable risks that are likely to cause irreparable harm – right here where we live. Let's make sure FERC gets the message: the Cowpasture River Preservation Association and its members do not believe that Dominion's proposed pipeline meets even the minimum standards of common sense protections from the erosion of soil, debris and rock into our rivers and streams or our karst ground water aquifers.

The only force standing between our rivers and karst aquifers, and environmental disaster is an informed citizenry. Let your voices be heard loud and clear in both Washington and Richmond!!!

**Attribution:**

Thank you, Mindy Brooks, for a heavy duty editing of this article.