2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 PROPOSED FACILITIES

The MVP and the EEP would involve the construction and operation of underground natural gas transmission pipelines and associated aboveground facilities in West Virginia, Virginia, and Pennsylvania. Figures 1-1 and 1-2 show the MVP and the EEP, respectively, and appendix B depicts the projects on U.S. Geological Survey (USGS) topographic base maps. Both Applicants also provided larger-scale aerial photographic base maps, referred to as alignment sheets, depicting the pipeline facilities and associated construction and operation rights-of-way. The alignment sheets can be accessed through the FERC's eLibrary system on our Internet website at www.ferc.gov.[1]

The MVP and the EEP combined would consist of about 309 miles of natural gas transmission pipelines. Aboveground facilities would consist of 4 new compressor stations; 1 existing compressor station to be decommissioned; 11 new M&R stations, interconnects, and taps; 7 pig launchers and receivers; and 36 MLVs for the MVP (see table 2.1-1).

The pipeline facilities would be constructed of steel and installed underground for their entire length using the methods described in sections 2.4.2 and 2.4.3. The basic functions of the various aboveground facilities are summarized in the following bullets, and additional details regarding each Applicants' individual facilities are provided below in sections 2.1.1 and 2.1.2.

- Compressor stations utilize engines to maintain pressure within the pipeline in order to deliver the contracted volumes of natural gas to specific points at specific pressures. Compressors are housed in buildings that are designed to attenuate noise and allow for operation and maintenance activities (see figure 2.1-1). Compressor stations also typically include administrative, maintenance, storage, and communications buildings, and can include metering and pig launcher/receiver facilities as discussed below. Most stations consist of a developed, fenced area within a larger parcel of land that remains undeveloped. The location of the compressor station and amount of compression needed are determined primarily by hydraulic modeling although typically there is some level of flexibility regarding the siting of compressor stations. The general construction and operation procedures for the compressor stations are discussed in sections 2.4.3 and 2.6.2. Regulatory requirements and impacts on air quality and noise associated with the new compressor stations are discussed in section 4.11.1.

[1] The eLibrary link can be found under "Documents & Filings" on the FERC Internet webpage. Alignment sheets for the MVP (accession numbers 20160421-5195, 20160422-5012, 20160624-5244, and 20160718-5161) are under Docket No. CP16-10-000, and alignment sheets for the EEP (accession number 20160422-5100) are under Docket No. CP16-13-000.

TABLE 2.1-1

Proposed Facilities for the Mountain Valley Project and the Equitrans Expansion Project

Facility/Project	West Virginia	Virginia	Pennsylvania	Total
PIPELINE (MILES)				
MVP	195.4	105.6	N/A	301.0
EEP	<0.1	N/A	7.8	7.9
Pipeline Subtotal	*195.4*	*105.6*	*7.8*	*308.9*
ABOVEGROUND FACILITIES				
New Compressor Stations (Number)				
MVP	3	0	N/A	3
EEP	0	N/A	1	1
New Compressor Stations Subtotal	*3*	*0*	*1*	*4*
Compressor Station Decommissioning (Number)				
MVP	0	0	N/A	N/A
EEP	0	N/A	1	1
Compressor Station Decommissioning Subtotal	*0*	*0*	*1*	*1*
M&R STATIONS, INTERCONNECTS, & TAPS (NUMBER)				
MVP	4	2	N/A	6
EEP	3	N/A	2	5
Total of New M&R Stations, Interconnects, & Taps	**7**	**2**	**2**	**11**
MLVs (NUMBER)				
MVP	22	14	N/A	36
EEP	N/A	N/A	N/A	N/A
Total of MLVs	**22**	**14**	**N/A**	**36**

N/A = Not applicable
Note: Totals may not sum correctly due to rounding.

- M&R stations measure the volume of gas removed from or added to a pipeline system. Most M&R stations consist of a small graveled area with small building(s) that enclose the measurement equipment (see figure 2.1-2). Mountain Valley would construct and operate M&R stations within some compressor station boundaries, at customer delivery points, and at interconnections with other interstate transmission systems.
- MLVs consist of a small system of aboveground and underground piping and valves that control the flow of gas within the pipeline and can also be used to vacate, or blow-off, the gas within a pipeline segment, if necessary (see figure 2.1-3). MLVs would be installed within the operational rights-of-way of the pipeline facilities. MLVs can be located at interconnections within a transmission system (i.e., between a mainline pipeline and a loop) and at locations based on the DOT Class designation of the pipeline; in general, the distance between MLVs is reduced in areas of higher human population (see section 4.12).

- Launchers and receivers are facilities where internal pipeline cleaning and inspection tools, referred to as "pigs," could be inserted or retrieved from the pipeline. Pig launchers/receivers consist of an aboveground group of piping within the pipeline's permanent right-of-way or other aboveground facility boundaries (see figure 2.1-4).
- Cathodic protection systems help prevent corrosion of underground facilities. These systems typically include a small, aboveground transformer-rectifier unit and an associated anode groundbed located on the surface or underground (see figure 2.1-5). Cathodic protection facilities are typically located within the pipeline's permanent right-of-way but may be adjacent to the permanent right-of-way--such is the case for the MVP and the EEP.

