

Mountain Valley Pipeline Project

Docket No. CP16-10-000

Attachment DR4 General 3d



February 23, 2017

United States Environmental Protection Agency
Region III
ATTN: Jeffrey D. Lapp
Associate Director
Office of Environmental Programs
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Re: Mountain Valley Project and Equitrans Expansion Project Draft Environmental Impact Statement; Pennsylvania, West Virginia, and Virginia; September 2016 (FERC Docket Number CP16-10-000 and CP16-13-000; CEQ# 2016-0212).

Dear Mr. Lapp:

Please see the following response by Mountain Valley Pipeline, LLC (Mountain Valley) in regards to the Environmental Protection Agency's (EPA) December 20, 2016 comments on the Federal Energy Regulatory Commission (FERC) Draft Environmental Impact Statement (DEIS) for the Proposed Mountain Valley Pipeline Project (Project):

EPA Comment No. 1: Construction of the MVP and the EEP results in impacts to aquatic resources totaling 39.3 acres of wetlands and 1,021 waterbody crossings. These systems provide habitat and valuable ecological services for the region. Mountain Valley is proposing to use the wet open cut method to cross three major waterbodies. EPA recommends that the potential for on-site and downstream effects of these flow perturbations be quantified and assessed, and that the information be shared in the NEPA process. It is not clear in the study that aquatic impacts have been fully avoided to the greatest extent possible or if appropriate mitigation has been proposed.

Mountain Valley Response No. 1: Total wetland acres of disturbance are identified in revised Table 4.3.3-1 (inserted below) for the October 2016 Proposed Route for the Project and the Equitrans Expansion Project (EEP) Cline variation. The table has been revised to identify temporary and permanent acres of disturbance for both projects, which is 32.7 acres (reduced from 39.3 in the DEIS).

Impacts to these resources have been reduced to the extent possible by reducing the temporary construction right-of-way (ROW), shifting the alignment to avoid and/or minimize impacts, and spanning resources where available. Measures to minimize impacts to sensitive waterbodies are discussed in detail in Resource Report 3. The temporary impacts will be restored to preconstruction conditions and monitored for stabilization until the state and federal agencies close the permit. Permanent impacts to aquatic resources will be mitigated through either existing mitigation banks or state approved in-lieu fee programs. State and federal permit applications have been submitted to the appropriate agencies to document the permanent and temporary impacts to aquatic resources. Permit applications are currently under review. Please see the response to Comment No. 2 below regarding the proposed wet, open-cut crossing for the Elk River, Gauley River, and Greenbrier River.

TABLE 4.3.3-1 (Revised February 2017 for MVP October 2016 Proposed Route and EEP Cline Route Variation) Wetland Impacts Associated with the Mountain Valley Project and Equitrans Expansion Project		
Type/State <u>a/</u>	Temporary (acres) <u>b/</u>	Permanent (acres) <u>b/</u>
PEM Wetlands		
West Virginia	18.92	0.70
Virginia	4.31	0.10
Pennsylvania	0.25	0.66
<i>Total PEM Wetland Impacts</i>	<i>23.47</i>	<i>1.46</i>
PSS Wetlands		
West Virginia	0	0.58
Virginia	0	1.94
Pennsylvania	0	0
<i>Total PSS Wetland Impacts</i>	<i>0</i>	<i>2.52</i>
PFO Wetlands		
West Virginia	0	2.58
Virginia	0	2.01
Pennsylvania	0	0.03
<i>Total PFO Wetland Impacts</i>	<i>0</i>	<i>4.62</i>
<i>Total Wetland Impacts</i>	<i>23.47</i>	<i>9.23</i>
<u>a/</u> PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested (Cowardin et al., 1979).		
<u>b/</u> Temporary impacts include those within the permanent (operational) footprint.		

EPA Comment No. 2: Mountain Valley is not proposing any HDD [horizontal directional drill] crossings, however several stream crossings are proposed using the wet open-cut method, including the Elk River (MP 87.4); Gauley River (MP118.6); Greenbrier River 1,841 crossing length (MP 170.6). The Pigg River is also being evaluated as a wet crossing; turbidity and sediment modeling will be conducted. FERC has requested the results of the quantitative modeling assessment for the Elk, Gauley, and Greenbrier Rivers. EPA recommends that assessment of the impacts associated with the proposed wet-cut crossings and the results of quantitative modeling for turbidity and sedimentation at the major river crossings be presented in the EIS. The DEIS states that impacts would be assessed prior to construction. We suggest the rationale for the waterbody crossings be provided in the EIS and an explanation of why alternate methods are not feasible. Please clarify if dry open-cut were considered for these crossings. Also, it is recommended that the geotechnical evaluations used to assess the feasibility of HDD at waterbody crossings, and the HDD lengths from point of intersection to point of intersection of the locations selected for the HDD geotechnical evaluation, be provided in the EIS. HDD is generally recognized as more protective of resources.

Mountain Valley Response No. 2: Mountain Valley had originally explored the option of crossing the Elk River, Gauley River, and Greenbrier River using a wet, open-cut crossing. Mountain Valley has determined that a dry-ditch technique is a more viable option, which will reduce the potential for downstream sedimentation and turbidity by creating a dry working site. Mountain Valley intends to use a Portadam structure (or equivalent structured system) that creates a dry-ditch work site for these stream crossings. The Portadam is an engineered, segmental or linked system that creates a dry workable area while minimizing instream and downstream impacts. Mountain Valley had originally explored the option of crossing the Elk River, Gauley River, and Greenbrier River using a wet, open-cut crossing. Mountain Valley has determined that a dry-ditch technique is a more viable option. Because the dry-ditch crossing technique significantly reduces the amount of sedimentation and turbidity, a quantitative analysis is not necessary. See Mountain Valley's February 9, 2017 response to FERC's data request (Fisheries, Question 1).

EPA Comment No. 3: EPA recommends that the potential for on-site and downstream effects of these flow perturbations be quantified and assessed, and that the information be shared in the NEPA process. It is not clear in the study that aquatic impacts have been fully avoided to the greatest extent possible or if appropriate mitigation has been proposed.

Mountain Valley Response No. 3: The proposed dry-ditch crossing technique significantly reduces the amount of sedimentation and turbidity. Therefore, a quantitative turbidity and sedimentation analysis is no longer needed.

EPA Comment No. 4: Other potential impacts of the proposed pipeline construction are associated with geological and hydrogeologic hazards, which have not been fully assessed in the DEIS. EPA recommends that FERC evaluate potential construction impacts relative to landslides, karst landscape, subsidence, flash flooding and potential blasting impacts to water wells, springs, and wetlands.

Mountain Valley Response No. 4: Mountain Valley acknowledges EPA Comment No. 4 and has addressed the elements of the comment in Resource Reports, responses to various agency comments, and responses multiple Data Requests from the FERC.

EPA Comment No. 5: Section 3.6.1.1 discusses the use of electricity to power the compressors at the MVP's Bradshaw, Harris, and Stallworth Compressor Stations as an alternative to the proposed natural gas-fired reciprocating engines and natural gas-fired turbines. The DEIS concluded that the use of electric-driven compressors at Mountain Valley's proposed compressor stations does not offer a significant environmental advantage when compared to the use of natural gas-fired compressors. EPA is concerned that the analysis presented is inconclusive.

Mountain Valley Response No. 5: The proposed compressor stations will include centrifugal turbines powered by natural gas, with the natural gas obtained directly from the pipeline. In some instances, natural gas compressor stations are powered by electric-motor-driven compressors. The use of electric motor driven compressors for the Project is not feasible because the electric power required for each site is not available, as described below.

- The Bradshaw Compressor Station would require approximately 70 MW if it were an electric-motor-drive facility. This amount of electricity exceeds the amount available on the 138-kV transmission system in the vicinity of the station. Obtaining the required quantity of electric power would be expensive, and the time required for the power system studies, engineering, and construction of a transmission line extension would exceed four years, which exceeds the timeline of the Project construction and commissioning.
- The Harris Compressor Station would require approximately 35 MW if it were an electric-motor-drive facility, and there is not sufficient power on the 138-kV transmission system available within several miles of the site. Obtaining the required quantity of electric power would be expensive, and the time required for the power system studies, engineering, and construction of a transmission line extension would exceed four years, which exceeds the timeline of the Project construction and commissioning.
- The Stallworth Compressor Station would require approximately 35 MW if it were an electric-motor-drive facility. The station is located more than five miles from the closest 138-kV transmission system. The time required for the power system studies, engineering, and construction of a transmission line extension would exceed four years, which exceeds the timeline of the Project construction and commissioning.

For these reasons the use of electric-motor-driven compression is not a reasonable or reliable alternative for the three proposed compressor stations. Furthermore, additional land disturbance would be required to run the necessary transmission line to the plant and would increase the footprint of the Project beyond what has been proposed.

The above paragraphs are taken directly from Resource Report 10 at 10.7.2.1.

With respect to the emissions impact, a comparison between emissions based on grid power for the location of the proposed Project and natural-gas combustion are included in Table 1 below. Emissions from grid power were based on Emissions & Generation Resource Integrated Database (eGRID) 2014 data (created 1/23/17) from the eGRID subregion that contains the proposed Project. Emissions include greenhouse gas emissions as well as NO_x and SO₂. With respect to the compressor stations in question, the three sites are located in West Virginia, where the primary source of fuel for electricity generation is coal (approximately 95% based on 2014 EIA data), which is a high-emission-intensity fuel.

Table 1. Emissions Summary

Pollutant	RFC West¹ lb/Mwh	MVP Compressor Stations^{2,3} lb/Mwh
CO ₂	1497.057	1140.40
CH ₄	0.161	0.021
N ₂ O	0.024	0.002
NO _x	1.345	0.59
SO ₂	3.142	0.04

1 egrid_summarytables.xls, downloaded from <https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid> on 2/3/17.

2 Greenhouse gas emissions from 40 CFR Subpart C

3 NO_x and SO₂ are average of the three stations comprising the MVP Project.

EPA Comment No. 6: Construction of the MVP would disturb about 4,189 acres of soils that are classified as having the potential for severe water erosion. Construction of the EEP would affect about 126 acres of soils rated as being prone to erosion by water.

