

**ATTACHMENT: COMMENTS ON THE FERC DEIS D0272**

**Submitted by**

**SMITH MOUNTAIN LAKE ASSOCIATION**

**Deficiency No. 1 in FERC DEIS D0272: The Mountain Valley Pipeline Impact on FERC Project 2210-169 and Smith Mountain Lake Levels**

**Executive Summary**

Near-surface groundwater flow in the soil overlying bedrock is a major source of the water flowing into Smith Mountain and Leesville Lakes in Franklin County. However, the FERC DEIS did not discuss or analyze the possibility that the MVP pipeline could disrupt this groundwater flow. Consequently, it is recommended that a hydrologist knowledgeable about near-surface groundwater flows in the Franklin and the associated counties be retained to quantitatively analyze and assess these issues before a decision about the MVP pipeline is made by FERC. The planned MVP pipeline route through Franklin County could cause an irreversible loss of water to the two lakes in several different ways, endangering both the economic viability of the FERC pumped storage project 2210-169 and the Franklin and Bedford county economic benefits from the two lakes. Based on the draft relicensing EIS for FERC project 2210-169 (FERC report DEIS-023D), the total economic loss could be as much as \$1.6 to \$7.2 million annually, and possibly even more, as well as the potential loss of an important component of the nation's energy grid. In addition, the current predictive model used by AEP to predict low lake levels may no longer work, requiring significant revisions.

**Deficiency in the Draft EIS (DEIS-D0272)**

Smith Mountain Lake (SML) and Leesville Lake in FERC Project 2210-169 (Ref. 1) are fed primarily by streamflow from the Roanoke, Blackwater and Pigg Rivers and runoff from precipitation near the lake shores. The operation of the FERC pump-back project for electricity generation during the fairly dry summer/early fall time period depends on sufficient water entering these two lakes to enable pumpback operations while simultaneously supporting required releases from Leesville Lake and evaporation from the lakes.

Approximately 33 to 67 percent (50 percent on the average) of the streamflow in these rivers is attributed to groundwater flow (Ref. 2). However, other studies have suggested that the groundwater flow is higher, around 60 percent - 70 percent in the major rivers feeding SML and Leesville Lake (Ref. 3). The majority of this groundwater flow occurs in the soil layer overlying the bedrock. Reference 2 states: "Much of the recharge in the Piedmont and the Blue Ridge

Provinces takes place in interstream areas. Almost all recharge is from precipitation that enters the aquifers through the porous regolith. Much of the recharge water moves laterally through the regolith and discharges to a nearby stream or depression shortly after a storm or precipitation event.” This near-surface groundwater flow is technically called interflow, but will be referred to in this paper as near-surface or surficial groundwater flow.

Franklin County area is primarily in the Blue Ridge Province, with the geology characterized by fairly thin soil layers (regolith) over the bedrock, ranging from 0 feet to about 150 feet in thickness, with a median thickness of 57 feet (Ref. 4). The FERC draft EIS, D-02072 (Ref. 5), recognizes that the “Regolith and fractured bedrock make up the transmissive layers of the Blue Ridge...” for water transmission, but fails to recognize the importance of these regolith flows for maintaining SML and Leesville Lake levels: The DEIS-D0272 further states: “Water quality within the surficial aquifer system is somewhat variable, but generally is suitable for municipal purposes. The surficial aquifer system is discontinuous, and as a result, has not been mapped by state agencies.”

Finally the FERC Draft EIS concludes for the Mountain Valley Pipeline that “... construction and operation of the projects would result in limited adverse environmental impacts, with the exception of impacts on forest.” without ever conducting any analysis to demonstrate that the MVP pipeline would not disrupt this critical surficial groundwater flow into SML and Leesville Lakes. The SMLA considers this lack of analysis a major deficiency in the EIS that needs to be corrected before a decision about whether the MVP pipeline can be built without disrupting FERC project 2210-169 and causing economic losses to Franklin and Bedford counties can be properly made.

### **Possible Impact of the MVP on surficial groundwater flows into SML and Leesville Lakes**

An estimate of the drainage area potentially affected by the MVP can be made using the USGS (US Geological Survey) streamflow gages closest to where the MVP cuts the rivers and streams of interest. These gages are the Lafayette gage for the Roanoke River in Montgomery County, the Rocky Mount gage for the Blackwater River in Franklin County and the Sandy Level gage for the Pigg River in Pittsylvania County. These gages represent drainage areas of 254, 115 and 351 square miles, respectively, totaling 720 square miles or 50 percent of the total SML/Leesville drainage area. Since surficial groundwater flow comprises ~ 50 percent or more of the total stream flow on the average at these USGS gage sites, a significant portion of the groundwater flow into SML and Leesville Lakes may be “upstream” of the MVP route through Franklin and Pittsylvania Counties and consequently compromised by the MVP pipeline.

Three possible ways that MVP could disrupt this groundwater flow were proposed in the filing by SMLA (Ref. 6).