2.1.1 Pipeline Facilities

The general purpose of the MVP is to transport about 2.0 Bcf/d of natural gas from production areas in southern Pennsylvania and northern West Virginia via a new 42-inch-diameter 301-mile-long pipeline, beginning at the Mobley Interconnect and receipt M&R station in Wetzel County, West Virginia and terminating at the Transco Interconnect and delivery M&R station, at the existing Transco Station 165, in Pittsylvania County, Virginia. Shippers would be able to take the gas from the Transco Station 165 to markets along the east coast.

The general purpose of the six newly proposed EEP pipelines is to transport natural gas from production areas in southern Pennsylvania to northern West Virginia, where the EEP would interconnect with the MVP pipeline at the Webster Interconnect and Mobley Tap in Wetzel County, West Virginia. The EEP pipelines could transport a total of 0.4 Bcf/d. Through interconnections with other existing pipeline systems in southern Pennsylvania, the EEP would be able to provide natural gas to markets in the Northeast. The north-south EEP pipelines would provide Equitrans with increased system reliability and flexibility. The six new EEP pipelines would total almost 8 miles combined, with segments located in Greene, Washington, and Allegany Counties, Pennsylvania and Wetzel County, West Virginia.

Typical Compressor Station

Figure 2.1-1

Mountain Valley &
Equitrans Expansion Projects

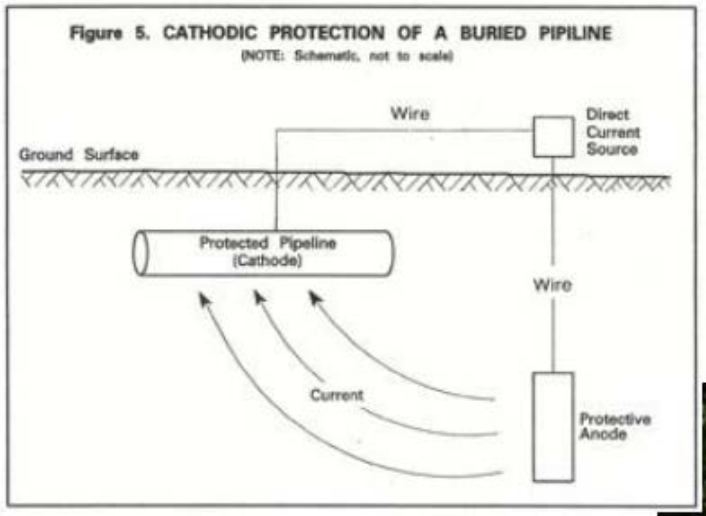
Typical M&R Station	Figure 2.1-2 Mountain Valley & Equitrans Expansion Projects

Typical MLV	Figure 2.1-3 Mountain Valley & Equitrans Expansion Projects

Typical Pig Launcher and Receiver

Figure 2.1-4

Mountain Valley &
Equitrans Expansion Projects



Typical Cathodic Protection System

Figure 2.1-5

Mountain Valley & Equitrans Expansion Projects

2.1.1.1 Mountain Valley Project

The proposed MVP pipeline consists of about 301 miles of 42-inch-diameter pipe located in the counties listed on table 2.1-2 and as described in detail below. The pipeline route begins at an interconnection with Equitrans' existing H-302 pipeline at the Mobley Interconnect and Tap in Wetzel County, West Virginia and proceeds in a general southeasterly direction to Transco's existing Station 165 in Pittsylvania County, Virginia. The pipeline has been designed to transport about 2.0 Bcf/d of natural gas. The maximum allowable operating pressure (MAOP) for the new pipeline would be 1,480 pounds per square inch gauge (psig). For about 88 miles (29 percent of the route), the MVP pipeline would follow other existing rights-of-away (see table 2.1-3).

TABLE 2.1-2

Pipeline Facilities for the Mountain Valley Project

State/County	MP Range	Length (miles)
West Virginia		
Wetzel County	0.0 – 9.6	9.6
Harrison County	9.6 – 31.6 32.7 – 33.7 37.5 – 38.1	23.7
Doddridge County	31.6 – 32.7 33.7 – 37.5	4.8
Lewis County	38.1 – 65.6	27.5
Braxton County	65.6 – 80.3	14.7
Webster County	80.3 – 109.5 109.8-110.6	30.0
Nicholas County	109.5 – 109.8 110.6 – 135.0	24.7
Greenbrier County	135.0 – 153.8 154.3 – 156.7	21.2
Fayette County	153.8 – 154.3	0.5
Summers County	156.7 – 173.4	16.7
Monroe County	173.4 – 195.4	22.0
	West Virginia (subtotal)	*195.4*
Virginia		
Giles County	195.4 – 215.4	20.0
Craig County	215.4 – 217.1	1.7
Montgomery County	217.1 – 236.1	19.0
Roanoke County	236.1 – 244.4	8.3
Franklin County	244.4 – 281.0	36.7
Pittsylvania County	281.0 – 301.0	19.9
	Virginia (subtotal)	*105.6*
	Mountain Valley Project Total	**301.0**

Note: Totals may not sum correctly due to rounding.