Mountain Valley Response No. 6: Mountain Valley revised Table 4.2.2-1 the Proposed Route. Construction of the Project would disturb 4,170 acres of soils that are classified as having the potential for severe water erosion. Table 4.2.1-2 was updated for the EEP Cline Variation, and EEP would disturb 127.5 acres of soils that are classified as having the potential for severe water erosion.

Impacts to these soils and all others will be reduced by incorporating the protective measures identified in the state-specific erosion and sediment control plans.

Mountain Valley has addressed slope stability for the project via the Landslide Mitigation Plan, which Mountain Valley filed in the FERC docket on October 13, 2016 and was updated in February 2017. The Landslide Mitigation Plan presents typical details to be employed during construction to minimize the risk of earth movement and specifies the use of these mitigation measures at predetermined locations along the pipeline. The mitigation measures are generally consistent with those recommended in the Interstate Natural Gas Association of America's (INGAA's) Mitigation of Land Movement in Steep and Rugged Terrain for

Pipeline Projects published in May 2016,¹ which presents best management practices (BMPs) for landslide mitigation in the Appalachian region.

During construction, inspectors will be deployed to identify additional areas, not already specifically addressed in the Landslide Mitigation Plan, where the landslide mitigation typical details should be implemented. The inspectors, in conjunction with Mountain Valley engineers, will develop additional mitigation measures to address slope stability as necessary based on subsurface conditions revealed during construction.

EEP is developing a slip mitigation report that identifies slip-prone areas prior to construction and provides recommendations to mitigate the risk of slip. Equitrans will also employ an inspector or use internal staff to address slope stability during and following construction.

EPA Comment No. 7: We recommend that the EIS describe the nature, extent, frequency of potential blasting impacts to water wells, springs, wetlands, resources of special concern, nearby aboveground facilities, and adjacent pipelines and utility lines. It was difficult to fully evaluate the potential effects of blasting as the EIS did not include the blasting plan that is referenced throughout the document. Changes to geology resulting from blasting may directly and indirectly affect hydrology, wildlife and local residents, which we recommend considering within the scope of the EIS.

Mountain Valley Response No. 7: The Mountain Valley Pipeline General Blasting Plan outlines the procedures and safety measures that the contractor will adhere to while implementing blasting activities during the construction of the pipeline. The Mountain Valley Pipeline General Blasting Plan was submitted as Attachment DR4 Geology-13 in Mountain Valley's February 9, 2017 response to FERC's Post-Draft Environmental Impact Statement Environmental Information Request Issued January 27, 2017.

Blasting would only be used in situations where conventional excavation techniques are ineffective. If blasting is conducted, it will be used in a controlled manner with the intent of creating minimal disturbance in bedrock only to the extent necessary to promote mechanical ripping of the fractured rock. Before any blasting will occur, the contractor will submit a site-specific blasting plan to Mountain Valley for approval. A thorough review of the site setting and environmental resources will occur and protective measures will be implemented, if necessary.

EPA Comment No. 8: Blasting, in combination with steep slopes, karst topography, and active or abandoned mines and quarries, has the potential to result in adverse impacts that were not considered or fully evaluated in the EIS. At this time, it is unclear if the data presented is complete or surveys are completed or ongoing. We recommend clarifying this information in the EIS. We also recommend evaluating the potential effects of these geologic hazards, including mining-related subsidence, landslides and flash flooding, on pipeline construction and operation. We recommend that impacts, especially in high risk areas, be evaluated specific to this project.

Mountain Valley Response No. 8: Mountain Valley personnel have considerable experience in the construction of natural gas pipelines. Given that the nature of this construction project requires excavation of a trench approximately 10 feet deep, the excavation will mostly encounter unconsolidated overburden or shallow highly weathered and rippable bedrock. Blasting for grade or trench excavation will be considered only after all reasonable means of excavation have been evaluated and determined to be unlikely to achieve the required results. If and where blasting is required, see Mountain Valley's response to EPA Comment No. 7, above. Mountain Valley has addressed the potential for landslides on steep slopes, has identified and avoided sensitive karst features, and has also prescribed inspection and mitigation processes for potential

¹ Available at <http://www.ingaa.org/Foundation/Foundation-Reports/28623.aspx>.

landslides and in karst terrain during all phases of construction, which also account for areas where blasting may occur. Mountain Valley will take all necessary and appropriate actions to safeguard the environment and human health as pertains to landslides and karst terrain. EPA's concerns are not generally commensurate with the scale of this narrow, shallow, linear construction project.

EPA Comment No. 9: We recommend that the EIS describe the nature, extent, frequency of potential blasting impacts to water wells, springs, wetlands, resources of special concern, nearby aboveground facilities, and adjacent pipelines and utility lines. It was difficult to fully evaluate the potential effects of blasting as the EIS did not include the blasting plan that is referenced throughout the document.

Mountain Valley Response No. 9: Blasting for grade or trench excavation will be considered only after all reasonable means of excavation have been evaluated and determined to be unlikely to achieve the required results. Refer to Mountain Valley's responses to EPA Comments No. 7 and No. 8, above. Mountain Valley has addressed well and spring water supply testing in Resource Report Number 2 (Water Supply Identification and Testing Plan). If blasting is required in the near vicinity of other resources, aboveground facilities, or adjacent subsurface utilities, these circumstances will be accounted for in a site-specific blasting approach by a qualified contractor. In the unlikely event that something is affected by blasting, Mountain Valley is committed to working with that owner to address concerns.

EPA Comment No. 10: The proposed pipeline route crosses about 119 miles exhibiting shallow depth to bedrock. We recommend explaining how methods needed in shallow bedrock areas (such as blasting) may impact soil moisture capacity, revegetation potential, or prime farmland soil conditions. Alteration of shallow bedrock may modify hydrologic pathways and storage potential of aquifers. These impacts may not be consistent over the entire length of the pipeline and may need to be evaluated on a case-by-case basis where groundwater resources are used for farming practices or drinking water-supply.

Mountain Valley Response No. 10: Mountain Valley will restore the limit of disturbance to pre-construction conditions. Topsoil will be salvaged and replaced in the limit of disturbance. Mountain Valley considers the narrow, shallow pipeline construction project and ensuing reclamation to present negligible risks for changing soil moisture capacity, revegetation potential, or prime farmland soil conditions, and in general will have minimal to no influence on farming. Even if blasting is required, this shallow, narrow, linear construction project is not reasonably expected to affect hydrologic pathways or storage potential of aquifers. The depth of the Project is not extensive enough to affect aquifer recharge to a measureable extent, nor is the excavation likely to encounter saturated conditions through most of the route. If groundwater is encountered in lowland areas (e.g., near a water body crossing), this will be a discharge zone to the water body, and there is no reason to expect the resulting backfilled trench to affect water flow.

EPA Comment No. 11: FS submitted a filing to FERC dated October 24, 2016, which raised concerns whether pipeline construction within the Jefferson National Forest (JNF) was without undue risk of resource damage. FS requested that MVP develop site-specific stabilization designs for challenging terrain. EPA supports FS requests in order to reduce resource risk. EPA further questions whether such measures should be implemented in similar challenging terrain outside of JNF. EPA recommends that FERC encourage the applicant to adopt recommendations made by the FS to minimize impacts within the JNF for areas outside of forest lands.

Mountain Valley Response No. 11: As noted above, Mountain Valley has addressed slope stability for the project via the Landslide Mitigation Plan. The Landslide Mitigation Plan presents typical details to be employed during construction to minimize the risk of earth movement and specifies the use of these mitigation measures at predetermined locations along the pipeline. The mitigation measures are generally consistent with those recommended in INGAA's Mitigation of Land Movement in Steep and Rugged Terrain for Pipeline Projects, which presents BMPs for landslide mitigation in the Appalachian region.

During construction, inspectors will be deployed to identify additional areas, not already specifically addressed in the Landslide Mitigation Plan, where the landslide mitigation typical details should be implemented. The inspectors, in conjunction with Mountain Valley engineers, will develop additional mitigation measures to address slope stability as necessary based on subsurface conditions revealed during construction.

EPA Comment No. 12: EPA recommends that the EIS study look at recent pipeline construction project to evaluate "lessons learned" and impacts, which could include construction, especially with respect to geohazards such as steep slope, karst terrain, etc. operation and implementation of mitigation.

Mountain Valley Response No. 12: Mountain Valley has incorporated lessons learned from various sources into its construction plans. One of its founding partners, and eventual operating company, EQT, has extensive experience constructing pipelines in the Appalachian region. This body of knowledge includes both remediating and mitigating landslides in steep terrain. On one of EQT's recent projects, the Ohio Valley Connector mitigation measures such as slope revetments and trench breaker daylight drains with rock aprons were installed in rugged terrain and have successfully prevented slope movement over a number of freeze-thaw cycles. Similar mitigation measures have been used as remediation techniques on completed EQT pipeline projects that experienced landslides. Geotechnical BMPs such as rock lined swales, cutoff drains, and geogrid were installed to remediate those earthen movements. After remediation several years ago, these areas remain stable. The proximate cause of many of these landslides is soil saturation resulting from improper control of ground or surface water. As such, many mitigation and remedial techniques aim to achieve the same outcome and can be used in both situations. Mountain Valley therefore has included proven BMPs from both scenarios in its Landslide Mitigation Plan. More information on previous EQT experience with geohazard avoidance and remediation can be found as part of Mountain Valley's response to the request for additional information from the United States Forest Service that was filed in February 2017.

INGAA's Mitigation of Land Movement in Steep and Rugged Terrain for Pipeline Projects reviews and outlines additional BMPs used by natural gas pipeline operators throughout the Appalachian region. The recommendations of this paper are based on the success of the prescribed BMPs in preventing land movement on reclaimed ROWs. Mountain Valley incorporated these findings into its Landslide Mitigation Plan.