1. The blasting in areas where the pipeline trench must cut into the bedrock in Franklin County may create additional fractures in the bedrock, allowing a greater fraction of the near-surface or surficial groundwater flow to enter the deeper bedrock, bypassing the

lakes. From Appendix 6B of the MVP FERC filing, locations in Franklin County where the bedrock can potentially lie within the depth of the pipeline trench occur 43 times, for a total distance of 15.9 miles, about 44 percent of the total pipeline 36 mile path through Franklin County (Ref. 7). This number is further supported by Appendix M of the FERC Draft EIS which states that 11.3 miles, or 31 percent of the Franklin County pipeline path crosses streams where the bedrock is within 7 feet of the surface. The Draft EIS does not address stream crossing conditions in Pittsylvania County, but the MVP pipeline route does cut the Pigg River in that county, suggesting the possibility of groundwater losses there as well.

While the FERC Draft EIS states blasting will only be used if ripping, rock trenching, rock sawing, hydraulic rams and jack hammers are insufficient to cut the bedrock in these areas, no discussion or analysis is provided in the EIS that addresses whether any of these methods, and particularly blasting, could increase bedrock fractures and thereby result in greater groundwater loss. Under this first possibility, there may be some loss of the surface runoff component of streamflow as well.

2. Depending on the degree of compaction in the fill material used to fill the pipeline trenches after pipeline installation, the pipeline trench may act as a partial block to groundwater flow past the pipeline. Given the shallow depth of soil in the Franklin County area, having a median depth of 57 feet with a pipeline trench that is 5.5 to 9 feet deep, this partial blockage may allow a greater fraction of the surficial groundwater “upstream” of the pipeline to enter fractures in the deeper bedrock, thereby reducing groundwater flow into the lakes. Moreover, since bedrock is within 7 feet of the surface for 31 percent of the pipeline path through Franklin County, the median depth of soil along the pipeline route is likely to be substantially less than 57 feet. In addition, a blocking effect by the pipeline could raise the water table upstream from the pipeline, resulting in a greater water loss through increased evapotranspiration.
3. There is also a significant vertical drop in the land elevation crossed by the pipeline path in Franklin County, going from about 2700 ft. where it enters the County to about 900 feet where it exits the County and to about 750 feet at the terminal point in Pittsylvania County. Depending on the degree of compaction in the fill, the pipeline trench may also act as a conduit to shift groundwater flow from the Smith Mountain Lake drainage areas to the Leesville Lake drainage areas. The MVP project does plan to install low permeability trench plugs at stream and waterbody crossings and on slopes greater than 5 percent with trench plug spacing depending on the slope (Ref. 8). However, these plugs are not necessarily watertight and are intended to prevent or slow the movement of water along the trench. In addition, the flow of surficial groundwater through the porous regolith in this region may simply see these trench plugs as partial restrictions, with the groundwater flowing around the plugs and continuing down the trench. Consequently, it is not clear the trench plugs will prevent the trench from functioning as a groundwater conduit from Franklin to Pittsylvania counties.

None of these three groundwater disruption possibilities were discussed or analyzed in the Draft EIS. Instead, the approach seemed to be taking the position that since there are no state surveys of surficial groundwater, any impacts of the MVP on surficial groundwater flow don't need to be considered as an issue. These three possibilities are also not mutually exclusive; there is no reason they could not occur together in varying degrees.

### **Potential Economic Impacts**

The FERC estimate for the beneficial economic impacts of the pumpback project 2210-169 is about \$8.6 million annually for electricity generation (\$48.4 million operating costs and \$57 million in power value), depending on the specific project alternative selected, and \$13.3 million annually for Bedford, Campbell, Franklin and Pittsylvania counties in 2005 (\$32.1 million in revenue and \$18.8 million in costs, Ref. 1).

The first two possibilities for groundwater disruption discussed above would affect both electricity generation and economic benefits of the four counties. Since groundwater loss to the lakes would be most serious during the summer/early fall season, about 1/4 of the electricity generation benefit could be lost, resulting in a net loss of \$5.6 million (assuming the power value drops to \$42.8 million while operating costs stay the same).

The economic benefit to the counties is more difficult to estimate. The benefit from recreational lake use occurs during the summer/early fall period, with Franklin and Bedford counties being the primary beneficiaries. Table 46 of Ref. 1 indicates these two counties receive 93 percent of the property tax revenues. It is assumed this 93 percent share applies to other economic benefits as well, and that seasonal residents and visitors might be most affected by chronic low lake levels in the summer/fall period. If these two groups stop coming to the lakes, their \$16 million dollar benefit (Table 47 of Ref. 1) would be reduced by \$14.9 million, turning the \$13.3 million benefit into an annual loss of \$1.6 million. A drop in property values for the permanent residents would also be likely, further increasing this loss, but it is difficult to accurately estimate how much this additional drop might be. Again it is assumed the county expenses for the four counties remain the same, at \$18.8 million. The total economic loss for either of the first two possibilities would then be \$7.2 million annually (\$1.6 million plus \$5.6 million), and possibly more depending on property value decreases.