TABLE 2.1-3

Summary of Pipeline Collocated with Existing Rights-of-Way
Mountain Valley Project

Collocation Type	Distance (miles)	Percent
Field Road Rights-of-Way	29.9	9.9
Underground Electric/Telephone Lines/Fiber Optics Rights-of-Way	0.8	0.3
Local Private/Public Road Rights-of-Way	1.2	0.4
Overhead Power Lines/Electric Transmission Line Rights-of-Way	26.5	8.8
Pipeline Rights-of-Way	10.9	3.6
Railroad Rights-of-Way	0.3	0.1
National/Field Trail Rights-of-Way	12.6	4.2
State/County Road Rights-of-Way	5.5	1.8
Total	**87.7**	**29.1**

Note: Totals may not sum correctly due to rounding.
Note: Not all collocated features are directly adjacent to the pipeline.

2.1.1.2 Equitrans Expansion Project

The pipelines for the EEP total about 8 miles of varying diameter pipe located in three counties in Pennsylvania and one county in West Virginia (listed on table 2.1-4). The pipeline system has been designed to transport about 600,000 Dth/d (600 million cubic feet per day [MMcf/d]) but is currently only contracted for 400,000 Dth/d (400 MMcf/d). The EEP pipelines would be adjacent to existing rights-of-way for about 1.6 miles (or 20 percent of the route).

TABLE 2.1-4

Pipeline Facilities for the Equitrans Expansion Project

State/Pipeline Segment	County	MP Range	Pipeline Diameter (inches)	Length (miles)
Pennsylvania				
H-318	Allegheny	0.0 – 3.0	20	3.0
H-318	Washington	3.0 – 4.3	20	1.2
H-316	Greene	0.0 – 3.0	30	3.0
H-158	Greene	0.0 – 0.2	12	0.2
M-80	Greene	0.0 – 0.2	6	0.2
H-305	Greene	0.0 – 0.1	24	0.1
			Pennsylvania (subtotal)	*7.8*
West Virginia				
H-319	Wetzel	0.0 – <0.1	16	<0.1
			West Virginia (subtotal)	*<0.1*
			Equitrans Expansion Project Total	**7.9**

Note: Totals may not sum correctly due to rounding.

The EEP consists of two larger pipeline segments (the H-316 and H-318 pipelines) and four shorter secondary pipeline segments (the M-80, the H-158, the H-305, and the H-319 pipelines). The new H-316 pipeline would extend about 3 miles in an east-to-west direction in Greene County, Pennsylvania. The H-316 pipeline would move natural gas from the new Redhook Compressor Station to Equitrans' existing H-302 24-inch-diameter pipeline for delivery to Texas Eastern, or south to the MVP pipeline. The MAOP for the H-316 pipeline would be 1,200 psig.

The new H-318 pipeline would extend about 4.2 miles in an east-to-west direction in Allegheny and Washington Counties, Pennsylvania. The H-318 pipeline would connect the existing Applegate Gathering System, operated by EQT Gathering, LLC, to Equitrans' existing H-148 20-inch-diameter pipeline for transport of natural gas south. The MAOP for the H-318 pipeline would be 1,200 psig.

The new H-158 and M-80 pipelines currently move gas to the existing Pratt Compressor Station. These pipelines would be extended to transport gas to the proposed Redhook Compressor Station. The MAOP for the H-158 and M-80 pipelines would be 1,000 psig.

The new H-305 pipeline would extend about 540 feet to move gas from the Redhook Compressor Station to Equitrans' existing H-305 pipeline. The MAOP for the H-305 pipeline would be 1,200 psig.

The new H-319 pipeline would extend about 200 feet to connect Equitrans' H-306 pipeline to the Webster Interconnect with the MVP. The MAOP for the H-319 pipeline would be 1,200 psig.

2.1.2 Aboveground Facilities

Aboveground facilities include compressor stations, M&R stations, taps, MLVs, and pig launchers/receivers.

2.1.2.1 Mountain Valley Project

The MVP would include the construction of 3 new compressor stations; 4 M&R stations and interconnects; 2 taps; 5 pig launchers and receivers; and 36 MLVs (as listed on table 2.1-5).

TABLE 2.1-5

Aboveground Facilities for the Mountain Valley Project

Facility	MP	County, State
Compressor Stations		
Bradshaw Compressor Station (with MLV 2, pig launcher and receiver, and a communication tower)	2.8	Wetzel, West Virginia
Harris Compressor Station (with pig launcher and receiver and a communication tower)	77.5	Braxton, West Virginia
Stallworth Compressor Station (with pig launcher and receiver, and a communication tower)	154.2	Fayette, West Virginia
M&R Stations, Interconnections, and Taps		
Mobley Interconnect (receipt with MLV 1 and pig launcher)	0.0	Wetzel, West Virginia
Webster Tap	0.8	Wetzel, West Virginia
Sherwood Interconnect (receipt)	23.7	Harrison, West Virginia
WB Interconnect (delivery)	77.5	Braxton, West Virginia
Roanoke Gas Tap	262.7	Franklin, Virginia
Transco Interconnect (delivery with pig receiver) and MLV 36	301.0	Pittsylvania, Virginia
Mainline Valves		
MLV 3	15.4	Harrison, West Virginia
MLV 4	15.5	Harrison, West Virginia
MLV 5	35.0	Doddridge, West Virginia
MLV 6	53.1	Lewis, West Virginia
MLV 7	64.7	Lewis, West Virginia
MLV 8	65.6	Lewis, West Virginia
MLV 9	77.5	Braxton, West Virginia
MLV 10	93.2	Webster, West Virginia
MLV 11	98.7	Webster, West Virginia
MLV 12	101.8	Webster, West Virginia
MLV 13	111.1	Nicholas, West Virginia
MLV 14	119.9	Nicholas, West Virginia
MLV 15	138.4	Greenbrier, West Virginia
MLV 16	140.5	Greenbrier, West Virginia
MLV 17	143.6	Greenbrier, West Virginia
MLV 18	143.8	Greenbrier, West Virginia
MLV 19	154.2	Fayette, West Virginia
MLV 20	170.1	Summers, West Virginia
MLV 21	171.0	Summers, West Virginia
MLV 22	185.2	Monroe, West Virginia
MLV 23	198.5	Giles, Virginia
MLV 24	200.6	Giles, Virginia
MLV 25	211.1	Giles, Virginia
MLV 26	222.3	Montgomery, Virginia
MLV 27	233.6	Montgomery, Virginia