Drawing on its experience with pipeline projects, Mountain Valley recognizes that many unknown challenges reveal themselves during construction and depend on field conditions. For this reason, Mountain Valley has committed to deploying a team of inspectors to oversee construction. In addition to ensuring proper implementation of the mitigation designs prescribed for the areas already identified in the Landslide Mitigation Plan, these inspectors will be responsible identifying additional geohazards along the pipeline alignment and developing strategies to effectively and safely address them. The updated version of the Landslide Mitigation Plan was filed in the FERC docket on October 13, 2016 and was updated in February 2017.

Mountain Valley acknowledges the challenges involved in crossing karst terrain and consulted with Draper Aden Associates (DAA) to ensure that Mountain Valley's plans and procedures effectively address them. DAA has extensive experience with construction projects in and around the karst features that characterize the southern West Virginia and south western Virginia region. This expertise produced an inventory of karst features in the vicinity of the proposed Project construction footprint via desktop study and field reconnaissance. Mountain Valley made numerous alignment adjustments in response to the data collected. DAA also developed a Karst Mitigation Plan for Mountain Valley use during construction. This plan provides BMPs for protecting the karst landscape in general and strategies and mitigations measures in the

event that previously unidentified features are encountered along the alignment. The recommendations included in this plan arise from DAA's working knowledge of the region. Similarly, Mountain Valley sought additional input from DAA and D.G. Honegger Consultants to verify that all necessary precautions have been taken with regards to seismic activity. The report produced by D.G. Honegger (Resource Report 6 Appendix D, filed with FERC on October 20, 2015) provides details on previous pipeline construction in seismic prone areas and what design measures should be taken to preserve safe pipeline operation in such circumstances.

EPA Comment No. 13: Understanding that there is a low probability for the occurrence of an earthquake exceeding magnitude 6.0 and a 4 percent probability of occurrence for an earthquake exceeding magnitude 5.0 within 50 kilometers of the MVP over a 50-year time period, it is recommended the EIS provide the probabilities of lower magnitude earthquakes occurring in the area that have the ability to significantly displace land. Please present analysis of potential impacts and recommended best management practices.

Mountain Valley Response No. 13: An inventory of recorded notable earthquakes in West Virginia and Virginia are included in Resource Report 6, Appendix D. The pipeline and construction design for the Project accounted for ground motion associated with a maximum probabilistic earthquake over a 50-year exposure period (1/2457 chance of being exceeded) in the region encompassing southern West Virginia and southwestern Virginia. See Resource Report 6 the Landslide Mitigation Plan (revised October 13, 2016 and forthcoming submittal in February 2017), and other Mountain Valley responses to agency reviews (such as Responses to FERC Environmental Information Request No. 1, filed January 15, 2016, and Responses to FERC Environmental Information Request No. 2, filed April 21, 2016) and the Federal Energy Regulatory Commission (FERC) Data Request No. 4, Geology 9, for more information on the assessment and mitigation of earthquake hazards, including the combination of earthquakes and landslides. Mountain Valley considers there to be negligible risk associated with a probabilistic maximum earthquake to affect land displacement (See Resource Report Number 6), thus the risk for lower-magnitude earthquakes affecting land displacement is infinitesimal. As an example, Mountain Valley notes that the 2011 magnitude 5.8 earthquake near Mineral, Virginia, which was over 150 miles from the Project alignment, resulted in no reported land displacement in the region (this magnitude exceeds the probabilistic maximum earthquake in the vicinity of the proposed alignment). Mountain Valley has accounted for seismic energy impacts to the pipeline in its Resource Reports, with additional information provided through the FERC's data requests.

EPA Comment No. 14: Please discuss if the landslide events mentioned in section 4.1.2.4 were linked to seismic events. If so, please report what magnitude events were associated with the landslide. These locations should be identified in a table or map.

Mountain Valley Response No. 14: Mountain Valley acknowledges that earthquakes can trigger landslides, and this has been observed in other parts of the world. However, there is no direct evidence that ancient landslides identified along the proposed Project alignment are related to earthquakes. Also see Mountain Valley's response to EPA Comment 13, above, for more discussion on Mountain Valley's management of earthquake hazards to the pipeline and construction areas.

EPA Comment No. 15: It is recommended that more information on past landslides in the vicinity of the project be included in the EIS. Information on past events such as rainfall data, percent slope, bedrock type, soil type in the corresponding area would be helpful to identify and avoid potentially hazardous locations.

Mountain Valley Response No. 15: Mountain Valley's Landslide Mitigation Plan specifies mitigation measures at specific locations, depending upon the actual site configurations. The mitigation measures will be implemented at specified locations, as well as other locations identified prior to and during construction.

EPA Comment No. 16: Page 4-66 states that topsoil and subsoil compaction tests would be conducted in agricultural and residential areas by Mountain Valley, and that decompacting activities such as tiling would be conducted as necessary. Please clarify if compaction is addressed in any written plans submitted to FERC; it is currently unclear how this information would be captured or memorialized. We recommend that the plan include testing methodologies and test frequencies. It appears that Mountain Valley is only proposing to address compaction in agricultural and residential areas. Please clarify how compaction will be addressed in forested areas and wetlands, especially as it is recognized in the EIS that soils with moderate moisture content would be more prone to compaction. Soil compaction in these areas could inhibit plant growth, successful revegetation, and change surface hydrology. We recommend that FERC address compaction of forested and wetland areas throughout the proposed construction work area and evaluate the impact of soil compaction to these locations.

Mountain Valley Response No. 16: Topsoil and subsoil will be tested for compaction throughout the Project area as necessary in areas disturbed by construction activities. Compaction testing locations will be determined by the Mountain Valley Environmental Inspector during restoration activities. Tests will be conducted on the same soil type under similar moisture conditions in undisturbed areas to identify approximate pre-construction conditions. A cone penetrometer or other appropriate devices will be used to conduct tests as necessary.

Mountain Valley intends to disc areas disturbed during construction activities to facilitate revegetation of the ROW. This will include discing subsoil prior to returning topsoil to the ROW. Topsoil will be discd prior to seed and mulch application. Severely compacted areas may require additional decompaction activities to be employed on an as-needed basis using a plow or other deep tillage implement. Alternatively, in agricultural areas, arrangements can be made with the landowner to plant and plow under a “green manure” crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, additional tilling may be required. Appropriate soil compaction mitigation will be performed in severely compacted residential areas.

EPA Comment No. 17: Page 4-66 states that additional topsoil for residential and agricultural lands would be locally sourced to prevent introduction of foreign (or invasive) species. Was this practice also considered for topsoil being placed in other areas within the construction ROW, such as forests and wetlands? Please provide the rationale for where this practice will be conducted.

Mountain Valley Response No. 17: All topsoil that is added for this Project will be locally sourced.

EPA Comment No. 18: Excess stone/rock disposed of within the construction ROW should not be placed in waters of the United States. If no practicable alternative location is available, appropriate permits or approval should be provided.

Mountain Valley Response No. 18: There will be no stone or rock disposed of within the waters of the United States.

EPA Comment No. 19: Mountain Valley would follow procedures put forth in its Unanticipated Discovery of Contamination Plan should contamination be discovered during construction. We recommend clarifying if the Plan addresses how testing for contamination would be done and any associated methodology. Clarify if Mountain Valley proposed to conduct soil or groundwater testing.

Mountain Valley Response No. 19: Mountain Valley submitted its Spill Prevention, Control, and Countermeasure Plan and Unanticipated Discovery of Contamination Plan to the FERC on February 26, 2016. The plan details how such discoveries will be handled during construction. In accordance with the

plan, if contamination is suspected, those materials will be segregated and isolated from other materials excavated and representative samples will be collected and submitted to an environmental laboratory for analysis and/or waste classification. If the testing reveals that the material is impacted, it will then be properly managed and disposed of at the appropriately permitted facility.

EPA Comment No. 20: Page 4-68 states that there is potential for ground heaving to temporarily affect early revegetation success along steep slopes. We recommend FERC consider these affects in combination with other geologic hazards.

Mountain Valley Response No. 20: While there is the potential for ground heaving or soil creep due to frost action on steep slopes, Mountain Valley will monitor restoration for two years following construction and provide corrective actions as necessary to support revegetation. Mountain Valley has proposed a variety of seed mixes for restoration, including mixes specific to establishing vegetation on steep slopes, that will be employed at appropriate locations. In the event that early revegetation is unsuccessful for any reason, including ground heaving or soil creep, Mountain Valley will reseed the affected area. Mountain Valley will pay particular attention to revegetation progress for slopes that are seeded late in the growing season, as the vegetation may not become well established prior to the onset of freezing weather. Areas that are reseeded at the beginning of the following growing season should be well established before frost action affects the soil again.

EPA Comment No. 21: Two tone construction in steep terrain is mentioned on page 4-206. Is this construction methodology proposed? What is involved? If this is being done in steep slopes already, how does this affect statements made earlier about dismissing alts because of terrain?

Mountain Valley Response No. 21: Two-tone construction method may be used in side-hill construction. This method is where the contractor builds two benches on the right-of-way. One bench is for the trench and the other bench is for the equipment. This method is normally not used in steep slope construction because it is not required if the steep slope is uniform. Side slope requires a bench for the ditch and a bench for the equipment. DEIS Page 2-38 should only include side slope. Reference to steep slope two-tone construction should be removed from the DEIS.

EPA Comment No. 22: The project would cross four National Rivers Inventory (NRI) waterbodies, including Left Fork Holly River, Elk River, Greenbrier River, and Craig Creek. EPA recommends that additional information on aquatic resources be included in the EIS and made publicly available prior to any issuance of Certificate approval by FERC, including complete field delineation information, impact breakdowns and specific construction techniques for each waterbody crossing, detailed stream and wetland assessment data on the quality or functions of the systems, and detailed, or at a minimum conceptual, compensatory mitigation plans.