For these first two possibilities, calculations of groundwater loss using the USGS streamflow gages nearest the pipeline also indicate that the SML adjusted level could drop as much as 12 feet on the average over a year, if the water releases from Leesville remain the same. Whether this drop in lake level could be offset by reduced releases from Leesville Lake without violating required Leesville releases is not addressed in the DEIS, nor are downstream economic costs resulting from reduced Leesville releases addressed.

The third possibility, transfer of water from SML to Leesville Lake via leakage down the pipeline trench, does not affect electricity generation. Although this transfer of groundwater from SML to Leesville does keep the SML adjusted level the same (adjusted SML level is the SML level

if all the water in Leesville above 600 ft. were pumped back to SML), it also makes the actual SML levels much more dependent on AEP regularly pumping back water from Leesville Lake to SML. Without the AEP pumpback, calculations of groundwater loss using the USGS streamflow gages nearest the pipeline indicate that the SML adjusted level could drop as much as 8 feet on the average over a year. Consequently, this third possibility would affect primarily the Franklin and Bedford County economic benefits by significantly reducing actual SML Lake levels during the prime recreation periods of summer/early fall, with a greater dependence on AEP electrical generation and pumpback schedules. Using the numbers from the earlier paragraph, this loss could be \$1.6 million, and possibly more depending on property value losses.

There may also be a strategic impact for the nation from possibilities 1 and 2 discussed above, in that the SML/Leesville pumpback project may not be available at all times during the year to generate electricity on short notice (within 10 minutes), which is identified as an important part of maintaining electrical grid stability (Ref. 1).

AEP is also required to use a predictive model to help predict low lake levels before they occur and employ various trigger warnings and reduced releases from Leesville to minimize these effects (Ref. 1). The reductions or redistributions of streamflow associated with all three possibilities means the assumptions of the current predictive model are no longer valid and a modified model will be needed. Under the first two possibilities, the current model will likely predict lower lake levels than actually occur, resulting in unnecessary trigger point warnings and reduced water releases from the Leesville dam. The economic costs to revise the predictive model and the downstream economic costs resulting from these unnecessary Leesville release reductions are also not addressed in this DEIS.

### **Recommendations**

The potential economic losses associated with groundwater loss to the SML-Leesville pumpback project for electrical generation and county benefits can be as much as \$1.6 to \$7.2 million annually, and possibly more. This potential economic loss, together with the fact that it may be impossible to remedy changes in groundwater flow once they occur, is considered a major deficiency that the FERC Draft EIS has not seriously addressed. Consequently, it is recommended that the final EIS include a detailed quantitative analysis on the impact of the MVP Project on surficial groundwater flow and its potential impact on FERC project 2210-169 and SML lake levels. Furthermore, it is also recommended that a hydrologist knowledgeable about surficial groundwater flows in the Franklin and the associated counties be retained to quantitatively analyze and assess these issues before a decision about the MVP pipeline is made by FERC.

### **References**

1. Draft Environmental Impact Statement for Hydropower Relicensing, DEIS-0230D, Smith Mountain Pumped Storage Project, FERC Project No. 2210-169, FERC Office of Energy Projects, March 2009

2. Ground Water Atlas of the United States, HA 730-L, Piedmont and Blue Ridge Aquifers, U.S. Geological Survey, H. Trapp, Jr. and M.A. Horn, 1997, available at <http://pubs.usgs.gov/ha/ha730/gwa.html>
3. Estimated Hydrological Characteristics of Shallow Aquifer Systems in the Valley and Ridge, the Blue Ridge, and the Piedmont Physiographic Provinces based on Analysis of Streamflow Recession and Baseflow, A.T. Rutledge and T.O. Mesko, USGS Professional Paper 1422- B, 1996
4. Groundwater Resources of the Blue Ridge Geologic Province, Virginia, B.A White, Virginia Department of Environmental Quality, OWS Technical Bulletin 12-01, September 2012
5. Mountain Valley Project and Equitrans Expansion Project, FERC/DEIS-D0272, FERC Office of Energy Projects, September 2016
6. Smith Mountain Lake Association (SMLA) Comments on the Mountain Valley Pipeline, document 201511130-5400 filed in the FERC eLibrary under docket CP16-10, Nov 30, 2015
7. Mountain Valley Pipeline application to FERC requesting authorization of the MVP, Appendix 6B: Blasting Plan, filed October 23, 2015, available at <https://www.mountainvalleypipeline.info/current-news>
8. Mountain Valley Pipeline application to FERC requesting authorization of the MVP, Resource Report 1 and Drawing MVP-20, filed October 23, 2015, available at <https://www.mountainvalleypipeline.info/current-news>