TABLE 2.1-5 (continued)

Aboveground Facilities for the Mountain Valley Project

Facility	MP	County, State
MLV 28	234.5	Montgomery, Virginia
MLV 29	247.1	Montgomery, Virginia
MLV 30	256.7	Franklin, Virginia
MLV 31	262.4	Franklin, Virginia
MLV 32	266.6	Franklin, Virginia
MLV 33	280.7	Franklin, Virginia
MLV 34	293.4	Pittsylvania, Virginia
MLV 35	296.8	Pittsylvania, Virginia

The Bradshaw Compressor Station would be located at MP 2.8 along the MVP pipeline in Wetzel County, West Virginia. The four gas-driven turbine units at the station combined would generate about 89,600 hp of compression. The station has been designed to raise pipeline pressure from 765 psig to 1,450 psig. The station would contain five structures (compressor building, air compressor building, two electrical control buildings, and an office), with a gravel yard surrounded by a chain link fence. Besides the communication tower, other equipment at the station would include gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, auxiliary micro-turbines, and a pig receiver. Dual 42-inch-diameter, 550-foot-long suction and discharge pipelines would connect the MVP pipeline with the Bradshaw pig receiver and launcher.

The Harris Compressor Station would be located at MP 77.5 along the MVP pipeline in Braxton County, West Virginia. The two gas-driven turbine units at the station combined would be capable of generating about 41,000 hp of compression. The station has been designed to raise the natural gas pressure in the pipeline from 1,100 psig to 1,450 psig. The Harris Compressor Station would contain similar buildings and equipment to the Bradshaw Compressor Station. Dual 42-inch-diameter, 100-foot-long suction and discharge pipelines would connect the MVP pipeline with the Harris pig receiver and launcher.

The Stallworth Compressor Station would be located at MP 154.2 along the MVP pipeline in Fayette County, West Virginia. The two gas-driven turbine units at the station combined would be capable of generating about 41,000 hp of compression. The station has been designed to raise the natural gas pressure in the pipeline from 1,060 psig to 1,450 psig. The Stallworth Compressor Station would contain similar buildings and equipment to the Bradshaw and Harris Compressor Stations. Dual 42-inch-diameter, 100-foot-long suction and discharge pipelines would connect the MVP pipeline with the Stallworth pig receiver and launcher.

The Mobley Interconnect and receipt M&R station would be located at MP 0.0 at the beginning of the MVP pipeline, in Wetzel County, West Virginia. The site would include a gravel yard surrounded by a chain link fence. At the Mobley Interconnect, Mountain Valley would receive natural gas from Equitrans through its existing 24-inch-diameter H-302 pipeline, via a new 36-inch-pipeline installed by Equitrans to discharge into the new 42-inch-diameter

MVP pipeline. The new station would contain an electronics building (used to house gas chromatographs, flow computers, and communication equipment). Other components of the interconnection would be four gas filter separators, three 20-inch ultrasonic gas meters runs, two 20-inch flow control valve runs, and a pig launcher.

The Sherwood Interconnect and receipt M&R station would be located at MP 23.7 along the MVP pipeline in Harrison County, West Virginia. The site would include a gravel yard surrounded by a chain link fence. The Sherwood Interconnect would receive natural gas from a third-party upstream pipeline and discharge at the Sherwood Gas Processing Plant into the MVP pipeline. Components of the interconnection would include two gas filter separators, one 12-inch ultrasonic gas meter run, and one 10-inch overpressure protection/flow control valve run. The discharge from the M&R station into the 42-inch-diameter MVP pipeline would be through a 16-inch-diameter pipeline, 50 feet long. This station would also contain two electronics buildings.

The WB Interconnect and delivery M&R station would be located at MP 77.5 along the MVP pipeline in Braxton County, West Virginia. The site would include a gravel yard surrounded by a chain link fence. The WB Interconnect would be located directly adjacent to the Harris Compressor Station. The WB Interconnect would deliver gas from the MVP pipeline into Columbia Lines WB and WB-5. In order to access Columbia's approved tap location, about 1,000 feet of 24-inch-diameter pipeline would be installed from the MVP pipeline. Components of the interconnection and M&R station would include two gas filter separators, two 16-inch gas ultrasonic meter runs, and three 12-inch overpressure protection/flow control values runs. There would be a canopy installed over the meter runs, and another over the control value runs. There would be one electronics building for Columbia and one for Mountain Valley at the site.