Mountain Valley Response No. 22: The Left Fork Holly River is a perennial stream located in Webster County, West Virginia. During the field investigations, the stream was measured to be approximately 80-foot wide, with an average bank height of 8.5-feet. The depth of water was approximately 4-feet deep. The stream is listed as a Tier-2 stream. The Elk River is a perennial stream also located in Webster County, West Virginia. During the field investigations, the river was approximately 150-foot wide, with an average bank height of 12-feet. The depth of water was approximately 5-feet deep. The stream is listed as a Tier-2 stream. The Greenbrier River is a perennial stream located in Summers County, West Virginia. During the field investigations, the stream was measured to be approximately 270-foot wide, with an average bank height of 10-feet. The depth of water was approximately 15-feet deep. The stream is listed as a Tier-3 stream. Mussel surveys were conducted at the proposed Greenbrier River (Summers County, West Virginia) crossing in September of 2015. The survey was conducted by WVDNR and USFWS approved malacologists. Live mussels were observed at the crossing but state or federally listed species were not

identified. Prior to construction at this crossing, mussel relocation efforts will be conducted according to WVDNR and USFWS standard procedures. Craig Creek is a perennial stream located in Montgomery County, Virginia. During the field investigations, the stream was measured to be approximately 35-foot wide, with an average bank height of 3.5-feet. The depth of water was approximately 4-inches deep. A mussel survey was completed in October 2015 and yielded no sign of James spinymussel nor any other freshwater mussel species within the survey extent.

The crossings of the Left Fork Holly River, Elk River, Greenbrier River, and Craig Creek will be completed using the dry-ditch, open cut construction technique which involves the use of cofferdams, pump and dams, or flume pipes. The benefit of these techniques isolates the work space from flowing water and allows construction to occur “in the dry”, reduces the potential for downstream sediment impacts, and maintains downstream flows. On streams that require cofferdams, approximately 60% of the stream channel will need to be diverted to facilitate pipeline installation. It is necessary to have an overlap of construction area so the pipe can be successfully connected. Spoils from trench excavation will be kept a minimum of 10’ from the stream’s edge and will be protected with the appropriate erosion control devices. All stream crossings will be restored to preconstruction conditions and contours as required by state and federal permits; the stream banks will be restored and seeded using seed mixes specified in the Project Specific Vegetation and Habitat Mitigation Plan as soon as the stream crossing is completed. The Left Fork Holly River, Elk River, and Greenbrier River will be crossed using a Portadam (or equivalent) engineered structure. Craig Creek will be crossed using either a flume pipe or dam and pump methods.

The 404 Nationwide Permits provide an impact and construction technique summary that describes the impacts to the aquatic resources crossed by the project. Mountain Valley does not anticipate the Project to create long-term, permanent impacts to the Left Fork Holly River, Elk River, Greenbrier River or Craig Creek.

EPA Comment No. 23: At this time, the entire proposed project corridor has not been surveyed. It is stated that Mountain Valley was unable to survey all parcels; therefore, the total wetland acreages were based on a combination of field surveys and the review of NWI (National Wetland Inventory) maps. It is unclear how much of the corridor has been field surveyed. While EPA recognizes that without a FERC Certificate the applicants may not gain access to complete surveys without landowner permission, EPA recommends that these surveys be completed and verified as soon as they become available, if possible prior to the issuance of a FERC Certificate. EPA recommends consideration of remote data including aerial information or GIS to support analysis of NWI maps.

Mountain Valley Response No. 23: Approximately 294.25 miles of the 303.9 miles of the pipeline alignment (approximately 97%) has been surveyed for aquatic resources. Information on all the resources identified within the study corridor have been submitted with the 401 and 404 permit applications. The permit applications include information on impacts, waterbody crossings, wetland functional assessments, and mitigation plans. Information for the West Virginia 401 Water Quality Certification resources is publicly available and can be viewed by contacting the WVDEP. Mountain Valley updated the information for the West Virginia 404 Nationwide Permit Resources in mid-February 2017. This information will be publicly available and can be viewed by contacting the USACE Pittsburgh and Huntington districts.

Mountain Valley is updating the Virginia 401 and 404 resource information and anticipates submittal in March 2017. This information will be publically available and can be viewed by contacting the VADEQ and USACE Norfolk District.

In areas where landowner access was not obtained, Mountain Valley conducted a desktop evaluation to determine the likely presence of aquatic resources. The desktop survey results were included in the February and April 2016 data responses. Updated field information and additional desktop surveys were completed

during the 2016 field season and have been included with the state and federal permit applications (401 and 404 applications).

Mountain Valley used available Geographic Information Systems (GIS) data to interpret site conditions and evaluate the likely presence and approximate locations of wetlands and waterbodies. The data used included:

- U.S. Department of Agriculture (USDA) National Agriculture Imagery Program color infrared (CIR) imagery at 1-meter resolution
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping (USFWS 2009)
- Natural Resource Conservation Service (NRCS) Soil Survey mapping (NRCS 2014)
- Light Detection and Ranging (LiDAR) survey data showing 2-foot topographic contours
- U.S. Geological Survey (USGS) 7.5-Minute Topographic Maps (USGS 2009)
- Google Earth aerial imagery (current and historic aerial imagery)
- National Hydrography Dataset (NHD) mapping (USGS, 2015)

The evaluation of site conditions for likely waterbody features primarily utilized LiDAR topographic contours, NHD imagery, and aerial imagery to identify potential stream channels that may exhibit regular water flow, typical of jurisdictional waterbodies. Mountain Valley gathered updated LiDAR and aerial photography via an aerial flyover in November 2014. The evaluation of site conditions for likely wetland locations utilized all of the datasets listed above. Mountain Valley evaluated sites for the potential to contain all three criteria required to be a wetland: hydric soils, hydrology, and hydrophytic vegetation. NWI mapping was used to identify any previously mapped wetlands in the areas not surveyed. USGS and LiDAR contours were used to identify flat, gently sloping, or concave areas where wetlands may naturally form. NRCS Soil Survey mapping was used to identify hydric or poorly drained soils where wetlands may naturally form. CIR and aerial imagery was used to identify any potential inundated, wet, or clayey areas. CIR imagery is a false-color image that shows the reflected electromagnetic waves from an object such that near infrared is projected in red color, green light is projected as blue, and red light is projected as green. Intense bright red colors indicate vigorously growing, dense vegetation. Light-red, magenta, or pink colors indicate slow-growing vegetation (mature evergreens, agricultural fields outside of growing season). Light-pink colors indicate dead or dormant vegetation. Gray-tan to blue-green colors indicate clayey soils, and light-blue to pale colors indicate sediment-laden water. Dark-blue and black colors indicate asphalt or deep water in larger rivers, lakes, and ponds. Upon review of the available GIS data, professional experience and judgment was used to identify likely waterbody channels and areas likely to exhibit a predominance of wetland characteristics on the sites that were not surveyed.

Equitrans has field reviewed the entire project footprint with the exception of the recently accepted New Cline Alternative. This approximately 2,600-foot long minor route variation was evaluated by desktop using a process similar to that of Mountain Valley to identify and characterize potential aquatic resources.

EPA Comment No. 24: EPA recommends that FERC provide baseline information for the potentially impacted areas. If the information is in the appendices, we suggest references be provided. We also recommend that the applicant use an appropriate functional assessment to evaluate the impacts, both temporary and secondary, to the aquatic ecosystem.

Mountain Valley Response No. 24: The Mitigation and Compensation plan for impacted aquatic resources are fully described in the Nationwide 12 Permit applications that were submitted to the USACE Pittsburgh District and Huntington District on February 17, 2017. The USACE Norfolk District will receive the updated application in early March and will include a Mitigation and Compensation plan.

The West Virginia mitigation credit requirements were determined using the WV Stream and Wetland Valuation Metric (SWVM). The WV SWVM utilizes a mitigation ratio based on detailed stream quality data to determine the mitigation credits required for anticipated impacts. Detailed stream quality assessments of streams anticipated to incur permanent impacts will be conducted during the 2017 field season. The Virginia mitigation requirements will be developed through coordination with the Norfolk USACE District and the Virginia DEQ.

EPA Comment No. 25: Mountain Valley estimates about 60,283,880 gallons of water would be needed for hydrostatic testing. The volume of water projected for use is considerable, with surface water sources being of concern because of the potential effects of hydrologic alteration. More detailed information should be provided for each test segment, including locations of water withdrawals and discharges, medium of discharge (overland or in water), waters used consumptively or waters being transferred between basins, withdrawal rates, and discharge rates.

Mountain Valley Response No. 25 Mountain Valley anticipates hydrostatic testing will require approximately 60 million gallons of water. A breakdown of this water usage can be seen in Attachment DR4 Water Resources 22, which updates Table 4.3.2-10 in the DEIS and was included in Mountain Valley's February 9, 2017 response to FERC's Post-Draft Environmental Impact Statement Environmental Information Request Issued January 27, 2017. This is not the total volume of the pipeline, but the water required to hydrostatically test the line taking into account sharing of water between segments of pipeline that will be tested separately.

Mountain Valley plans to withdraw water from two surface water resources for hydrostatic testing in West Virginia: The Meadow River and Greenbrier River in West Virginia. No surface water withdrawals will take place in Virginia. The locations of these withdrawal points, as well as all water discharge points, are detailed in Attachment DR4 Water Resources 22 (included in Mountain Valley's February 9, 2017 filing). Mountain Valley will use the West Virginia Department of Environmental Protection (WVDEP) Water Withdrawal guidance tool to determine if withdrawals from these rivers can be made. The use of this tool is required by the WVDEP prior to any water withdrawals and must be done every day a withdrawal is anticipated. If the WVDEP Water Withdrawal Guidance Tool indicates that water withdrawal is acceptable, Mountain Valley has committed to limiting surface water withdrawals to 10% of a stream's instantaneous flow, but expects maximum withdrawal rates of 1,500 gallons per minute. Direct discharges of hydrostatic test water to water of the United States will not occur. All discharges will be through a controlled discharge system consisting of a sediment filter bag within an engineered structure of straw bales and geotextile, located on a stabilized surface. The flow rates and discharge will be monitored and controlled to ensure the dewatering structure is not overwhelmed and instream sedimentation does not occur.