The Transco Interconnect and delivery M&R station would be located at MP 301 at the terminus of the MVP pipeline in Pittsylvania County, Virginia. The site would include a gravel yard enclosed by a chain-link fence. Mountain Valley proposes to interconnect with four existing Transco pipelines at existing Station 165 (Pipelines A and B are 30 inches in diameter; Pipeline C is 36 inches in diameter; and Pipeline D is 42 inches in diameter). Components of the Transco Interconnect and M&R station would include five gas filter separators, six 16-inch ultrasonic gas meter runs, four 16-inch overpressure protection/flow control meter runs, two 26-inch overpressure protection security valve runs and a pig receiver. The pig receiver would attach directly to the MVP pipeline. A meter building would enclose the meter runs and a control valve building would enclose the control valve runs. One electronics building would be erected for Transco's equipment, and another for Mountain Valley's.

Two taps would be constructed as part of the MVP: Webster and Roanoke Gas. The Webster Tap would be located about MP 0.8 along the MVP pipeline, in Wetzel County, West Virginia, and would be adjacent to the Webster Interconnect planned by Equitrans for its EEP (see section 2.1.2.2). The Webster Tap would have a delivery capacity of about 630,000 Dth/day (630 MMcf/d).

Roanoke Gas and Mountain Valley have not yet determined the exact tap location of the Roanoke Gas Tap. However, a preliminary location would be about MP 262.7 along the MVP pipeline, in Roanoke County, Virginia. The final location would be determined based on terrain,

land use, parcel sizes, residences, and land acquisition. Mountain Valley currently estimates that the Roanoke Gas Tap would have a delivery capacity of 5,000 Dth/day (5 MMcf/d).

A single communication tower would be contained completely within each of the three new compressor stations. Each communication tower would be 60 feet tall and would include one to three radio antennas. The tower would include three vertical posts supported by cross beams for the entire length and attached to a concrete foundation. Mountain Valley would install very small aperture terminal (VSAT) equipment at all three compressor stations, all four interconnections, and all 36 MLV sites for primary telecommunications service. Each VSAT site would include a 4-foot-diameter dish antenna attached to a 2.5-inch metal pole about 6.5 feet above the ground. The VSAT dish would be connected to a modem using coaxial cable. The communication towers would not emit any light or noise.

Mountain Valley proposes to use remotely controlled MLVs along the pipeline route at 36 locations. One MLV would be within the Bradshaw Compressor Station; one would be installed at the Mobley Interconnect; and one would be installed at the Transco Interconnect. The rest would be constructed along the new pipeline. The MLVs would be continuously monitored at Mountain Valley's gas control center and could be controlled both locally and remotely. In the event of an incident, an electronic command for valve closure can be sent, with the MLV closing within 2 minutes following issuance of a remote signal.

Pig launchers and receivers would be installed at all three of the new compressor stations and two of the interconnections (Mobley and Transco). Pig launchers would be installed at MP 0.0 and on the discharge side of each compressor station. Pig receivers would be installed at MP 301.0 and on the suction side of each compressor station.

2.1.2.2 Equitrans Expansion Project

The EEP would include the construction of one new compressor station, five interconnects and taps, and two pig launchers and receivers; and the decommissioning of an existing compressor station (see table 2.1-6).

TABLE 2.1-6

Aboveground Facilities for the Equitrans Expansion Project

Facility	Pipeline Segment - MP	County, State
Compressor Stations		
Redhook Compressor Station (with one 60-foot-tall communication tower and one pig launcher/receiver)	H-316 – 0.0 H-158/M-80 – 0.2	Greene, Pennsylvania
Decommissioning of the existing Pratt Compressor Station	N/A	Greene, Pennsylvania
Tap Sites & Interconnects		
Webster Interconnect	H-319 – <0.1	Wetzel, West Virginia
Mobley Tap	H-302 – 0.6	Wetzel, West Virginia
H-302 Tap (with pig launcher/receiver)	H-316 – 3.0	Greene, Pennsylvania
H-306 Tap	H-319 – 0.0	Wetzel, West Virginia
H-148 Tap	H-318 – 4.2	Washington, Pennsylvania
Pig Launcher/Receiver Facilities		
Applegate	H-318 – 0.0	Allegheny, Pennsylvania
Hartson	H-318 – 4.3	Washington, Pennsylvania

N/A = Not Applicable

The new Redhook Compressor Station would be located on a "green field" site in Greene County, Pennsylvania. The station would use two natural gas-fired reciprocating engines and two natural gas-fired turbine engines to produce about 31,300 hp of compression. It would have a capacity of 878.5 MMcf/d.

The existing Pratt Compressor Station, in Greene County, Pennsylvania, would be abandoned, decommissioned, and demolished once the new Redhook Compressor Station is operational. The 6-inch-diameter M-80 and 12-inch-diamenter H-158 pipelines would be re-routed from the Pratt Compressor Station to the Redhook Compressor Station. During operation, Equitrans would use the abandoned compressor station site as a storage yard.

Equitrans would utilize best management practices (BMPs) to remove old compressor station equipment from the abandoned Pratt Compressor Station. All removed equipment would be salvaged or disposed of properly. According to Equitrans, several facilities would remain at the Pratt Compressor Station site, including:

- the H-147 pipeline receiver;
- the H-147 pipeline ultrasonic meter;
- two Dominion interconnects with control valves, filter/separators, regulation runs, and ultrasonic meter runs/chromatographs (in a building);
- an Equitrans electronics building;
- a Dominion dekatherm building; and
- a tap valve.

Additionally, Equitrans would construct new regulator and meter runs to supply the Peoples Natural Gas, LLC; a new prefabricated gas chromatograph/instrument/remote terminal unit building; and join ("tie-in") multiple existing pipelines. The tie-ins would join:

- the H-147 pipeline to the H-148 pipeline;
- the H-137 pipeline to the H-106 pipeline;
- the H-117 pipeline to the H-108 pipeline;
- the GSF-360 to Dominion Pratt II Interconnect;
- GSF-360 to Dominion Pratt I Interconnect; and
- H-137 to H-136.

The tie-ins would also require removal of small segments of existing pipelines, specifically:

- a portion of the existing 12-inch-diameter H-136 pipeline;
- a portion of the existing 16-inch-diameter GSF-360 pipeline;
- portions of the existing 10-inch-diameter M-80 pipeline;
- a portion of the existing 16-inch-diameter H-106 pipeline; and
- a portion of the existing 16-inch-diameter H-108 pipeline.

Equitrans would construct all of the modifications to the Pratt Compressor Station site within the existing industrial boundary and would install all new equipment within the currently disturbed site. Therefore, environmental resources associated with these facilities are evaluated within the context of the Pratt Compressor Station as a yard throughout this EIS.

During decommissioning of the Pratt Compressor Station, Equitrans anticipates removing and disposing of the following hazardous materials:

- petroleum (oil) contaminated soil;
- lead paint;
- asbestos (coal-tar wrap);
- liquid hydrocarbons in various pipes;
- mercury meters; and
- a polychlorinated biphenyl (PCB) transformer.

Equitrans would handle all hazardous materials in accordance with state and federal regulatory requirements. Equitrans would also follow its *Spill Prevention Controls and Countermeasures Plan* (SPCCP) and *Preparedness, Prevention and Contingency and Emergency Action Plans* (see table 2.4-2). Equitrans would collect and analyze samples to determine the proper disposal method for potentially contaminated soil and coal tar or asbestos wrapped pipe. These materials would be stored at the Pratt Compressor Station until sample analysis has been completed.

The Webster Interconnect would be located in Wetzel County, West Virginia, at the terminus of the new H-319 pipeline. The site would include a gravel yard surrounded by a fence. The interconnection would consist of meters, pressure/flow control valves, isolation block

valves, and associated instrumentation and controls to measure and control the flow of gas between the EEP and the MVP pipeline. The Webster Interconnect would join Equitrans' existing H-306 16-inch-diameter pipeline and the planned H-319 pipeline.

The Mobley Tap would be located in Wetzel County, West Virginia at the terminus of the existing H-302 pipeline, and would include a gravel yard surrounded by a fence. The facilities would include two taps, a riser, valves, and associated piping between the existing 24-inch-diameter Equitrans H-302 pipeline and the new 42-inch-diameter MVP pipeline. The anticipated flow from the south from the existing Mobley Plant through the Mobley Tap would range from 300 to 920 MMcf/d, while the flow from the north from Pennsylvania would range from 300 to 600 MMcf/d.

The EEP would not require any MLVs. The pig launchers and receivers at the beginning and end of each pipeline segment would contain the required shutoff valves. Equitrans would install one of the pig launcher/receivers at the Applegate site, at MP 0.0 of the new H-318 pipeline, in Allegheny County, Pennsylvania. Another pig launcher/receiver would be constructed at the Hartson site, at MP 4.3 of the new H-318 pipeline in Washington County, Pennsylvania. The third pig launcher/receiver would be installed at the H-302 Tap site, at MP 3.0 along the new H-316 pipeline, in Greene County, Pennsylvania.

2.1.3 Cathodic Protection

Cathodic protection units would include both aboveground and underground components. These units, typically installed after the pipeline, are meant to decrease or prevent corrosion of the pipe. Protection units typically consist of underground negative connection cables welded to the pipeline. The negative connection cables would connect to underground linear anode cable systems tied into an aboveground junction box and rectifier that operate the system.

2.1.3.1 Mountain Valley Project

Mountain Valley would install cathodic protection at 31 locations along the MVP pipeline route (see table 2.1-7).

TABLE 2.1-7

Cathodic Protection Units
Along the Route of the Mountain Valley Project

Facility	MP	County, State
1a	2.3	Wetzel, West Virginia
1b	6.6	Wetzel, West Virginia
2	15.5	Harrison, West Virginia
3	23.1	Harrison, West Virginia
4	35.0	Doddridge, West Virginia
5	46.0	Lewis, West Virginia
6	55.2	Lewis, West Virginia
7	62.3	Lewis, West Virginia
8	73.8	Braxton, West Virginia
9	84.1	Webster, West Virginia
10	93.2	Webster, West Virginia
11	98.7	Webster, West Virginia
12	106.8	Webster, West Virginia
13	122.1	Nicholas, West Virginia
14	127.9	Nicholas, West Virginia
15	137.9	Greenbrier, West Virginia
16	149.2	Greenbrier, West Virginia
17	159.1	Summers, West Virginia
18	171.0	Summers, West Virginia
19	181.4	Monroe, West Virginia
20	190.5	Monroe, West Virginia
21	199.6	Giles, Virginia
22	210.0	Giles, Virginia
23	225.2	Montgomery, Virginia
24	233.9	Montgomery, Virginia
25	244.0	Roanoke, Virginia
26	253.0	Franklin, Virginia
27	261.6	Franklin, Virginia
28	272.1	Franklin, Virginia
29	282.6	Pittsylvania, Virginia
30	294.2	Pittsylvania, Virginia