The remainder of the required hydrostatic test water will be supplied by purchased municipal water. Mountain Valley does not anticipate any surface waters being transferred between basins.

EPA Comment No. 26: The DEIS also estimates that approximately an additional 55,000 gallons per day (gpd) will be used for dust management. We recommend that Mountain Valley prepare a Dust Suppression Plan, which could include locations, rates, withdrawals volumes, and anticipated frequency.

Mountain Valley Response No. 26: Mountain Valley submitted a Fugitive Dust Control Plan, to the FERC in January 2016 (see as Attachment General 1-g of Mountain Valley's January 15, 2016 filing). Since precipitation and various other weather and site conditions contribute to soil moisture and access road conditions, it would be of little value to attempt to predict the actual volumes of water needed and the daily application rates to suppress dust. The estimate of 55,000 gallons per day was based on approximate

averages and construction-related experience, but it is unlikely, given the normal regional annual days of precipitation, that this daily volume would be needed.

EPA Comment No. 27: This withdrawal could cause significant impacts especially when considered along with hydrostatic testing withdrawals. Estimates of withdrawal volumes and rates (while difficult) for Horizontal Directional Drilling (HDD) are also useful to this analysis to evaluate potential impacts of cumulative hydrologic alteration and directs a decision if water management plans should be developed to specify withdrawal locations, quantities, study impacts and propose best practices to minimize or mitigate impacts. Testing of discharge water quality should also be specified.

Mountain Valley Response No. 27: As shown in Attachment DR4 Water Resources 22 (included in Mountain Valley's February 9, 2017 filing), Mountain Valley will utilize purchased municipal water for the majority of hydrostatic testing, including all testing that will occur in Virginia. The locations of the line that require surface water withdrawal are detailed in this table.

EPA Comment No. 28: Further, the locations, volumes, and rates of water withdrawals and discharges should be examined to determine if the withdrawal will contribute to existing impairments or impact threatened and endangered species.

Mountain Valley Response No. 28: Mountain Valley plans to withdraw water from two surface water resources in West Virginia: The Meadow River and the Greenbrier River in West Virginia. No surface water withdrawals will occur in Virginia. The locations of these withdrawal points, as well as all water discharge points, are detailed in Attachment DR4 Water Resources 22 (included in Mountain Valley's February 9, 2017 filing). Mountain Valley will use the WVDEP Water Withdrawal guidance tool to determine if withdrawals from these rivers can be made. The use of this tool is required by the WVDEP prior to any water withdrawals and must be done every day a withdrawal is anticipated. If the WVDEP Water Withdrawal Guidance Tool indicates that water withdrawal is acceptable, Mountain Valley has committed to limiting surface water withdrawals to 10% of a stream's instantaneous flow, but expects maximum withdrawal rates of 1,500 gallons per minute. Using the WVDEP Water Withdrawal tool and limiting the water withdrawals to 10% of the stream's instantaneous flow will help the Rivers maintain their existing physical, chemical, and biological characteristics. It is not anticipated that these withdrawals would contribute to any existing impairments on these rivers.

Mussel surveys were conducted at the proposed Greenbrier River and Meadow River crossings. No federally or state-listed species were identified during these investigations. Temporary water withdrawals are proposed for both rivers at the crossing locations. Mountain Valley will coordinate as required with the West Virginia Division of Natural Resources and USFWS prior to withdrawing water from these rivers. The water withdrawals at the Greenbrier and Meadow Rivers will be located within the proposed limits-of-disturbance (LOD). Temporary water intakes will be used and will not rest on the river bottom substrates. Intakes will be screened with the openings not to exceed 3/16-inch and will limit the through-screen approach velocity to 0.5 feet per second or less. Impacts to threatened and endangered species are not anticipated. Therefore, mussel surveys are not required and impacts to mussel, threatened and endangered species are not anticipated.

Direct discharges of hydrostatic test water to water of the United States will not occur. All discharges will be through a controlled discharge system consisting of a sediment filter bag within an engineered structure of straw bales and geotextile, located on a stabilized surface. The flow rates and discharge will be monitored and controlled to ensure the dewatering structure is not overwhelmed and instream sedimentation does not occur.

Mountain Valley Response No. 29: EPA appreciates the special consideration that crossing karst streams has received in the DEIS. However, the DEIS does not discuss the potential aquatic life or surface water impacts that could occur to karst ecosystems due to construction (including blasting) of the pipeline or water withdrawals.

Mountain Valley Response No. 29: Mountain Valley provided information in this response regarding potential surface water impacts and potential impacts to karst ecosystems and aquatic life in EPA Comment Nos. 24, 30, 33 and 35. Mountain Valley also provided information in this response regarding potential impacts from blasting in EPA Comment Nos. 7, 9, and 32. Mountain Valley's General Blasting Plan includes specific karst terrain blasting procedures. Overall discussions on karst hydrology and resource protection was provided in Resource Report #2 (Water Supply Identification and Testing Plan), Resource Report #6 (Karst Hazards Assessment and Karst Mitigation Plan), and can also be found in the Karst-Specific Erosion and Sediment Control Plan – Virginia (submitted in the responses to FERC Environmental Information Request dated December 24, 2015). The Karst-Specific Erosion and Sediment Control Plan includes karst-specific measures to prevent erosion, overland flow and sediment transport to waterbodies and karst features during pipeline construction, and to prevent erosion, sedimentation, and flooding problems in karst areas after pipeline construction and right-of-way restoration. These measures are intended to prevent potential impacts to surface waters and to protect aquatic life. Finally, Mountain Valley notified the FERC that water withdrawals to support construction (e.g., hydrostatic testing, dust suppression, etc.) will not occur in karst terrain. Therefore, there are no risks to surface water, aquatic life, or karst ecosystems from water withdrawals.

EPA Comment No. 30: The DEIS Section 4.3.2.1 on karst impacts states that potentially affected surface waters may impact groundwater supplies. EPA recommends that a discussion should be included addressing how surface waters could be affected.

Mountain Valley Response No. 30: EPA points to Section 4.3.2.1 of the DEIS to indicate that the FERC states potentially affected surface water may impact groundwater supplies. Mountain Valley interprets the DEIS statement to be generalized, acknowledging a potential for impact but not necessarily the probability. Theoretically, the possible nature and route of impact to surface water from the proposed construction activity would be a fuel spill from vehicles or excavation equipment, or the uncontrolled release of sediment from land disturbance that would flow to a karst feature.

EPA Comment No. 31: Most of the discussion on impacts to karst ecosystems is centered on mitigation plans, not on the avoidance of impacts. Since pipeline construction activities could alter sediment flushing, intersect active ground-water conduits and phreatic loops, or cause their blockage, EPA is concerned that impacts to surface water and aquatic life may not be insignificant.

Mountain Valley Response No. 31: Mountain Valley is taking all reasonable and necessary precautions to prevent, not just mitigate, theoretical impacts in karst terrain. Mountain Valley has made major and minor route adjustments to avoid karst features and sensitive water resources identified in the Karst Hazards Assessment. Best Management Practices established in the Spill Prevention Control and Countermeasures Plan, the Erosion and Sediment Control Plan, and the Karst Mitigation Plan are designed to prevent uncontrolled releases to surface waters and karst features in order to protect the underlying aquifer. Mountain Valley will deploy on-site inspectors during all phases of construction to monitor karst resources and ensure that prescribed measures are in-place to prevent uncontrolled surface water releases, prevent impacts to karst features, and therefore protect groundwater. Through these actions, potential impacts to surface water in karst terrain (and along the entire proposed construction limit of disturbance for the pipeline and components) will be avoided, and therefore potential impacts to aquatic life would be insignificant.

EPA Comment No. 32: The DEIS notes that blasting in karst can potentially change groundwater flow, create contamination, and affect yield and turbidity. It is also noted that potential impacts on water wells, springs, wetlands and other resources could occur. Although the DEIS states that Mountain Valley is aware of possible changes or loss to surface water and will use specialized construction techniques, EPA is concerned that there is insufficient information to conclude that karst blasting and other construction activities would only result in temporary, insignificant impacts.

Mountain Valley Response No. 32: The Project entails land clearing, surface construction, and excavation approximately 10 feet below ground to install the pipeline. The nature of this construction project is such that there is negligible risk to encounter an aquifer along the vast majority of the alignment, but where groundwater is encountered in the shallow subsurface (e.g., perched aquifers, flood plains near rivers and streams), the backfilled excavation will convey water to allow it to resume its natural flow path and will not disrupt the major hydrologic balance. Mountain Valley will limit the extent of blasting required to a minimum. Blasting for grade or trench excavation will be considered only after all other reasonable means of excavation have been evaluated and determined to be unlikely to achieve the required results. If blasting is required, it would be undertaken only to the extent necessary to promote ripping and excavation in the immediate vicinity of the pipeline trench. Areas where blasting may be required will be reviewed for karst features by the on-site karst inspectors (per the Karst Mitigation Plan). The General Blasting Plan (filed on February 9, 2017) outlines the procedures and safety measures that the contractor will adhere to while implementing blasting activities. Based on the stated limits of potential blasting, Mountain Valley does not anticipate any resulting change to groundwater flow, or contamination, and effects on well yield and turbidity. Mountain Valley will implement the Water Supply Identification and Testing Plan to provide direct outreach to private and public water supply owners along the entire alignment, including karst areas, and address their concerns (including those for blasting if this technique is needed) and protect the water supplies. Mountain Valley has identified the assessment, avoidance, mitigation, and monitoring that will be applied to this Project to protect hydrologic resources. Through protection of surface water and groundwater resources, Mountain Valley will protect aquatic life in karst surface water and groundwater, as well as aquatic life in non-karst surface water. See also the information presented in 1) and 2) of this response, and Mountain Valley's responses to EPA Comments No. 8, No. 9, and No. 10 presented above regarding potential effects on surface water and karst groundwater impacts, as well as blasting.

EPA Comment No. 33: Changes in the geology, even just cracks and fissures, can alter flow patterns, permanently impacting aquatic life and water chemistry. EPA recommends that FERC conduct a fracture trace/lineament analysis at all karst stream crossings and potential blasting areas along the route; additional monitoring or modifications of route should be proposed to avoid permanently altering flows and impacting biology in interconnected karst voids and cave systems.

Mountain Valley Response No. 33: Mountain Valley has made hundreds of alignment adjustments to avoid sensitive hydrologic settings (including karst resources). The Karst Mitigation Plan calls for minor adjustments within the approved right-of-way during construction if and when necessary to avoid sensitive features. Furthermore, Mountain Valley has proposed alignment variations to avoid Canoe Cave and in the area that is commonly referred to as the Mount Tabor sinkhole plain. Mountain Valley completed fracture trace and electrical resistivity analyses in the area of the Mount Tabor sinkhole plain, which did not indicate significant concerns regarding the proposed alignment, given the previous adjustments to avoid karst features. The proposed alignment is not routed over, through, or even in the vicinity of a known cave (see Karst Hazards Assessment). Mountain Valley expects there to be no long-term alteration of water flow or impact to biological resource in interconnected karst voids and cave systems, and certainly no cracking of cave roofs or floors that could lead to the EPA or USGS stated impacts to biota.

EPA Comment No. 34: The impacts on groundwater and surface water are intertwined in karst ecosystems and that point should be elaborated: contaminating groundwater could lead to surface water contamination and altering subsurface flows could affect surface flows.

Mountain Valley Response No. 34: Mountain Valley acknowledges, and clearly understands, that karst terrain presents uniquely intertwined surface water and groundwater dynamics, which affect karst ecosystems. Mountain Valley elaborated on the potential impacts to surface water and groundwater above, and in a related manner identified how such theoretical impacts will be avoided.

EPA Comment No. 35: We recommend that FERC separately describe potential effects of the pipeline on aquatic life and surface water in order to evaluate if impacts will be minimal, even with the Karst Mitigation and Sediment Control Plans.

Mountain Valley Response No. 35: Mountain Valley described in the preceding response points, the potential and theoretical impacts from pipeline and component construction on surface water and aquatic life in karst terrain. EPA notes that surface water and aquatic life (and groundwater) in karst terrain is intertwined, and as such Mountain Valley does not concur that theoretical risks should be described separately.

EPA Comment No. 36: Additionally, impacts to karst ecosystems and surface water should be evaluated in context of multiple geologic hazards (landslide potential, seismic risk) that occur in mountainous karst regions. EPA recommends an appropriate monitoring plan be developed to monitor these types of potential impacts.

Mountain Valley Response No. 36: Mountain Valley considered landslide, and earthquake, hazards for slope stability along the alignment, as well as potential effects on pipeline integrity and integrated these potential hazards into the proposed alignment design as well as pipeline material specifications and design. Mountain Valley determined that the risk for these potential hazards are so remote as to be negligible.

EPA Comment No. 37: EPA supports the recommendation that Mountain Valley investigate route variations to avoid or reduce impacts on Canoe Cave and the Mount Tabor Sinkhole Plain.

Mountain Valley Response No. 37: Mountain Valley made alignment adjustments in the October 2016 Proposed Route to avoid Canoe Cave and in the area of the Mount Tabor sinkhole plain.

EPA Comment No. 38: The DEIS states (pg 4-79) erosion controls would be installed to provide a minimum 100 foot-natural vegetated buffer around a waterbody or karst feature; and that refueling, hazardous materials storage, and overnight equipment parking with 100 feet of karst features would be prohibited. Please provide the basis for the 100-foot buffer determination. The Fish and Wildlife Service (USFWS) recommend a 300 feet buffer for Karst Areas in the Ozarks, and EPA is concerned a 100-foot buffer will not adequately prevent impacts.

Mountain Valley Response No. 38: Mountain Valley established the 100-foot buffers referenced by the U.S. EPA as Best Management Practices based on Mountain Valley construction personnel's considerable and demonstrated experience in natural gas pipeline construction. Mountain Valley will implement multiple avoidance and protective measures to prevent impacts to sensitive environmental receptors, not just establishing the prescribed exclusion zones. These measures, in concert with exclusion buffers will be protective of environmental receptors including karst features, given Mountain Valley's construction

practices, and control Plans that will be in place (i.e., SPCC, E&S, KMP, etc.). Mountain Valley notes that a 300-foot buffer would exceed the construction right-of way.

EPA Comment No. 39: EPA also recommends clarify the definition of karst development, which is referred to on Page 4-35 as occurring from MPs 171 to 175.

Mountain Valley Response No. 39: Mountain Valley has provided information regarding karst hydrology and resource protection in Resource Report Number 2 (Water Supply Identification and Testing Plan), Resource Report Number 6 (Karst Hazards Assessment and Karst Mitigation Plan), various responses to agency comments, and prior and current FERC Data Requests. Regardless of the relative development of karst, Mountain Valley will follow the same procedures in all karst areas.

EPA Comment No. 40: The Pigg River is also being evaluated as a wet crossing; turbidity and sediment modeling will be conducted. FERC has requested the results of the quantitative modeling assessment for the Elk, Gauley, and Greenbrier Rivers. EPA recommends that assessment of the impacts associated with the proposed wet-cut crossings and the results of quantitative modeling for turbidity and sedimentation at the major river crossings be presented in the EIS. The DEIS states that impacts would be assessed prior to construction. We suggest the rationale for the waterbody crossings be provided in the EIS and an explanation of why alternate methods are not feasible. Please clarify if dry open-cut were considered for these crossings. Also, it is recommended that the geotechnical evaluations used to assess the feasibility of HDD at waterbody crossings, and the HDD lengths from point of intersection to point of intersection of the locations selected for the HDD geotechnical evaluation, be provided in the EIS. HDD is generally recognized as more protective of resources.

Mountain Valley Response No. 40: Mountain Valley had originally explored the option of crossing the Elk River, Gauley River, and Greenbrier River using a wet, open-cut crossing. Mountain Valley has determined that a dry-ditch technique is a more viable option, which will reduce the potential for downstream sedimentation and turbidity by creating a dry working site. Mountain Valley intends to use a Portadam structure (or equivalent structured system) that creates a dry-ditch work site for these stream crossings. The Portadam is an engineered, segmental or linked system that creates a dry workable area while minimizing instream and downstream impacts. Because the dry-ditch crossing technique significantly reduces the amount of sedimentation and turbidity, a quantitative analysis is not necessary. See Mountain Valley's February 9, 2017 response to FERC's data request (Fisheries, Question 1).

EPA Comment No. 41: MVP proposes to cross Craig Creek, an NRI stream which supports endangered mussels, four separate times. It is stated that coordination with the USFS is ongoing to potentially reduce the number of crossings. EPA supports reducing the impacts on sensitive waterbodies, such as Craig Creek, and urges FERC and the applicants to adopt FS recommendations. Additional efforts should be made to avoid impacts to Craig Creek and other aquatic resources that contain listed species. Please provide additional information regarding avoidance and minimization to all of these waterbodies. Provide documentation as to how the project will be modified to address Forest Service concerns. FERC requested the applicant look at trenchless (HDD) crossings

Mountain Valley Response No. 41: An alternatives analysis in the area of Craig Creek was filed with FERC on February 23, 2017 as Attachment DR4 Land Use 17. Please reference that attachment.

EPA Comment No. 42: FERC requested the applicant look at trenchless (HDD) crossings on the Left Fork of the Holly River; Elk River; Gauley River; Greenbrier River; Blackwater River (crossed twice); and the Pigg River. The Blackwater and Pigg Rivers are on the Virginia Significant Rivers List. These are high quality waterbodies that are protected for the benefit and enjoyment of future generations. A description of

how these waterbodies may be impacted by the project would benefit decision-making, as these waters are highly sensitive to changes in chemistry, temperature, turbidity, and sedimentation. EPA encourages FERC to select the least impactful crossing method.

Mountain Valley Response No. 42 Mountain Valley evaluated the feasibility of using HDD to cross the Left Fork of Holly River, Elk River, Gauley River, Greenbrier River, Blackwater River, and Pigg River. Mountain Valley filed Attachment DR4 General-3d-45 to the docket that contains a summary of the results.

EPA Comment No. 43: Page 4-95: The DEIS is missing other exceptional waterbodies and tributaries designated as Tier III streams and Wild Natural Trout Streams. Notably Bottom Creek in Virginia. Please provide a more comprehensive analysis of exceptional waters that would be impacted by the project.

Mountain Valley Response No. 43: See Attachment 1A, a Revised Table for Tier III waters crossed by the Project. Please note that, as described on pages 4-90 and 4-95 of the DEIS, the Project does not cross the specific Tier III segment of Bottom Creek or Little Stony Creek. Waterbodies crossed by the Project that are considered Wild Trout Streams by the Virginia Department of Game and Inland Fisheries (VADGIF) are included in Attachment 1B.

EPA Comment No. 44: The DEIS concludes that significant impacts would occur on upland forests; however, it concluded that impacts on most non-special status species would not result in long-term or significant population level effects. It is not clear that this conclusion has been supported in the DEIS.

Mountain Valley Response No. 44: Cumulatively, impacts to all forest and scrub-shrub habitats within the limits of disturbance to the Project represent less than 0.4% of all habitat within a five-mile radius of the Project. Permanent impacts associated with the operational footprint represent less than 0.1% of all such habitats within a five-mile radius of the project. Because the quantity of habitat available for non-special status species is substantially larger than the habitat that is being removed, Mountain Valley believes that no significant impacts to these species will occur.

EPA Comment No. 45: Page 4-111: We suggest the updated scour analysis be provided in the FEIS.

Mountain Valley Response No. 45: Mountain Valley has performed a scour analysis which was submitted to the docket on February 9, 2017 as Attachment DR4 Water Resources 13e.

EPA Comment No. 46: To prevent impacts on public water supplies, EPA recommends that pipeline routes also avoid state-defined wellhead protection areas (WHPAs) or source water protection areas where possible.