According to Mountain Valley, the permanent footprint of cathodic surface groundbeds would be perpendicular to the right-of-way and vary from about 25 feet wide and 377 feet long to 25 feet wide and 972 feet long. Most surface groundbeds would also require a temporary workspace adjacent to the permanent footprint; this workspace would be 25 feet wide and run the length of the groundbed. The permanent footprint of deep well groundbeds would be within the permanent right-of-way or adjacent to the right-of-way in a workspace of 25 feet by 25 feet (0.014 acre each). A temporary workspace for deep well groundbeds would not be needed.

Mountain Valley would install four deep well groundbeds, permanently affecting a total of about 0.06 acre, and 27 surface groundbeds, affecting a total of about 19.0 acres during construction and 9.8 acres during operation.

According to alignment sheets filed by Mountain Valley, many of the cathodic protection groundbeds would be located outside of Mountain Valley's environmental survey corridor. We are recommending in section 4.8.1 that Mountain Valley should file the results for environmental surveys for all cathodic protection groundbeds prior to construction.

2.1.3.2 Equitrans Expansion Project

Equitrans would install cathodic protection at two locations along the EEP pipeline routes (see table 2.1-8). Magnesium anodes installed within the right-of-way would protect the M-80 pipeline from corrosion. The H-158, the H-305, and the H-319 pipelines would be protected by cathodic protection systems along Equitrans' existing M-82 pipeline, H-106 pipeline, and the H-306 pipeline, respectively.

TABLE 2.1-8

Cathodic Protection Units
Along the Route of the Equitrans Expansion Project

Facility	MP	County, State
H-316 Site	0.8	Greene, Pennsylvania
H-318 Site	2.8	Allegheny, Pennsylvania

2.2 NON-JURISDICTIONAL FACILITIES

Under Section 7 of the NGA, the FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the FERC. These "non-jurisdictional" facilities may be integral to the project objective (e.g., a new or expanded power plant that is not under the jurisdiction of the FERC at the end of a pipeline) or they may be merely associated as minor, non-integral components of the jurisdictional facilities that would be constructed and operated with the proposed facilities (e.g., a meter station constructed by a customer of the pipeline to measure gas offtake). In this EIS, we consider the potential environmental impacts associated with the construction and operation of non-jurisdictional facilities that are directly connected to the projects. In many cases, those non-jurisdictional facilities would be built, operated, and owned by third parties other than Mountain Valley and Equitrans, such as local electric utility companies.

2.2.1 Mountain Valley Project

The non-jurisdictional facilities associated with the MVP would include installation of aboveground and underground powerlines and telecommunications from existing nearby power poles to the interconnects, taps, compressor stations, and MLVs. Of the 36 MLVs associated with the project, 24 MLVs would require the local electric distributor to extend aboveground

power and telecommunications from an existing power pole to the MLV site. These extensions would range from 2 feet to 1,400 feet in length. One MLV (MLV 1) would require a 30-foot underground extension of power and telecommunications from an existing power pole. About 400 feet of conduit would be run from MLV 4 to power MLV 3. Six of the MLVs would not require any non-jurisdictional facilities for power or telecommunications. On-site solar panels, thermal electric generators, or fuel cells would power these six MLVs. Telecommunications would be radio and/or cellular with VSAT service as a backup (see section 2.1.2). The remaining four MLVs would be associated with either a compressor station or interconnection and are discussed below.

2.2.1.1 Mobley Interconnect

The Mobley Interconnect would require a 50-foot-long underground power and telecommunications service lateral.

2.2.1.2 Bradshaw Compressor Station and Mainline Valve 2

The Bradshaw Compressor Station and MLV 2 site would require the local electric distributor, Mon Power, to extend electric/telecommunications service about 9.1 miles to the site. Mon Power may also need to upgrade its Jacksonburg Substation to provide adequate power to the Bradshaw Compressor Station. A 400-foot-long underground electrical line would be run from the Bradshaw Compressor Station to MLV 2.

2.2.1.3 Sherwood Interconnect

The Sherwood Interconnect would require a 30-foot-long underground power and telecommunications service lateral.

2.2.1.4 Harris Compressor Station, WB Interconnect, and Mainline Valve 9

Initial power to the WB Interconnect and MLV 9 site would be provided by Mon Power from an existing power pole about 500 feet from MLV 9 and 1,000 feet from the WB Interconnect. Mon Power would install a transformer pole at MLV 9 and the WB Interconnect and connect a 30-foot-long 240/120 volt supply lateral from the pole to each site. The existing telecommunications lines would also be extended to MLV 9 and the WB Interconnect. Following completion of the Harris Compressor Station, Mountain Valley would install an underground 240/120 volt supply lateral (including telecommunications) adjacent to the pipeline from the Harris Compressor Station to MLV 9 and the WB Interconnect. At this time, the power purchased from Mon Power would be used as a backup power source.