Mountain Valley Response No. 46: In West Virginia, the West Virginia Bureau for Public Health is designated as the lead agency responsible for the Wellhead Protection Program (WHPP). The West Virginia WHPP was approved by the U.S. Environmental Protection Agency in 1992. The 1996 amendments to the Safe Drinking Water Act required states to develop a plan to assess the source water for all public water supply systems—both surface and groundwater. West Virginia Bureau for Public Health developed a Source Water Assessment Program (SWAP) that delineates source area for ground and surface water systems, identifies the potential contaminant sources within the source area, and determines each public water system's susceptibility to contamination.

In Virginia, the Virginia Department of Health, Office of Drinking Water (VDH-ODW) is the Commonwealth's agency that regulates public drinking water. In 1999, VDH-ODW developed a SWAP. By 2003, VDH-ODW had assessed all existing drinking water sources. Wellhead protection activities, specifically, fall under assessing a public water supply's contamination susceptibility on the local level,

with technical support from the VDH-ODW. In summary, for both states, protection of public drinking water is currently managed through source water protection efforts described above, which overarch wellhead protection measures.

Mountain Valley designed the proposed Project alignment, and has made hundreds of major and minor adjustments, in consideration of a wide range of parameters that minimize risk and maximize safety for pipeline construction and operation. One parameter that was highly considered is avoiding public water supplies. Mountain Valley has contacted all public water supplies that have a surface water intake located within three miles of a water body crossing (per FERC guidance) and more generally any public supply located within a HUC-10 watershed that is traversed by the proposed alignment. This is a conservative approach designed to maximize the number of public suppliers to be contacted, as a HUC-10 watershed is typically tens-of-thousands of acres in scale. Where the proposed alignment crosses a source water protection area (e.g., Red Sulphur Public Service District, Big Bend Public Service District, etc.,) Mountain Valley has met with these public suppliers and is currently working on contingency plans to address their concerns.

Mountain Valley's initial alignment accounted for public water supplies, and then further analysis resulted in further alignment adjustments designed to protect public water sources. For example, Mountain Valley made major alignment adjustments near the Town of Boones Mill, Virginia and near Rocky Mount, Virginia that relocated the alignment significantly away from the public supply sources.

More broadly, Mountain Valley prepared the Water Supply Identification and Testing Plan (updated February 2017), which directs efforts to identify private and public water supplies (wells, springs, intakes) along the entire proposed Project alignment, establish a pre-construction testing program, and work directly with the water suppliers to identify and address concerns related to the Project. Mountain Valley has contacted all property owners along approximately 170 miles of the 303-mile alignment to summarize the Project, request information regarding whether the property has a water supply and if so its characteristics, and request permission to conduct pre-construction sampling. Mountain Valley will complete contacts of the remaining property owners (essentially the middle section of the alignment) in mid-2017.

EPA Comment No. 47: In regards to private wells, field surveys have not been completed to identify private wells and springs within 150 feet of construction workspaces (500 feet in karst terrain) due to the lack of access. In the event that a public or private well or spring is identified, the Applicants would flag the wellhead, notify the owner or operator of the resource, and offer pre-construction water quality and water yield monitoring. However, post-construction monitoring is only being conducted if a complaint is lodged after construction. EPA recommends that interested landowners be offered post-construction monitoring as part of their water testing programs. Additionally, Equitrans' water testing program includes oil and grease, volatile organic compounds, and hydrocarbons. It is recommended that Mountain Valley include these parameters as well to help assess any potential impacts from accidental spills or releases.

Mountain Valley Response No. 47: Mountain Valley has provided information regarding water supply testing and protection of private and public water supplies in Resource Report Number 2 (Water Supply Identification and Testing Plan; most recent update February 2017). As noted in Mountain Valley's Water Supply Identification and Testing Plan (Resource Report #2, updated June 2016, October 2016 and February 2017), private water supplies located within 150 feet (500 feet in karst) will be included in pre-construction monitoring. Public water suppliers with supply intakes located within three miles of a water body crossing or a supply source located within a HUC-10 watershed that is traversed by the proposed alignment have already been contacted by Mountain Valley for pre-construction testing and to discuss the proposed Project and address any concerns that the public supplier may have.

In order to ensure to the extent possible that all water supplies are tested, Mountain Valley is conducting

direct outreach to all property owners along the route to gather information on the location and characteristics of water supplies and to request permission to conduct pre-construction testing of these supplies. To date, Mountain Valley has contacted property owners along approximately 130 miles along the northern portion and approximately 40 miles along the southern portion of the proposed alignment. Mountain Valley plans to contact property owners regarding water supplies along the remaining portion of the alignment in mid-2017.

Mountain Valley does not consider it necessary from the standpoint of protecting water supplies to offer post-construction testing. For the reasons described in Response No. 46 above, Mountain Valley considers there to be minimal risk to water supplies. In the case of public water supplies, Mountain Valley is working preemptively with those suppliers that expressed concerns and have addressed their concerns through alignment adjustment or is working with the owner to establish contingency measures to ensure no impacts or interruptions to the public supply. In the event that a water supply owner claims impact from construction, Mountain Valley will conduct a thorough investigation of the water supply and the potential impact(s). If the water supply is impacted, and that impact is attributable to Project construction, Mountain Valley will provide a temporary water supply until the impacted supply is restored or replaced to the satisfaction of the owner. Mountain Valley consulted with the Virginia Department of Health, and adopted recommendations from the FERC, when establishing the target analyte list for pre-construction testing during preparation of the Water Supply Identification and Testing Plan (the most recent update is February 2017).

EPA Comment No. 48: To prevent impacts on public water supplies, the pipelines should avoid state-defined source water protection areas (SWPAs) where possible, especially those where the project crosses Zones of Critical Concern.

Mountain Valley Response No. 48: Mountain Valley has provided information regarding water supply testing and protection of private and public water supplies in the Water Supply Identification and Testing Plan (most recent update February 2017), responses to various agency comments, and responses to prior and current FERC data requests. Mountain Valley designed the proposed route to minimize potential impacts to public water supplies by avoiding Source Water Protection Areas and Zones of Critical Concern to the extent possible. Exceptions to this are areas that avoidance was not practical (e.g., Red Sulphur PSD, Big Bend PSD). To address these public water suppliers concerns, as well as private water supplies, Mountain Valley prepared and is enacting, the Water Supply Identification and Testing Plan. As part of this Plan, Mountain Valley contacted public water supply intakes located within three miles of a water body crossing or any public water supply source located within a HUC-10 watershed that is traversed by the proposed alignment (this encompasses WHPAs, Source Water Protection Areas, Zones of Critical Concern) to apprise them of the Project plans and to address concerns to ensure that no interruption to their water supply will occur as a result of construction or operation of the Project.

EPA Comment No. 49: Although maps of core forest areas and ecological core areas were provided, EPA recommends estimating the number of interior forests bisected, acreage affected, interior forest permanently eliminated and converted to forest edge habitat, and address reduced core and forest block sizes in the EIS.

Mountain Valley Response No. 49: Mountain Valley is currently working with state agencies in developing a more detailed evaluation of the Project for specific impacts of forest clearing. The evaluation being reviewed, specifically with the Commonwealth of Virginia, will better quantify the impacts to ecological values resulting from direct and indirect impacts, and determine any losses of ecological values. The evaluation data will be used for discussions with state agencies to come to an agreement on mitigation measures to minimize and offset any losses of ecological resources. Mountain Valley will continue to consult with state and federal agencies on mitigation measures.

EPA Comment No. 50: EPA recommends the DEIS clearly describe the long-term and short-term impacts on migratory bird habitat, as well as how impacts have been avoided and minimized and how impacts will be mitigated. Some tree clearing is proposed by EEP within certain mile markers during the migratory bird nesting season.

Mountain Valley Response No. 50: The revised version of the Migratory Bird Conservation Plan, which Mountain Valley intends to file with FERC in March 2017, will provide details concerning these impacts. See also the response to EPA Comment No. 49.

EPA Comment No. 51: EPA urges FERC to include data and information that will be necessary as part of these approvals to evaluate the significance of air emissions and impacts and support the conclusions made within the DEIS.

Mountain Valley Response No. 51: Mountain Valley completed dispersion modeling for each of the compressor stations in question. The results of the modeling demonstrate that the impacts from the proposed stations, when including background concentrations, are below applicable ambient air quality standards. A summary of the results of the analyses for the Project and the EPP are included in Table 4.11.1-9 and 4.11.1-10, respectively, of the DEIS.

EPA Comment No. 52: The DEIS also concludes that the construction of the proposed projects in combination with other projects would not result in a significant cumulative impacts on air quality, Table 4.13.2.1 in the DEIS shows that the proposed new and modified gas-fired compressor stations in the geographic scope of analysis for these two projects comprise over 19 stations totaling 490,200 horsepower (1247 mmbtu/hr.), which appears to be incomplete. The table does not include horsepower information on four compressor stations. EPA recommends FERC account for all the compressor station horsepower. [Note that this comment also included a table of EPA's estimate of annual potential emissions represented by 490,200 horsepower.]

Mountain Valley Response No. 52: An updated summary of the horsepower is included below in an updated **Table 2**. Note that the proposed projects represent 36% of the total horsepower, and as noted before, demonstrates compliance with ambient air quality standards.

Table 2. Proposed New and Modified FERC-regulated, Gas-fired Compressor Stations in the Geographic Scope of Analysis

Project	Compressor Station	New/ Upgrade	County	State	Horsepower	Air Quality Control Region
MVP	Harris	New	Braxton	WV	41,000	Central West Virginia Intrastate
Rover	Sherwood	New	Doddridge	WV	14,205	Central West Virginia Intrastate
Columbia Smithfield	Glenville	Upgrade	Gilmer	WV	15,600	Central West Virginia Intrastate
Columbia WB XPress	Cleveland	New	Upshur	WV	31,800	Central West Virginia Intrastate
Virginia Southside	CS166	Upgrade	Pittsylvania	VA	21,830	Central Virginia Intrastate
ACP	CS 1	New	Lewis	WV	55,015	Central West Virginia Intrastate
ACP	CS 2	New	Buckingham	VA	40,715	Central West Virginia Intrastate
MVP	Bradshaw	New	Wetzel	WV	86,900	Parkersburg-Marietta Interstate
Supply Header	Mocking hill	Upgrade	Wetzel	WV	41,000	Parkersburg-Marietta Interstate
MVP	Stallworth	New	Fayette	WV	41,000	Southern West Virginia Intrastate
EEP	Redhook	New	Greene	PA	31,300	Southwest Pennsylvania Intrastate
Rover	Burgettstown	New	Washington	PA	5,175	Southwest Pennsylvania Intrastate
Columbia Smithfield	Redd Farm	New	Washington	PA	9,400	Southwest Pennsylvania Intrastate
Supply Header	JB Tonkin	Upgrade	Westmorland	PA	21,830	Southwest Pennsylvania Intrastate
Supply Header	Crayne	Upgrade	Greene	PA	23,300	Southwest Pennsylvania Intrastate
Rover	Clarington	New	Monroe	OH	11,245	Steubenville-Weirton-Wheeling Interstate
Rover	Majorsville	New	Marshall	WV	7,100	Steubenville-Weirton-Wheeling Interstate
Supply Header	Burch Ridge	Upgrade	Marshall	WV	6,130	Steubenville-Weirton-Wheeling Interstate
Nexus Gas Transmission Project	Hanoverton	New	Columbiana	OH	52,000	Steubenville-Weirton-Wheeling Interstate

The total emissions represented in the table included in EPA’s comment from the collected projects were calculated using AP-42 factors, which are overly conservative when compared to individual project totals. For example, the Bradshaw compressor station represents 15% of the total horsepower of the proposed compressor station projects listed in Table 2. However, the Bradshaw compressor station has potential emissions of approximately 180 tons per year for NOx, which is much lower than its share of the total emissions calculated by EPA in the comment (i.e., in its comment EPA indicated total NOx emissions of 17,314, 15% of which would be approximately 2,700 tons per year, which is much greater than 180 tons per year). Therefore, the comment is based on emission values that are not representative of, at least at a minimum, the Project.

In addition, the Bradshaw compressor station (the largest facility noted in the summary) demonstrated compliance with the ambient air quality standards at the facility fence line (including regional background), and Mountain Valley would expect that approvals for the remaining projects in Table 2 are based on a similar demonstration of compliance. Upon review of the proposed projects in the comment, the compressor

stations in question are located in various counties (i.e., no more than two compressor stations are located in the same county). This spatial relationship reduces the likelihood of overlapping impacts as the maximum modeled impacts (for the Project) are located at or near the facility fence line.

EPA Comment No. 53: Additionally, the DEIS does not demonstrate how the actions associated with the proposed projects and in combination with other projects will reduce the emissions resulting from operation of the new and existing compressor stations.

Mountain Valley Response No. 53: As noted previously and in the applicable air permits granted for the Project, Mountain Valley has demonstrated compliance with ambient air quality standards when including background concentrations. The additional projects noted in the comment and summarized in Table 2 of Response No. 52 are unrelated to the Project. Therefore, any emissions impact from the projects are unrelated to the Project. As noted previously, the overlapping impact is anticipated to be minimal due to the dispersed nature of the facilities. Also, as noted previously in Response No. 52, it appears that the emissions noted in the comment are not based on an accurate representation of emissions from the projects.

Please feel free to contact me if you have questions or need any additional information. Thank you for your time and consideration.

Sincerely,

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**Attachmnet 1A - TABLE
Exceptional Waterbodies Crossed by Mountain Valley Project**

NHD Stream Name	County	State	Designation
UNT to Painter Run	Monroe	WV	Tier 3
Painter Run	Monroe	WV	Tier 3
Dry Creek	Monroe	WV	Tier 3
UNT to Hans Creek	Monroe	WV	Tier 3
UNT to Hans Creek	Monroe	WV	Tier 3
UNT to Hans Creek	Monroe	WV	Tier 3
UNT to Hans Creek	Monroe	WV	Tier 3
Indian Creek	Monroe	WV	Tier 3
Slate Run	Monroe	WV	Tier 3
Slate Run	Monroe	WV	Tier 3
UNT to Little Stony Creek	Monroe	WV	Tier 3
Stony Creek	Monroe	WV	Tier 3
UNT to Stoney Creek	Monroe	WV	Tier 3
UNT to Stoney Creek	Monroe	WV	Tier 3
Wind Creek	Monroe	WV	Tier 3
Kelly Creek	Summers	WV	Tier 3
Hungard Creek	Summers	WV	Tier 3
Right Fork Hungard Creek	Summers	WV	Tier 3
Hungard Creek	Summers	WV	Tier 3
Lick Creek	Summers	WV	Tier 3
UNT to Lick Creek	Summers	WV	Tier 3
UNT to Meadow River	Greenbrier	WV	Tier 3
Morris Fork	Greenbrier	WV	Tier 3
Buffalo Creek	Greenbrier	WV	Tier 3
UNT to Boggs Creek	Greenbrier	WV	Tier 3
Little Sewell Creek	Greenbrier	WV	Tier 3
Meadow River	Greenbrier	WV	Tier 3
UNT to Meadow Creek	Greenbrier	WV	Tier 3
UNT to Hominy Creek	Nicholas	WV	Tier 3
Sugar Branch	Nicholas	WV	Tier 3
UNT to Hominy Creek	Nicholas	WV	Tier 3
Hominy Creek	Nicholas	WV	Tier 3
UNT to Hominy Creek	Nicholas	WV	Tier 3
UNT to Hominy Creek	Nicholas	WV	Tier 3
Riley Branch	Nicholas	WV	Tier 3
UNT to Riley Branch	Nicholas	WV	Tier 3
Jims Creek	Nicholas	WV	Tier 3
Skelt Run	Nicholas	WV	Tier 3
Skelt Run	Nicholas	WV	Tier 3
UNT to Little Laurel Creek	Nicholas	WV	Tier 3
Gauley River	Nicholas	WV	Tier 3
UNT to Gauley River	Nicholas	WV	Tier 3
UNT to Gauley River	Nicholas	WV	Tier 3

TABLE 1
Exceptional Waterbodies Crossed by Mountain Valley Project

NHD Stream Name	County	State	Designation
Big Run	Nicholas	WV	Tier 3
Granny Run	Nicholas	WV	Tier 3
Big Beaver Creek	Nicholas	WV	Tier 3
UNT to Big Beaver Creek	Nicholas	WV	Tier 3
Big Beaver Creek	Nicholas	WV	Tier 3
Cherry Run	Nicholas	WV	Tier 3
Barn Run	Nicholas	WV	Tier 3
Barn Run	Nicholas	WV	Tier 3
Strouds Creek	Webster	WV	Tier 3
UNT to Laurel Run	Braxton	WV	Tier 3
Little Laurel Creek	Nicholas	WV	Tier 3, Trout Waters
Little Laurel Creek	Nicholas	WV	Tier 3, Trout Waters
UNT to Slate Run	Monroe	WV	Tier 3, Trout Waters
Greenbrier River	Summers	WV	Tier 3, WV Natural Stream, M
UNT to Hans Creek	Monroe	WV	Tier 3, WWF
Lick Creek	Summers	WV	Tier 3, WWF
UNT to Wind Creek	Monroe	WV	Tier 3, WWF*
UNT to Wind Creek	Monroe	WV	Tier 3, WWF*
UNT to Blue Lick	Monroe	WV	Tier 3, WWF*

WV Stream Designations:

- WWF - Warm Water Fishery listed in WV 2014 Integrated Report 305(b) Designated Use and Overall Category Designation;

Trout waters - Category B-2 Trout Waters;

* - Indicates a tributary to a stream designated as WWF or Trout Water, as noted. As upstream tributaries to designated WWF or Trout Waters, these tributaries are also considered WWF or Trout Waters.;

WV Natural Stream - streams identified in WV Natural Streams Preservation Act listed in Nationwide Permits for the State of West Virginia General Conditions;

Tier 1 - A waterbody that is listed as impaired on the states 303(d) list is considered a Tier 1 water as it pertains to the specific pollutant listed;

Tier 2 - the default assignment for a waterbody not listed as impaired on the states 303(d) list;

Tier 3 - outstanding national resource waters, streams were identified using an ArcGIS shapefile provided by WVDEP in June 2016,

M - freshwater mussels observed in the proposed Project crossing area.

- In stream work in designated warm water streams and their adjacent tributaries during the fish spawning season, April - June and trout waters and their adjacent tributaries during the trout water fish spawning season September 15-March 31st requires a spawning season waiver from the WVDNR, Wildlife Resources Section.

- In stream work may occur during the respective spawning season in ephemeral waters without a waiver if all reasonable measures are taken to minimize turbidity and sedimentation downstream associated with the proposed project.

VA Stream Designations

-Trout Waters - Cold Water Streams Survey (CWSS) – trout streams shapefile available here:

<https://www.dgif.virginia.gov/gis/data/download/>

-Anadromous Fish Use Areas - No anadromous fish use areas within project survey area. All areas are far to the east of the project. Shapefile available at path below:
<https://www.dgif.virginia.gov/gis/data/download/>

- Tier 3: listed at path below

[http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/ExceptionalStateWaters\(TierIII\).aspx](http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/ExceptionalStateWaters(TierIII).aspx)

-Tier 1 and Tier 2 designations not publically available from VA DEQ. Tier 1 and Tier 2 designations decisions are made by VA DEQ when necessary to make a permitting decision.

NOTE: No Tier 3 Waterbodies are crossed by the Project in Virginia.

Attachment 1B
Waterbodies Crossed by Mountain Valley Identified
as Wild Trout Waters in Virginia (VADGIF)

NHD Stream Name	County	Trout waters (class from VADGIF shapefile)
Bottom Creek	Roanoke	Class III
Mill Creek	Montgomery	Class II
UNT to Little Stony Creek	Giles	Class II
Green Creek	Franklin	Class II
UNT to Bottom Creek	Roanoke	Class III
Little Stony Creek	Giles	Class II
Bottom Creek	Roanoke	Class III