2.2.1.5 Stallworth Compressor Station and Mainline Valve 19

Mountain Valley has requested that American Electric Power (AEP) extend a three-phase electric line about 2.7 miles to the Stallworth Compressor Station site. Telecommunications would also be extended to the site. Power and telecommunications from the Stallworth Compressor Station would be extended to the nearby MLV 19 site.

2.2.1.6 Transco Interconnect and Mainline Valve 36

The Transco Interconnect and MLV 36 would require a 1,100-foot-long aboveground power and telecommunications service lateral.

2.2.2 Equitrans Expansion Project

According to Equitrans, there are no non-jurisdictional facilities associated with the EEP.

2.3 LAND REQUIREMENTS

Construction of the MVP and the EEP would require the temporary use of a total of about 6,524 acres of land. This includes the pipeline construction right-of-way, ATWS, aboveground facilities, staging areas, contractor and storage yards (yards), cathodic protection areas, and new and improved access roads (see table 2.3-1). Operation of both the MVP and the EEP combined would utilize a total of about 2,179 acres. This includes the permanent pipeline easements, aboveground facilities, and permanent access roads.

TABLE 2.3-1

Land Requirements Associated with the Mountain Valley Project and the Equitrans Expansion Project

Project Component/State	Land Affected During Construction (acres)	Land Affected During Operation (acres)
PIPELINE FACILITIES		
West Virginia		
Pipeline Right-of-Way (MVP)	2,896.8	1,184.5
ATWS (MVP)	503.9	0.0
Pipeline Right-of-Way (EEP)	0.4	0.3
ATWS (EEP)	1.6	0.0
Virginia		
Pipeline Right-of-Way (MVP t)	1,551.1	639.5
ATWS (MVP	230.1	0.0
Pennsylvania		
Pipeline Right-of-Way (EEP)	90.0	46.0
ATWS (EEP)	59.9	0.0
Subtotal Pipeline Facilities – MVP	*5,181.9*	*1,824.0*
Subtotal Pipeline Facilities - EEP	*151.9*	*46.2*
Combined MVP and EEP Pipeline Facilities Total	***5,334***	***1,870***

TABLE 2.3-1 (continued)

Land Requirements Associated with the Mountain Valley Project and the Equitrans Expansion Project

Project Component/State	Land Affected During Construction (acres)	Land Affected During Operation (acres)
ABOVEGROUND FACILITIES		
West Virginia		
Mobley Interconnect (MVP	5.0	0.8
Bradshaw Compressor Station (MVP)	24.0	5.8
Sherwood Interconnect (MVP	7.1	2.0
Harris Compressor Station (MVP)	21.1	4.4
WB Interconnect (MVP t)	6.2	1.2
Stallworth Compressor Station (MVP)	24.7	5.7
Webster Interconnect (EEP)	0.8	0.8
Mobley Tap (EEP)	0.4	0.4
H-306 Tap (EEP)	<0.1	<0.1
H-148 Tap (EEP)	<0.1	<0.1
Virginia		
Transco Interconnect (MVP)	6.2	2.4
Pennsylvania		
Redhook Compressor Station (EEP)	17.7	17.7
Pratt Compressor Station Decommissioning (EEP)	7.5	7.5
Applegate Pig Launcher/Receiver (EEP)	0.4	0.4
Hartson Pig Launcher/Receiver (EEP)	0.1	0.1
H-302 Tap & Pig Launcher/Receiver (EEP)	0.1	0.1
Subtotal Aboveground Facilities – MVP	94.2	22.4
Subtotal Aboveground Facilities - EEP	26.4	26.4
Combined MVP and EEP Aboveground Facilities Total		
YARDS		
West Virginia (MVP)	109.1	0.0
West Virginia (EEP)	0.3	0.0
Virginia (MVP)	37.8	0.0
Pennsylvania (EEP)	11.4	0.0
Subtotal Yards – MVP	147.0	0.0
Subtotal Yards - EEP	11.6	0.0
Combined MVP and EEP Yards Total	**158.6**	**0.0**
ACCESS ROADS		
West Virginia (MVP)	648.5	175.3
West Virginia (EEP)	0.1	0.1
Virginia (MVP	234.6	71.8
Pennsylvania (EEP)	8.2	2.0
Subtotal Access Roads – MVP	883.1	247.1
Subtotal Access Roads - EEP	8.4	2.0

TABLE 2.3-1 (continued)

Land Requirements Associated with the Mountain Valley Project and the Equitrans Expansion Project

Project Component/State	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Combined MVP and EEP Access Roads Total	**891.5**	**249.1**
CATHODIC PROTECTION BEDS		
West Virginia (MVP)	12.0	6.2
West Virginia (EEP)	0.0	0.0
Virginia (MVP)	7.0	3.6
Pennsylvania (EEP)	1.0	1.0
Subtotal Cathodic Protection Beds – MVP	19.0	9.8
Subtotal Cathodic Protection Beds - EEP	1.0	1.0
Combined MVP and EEP Cathodic Protection Beds Total	**20.0**	**10.8**
MVP Totals	6,325.1	2,103.2
EEP Totals	199.3	75.7
COMBINED TOTALS FOR BOTH PROJECTS	**6,524.4**	**2,178.9**

Note: The totals shown in this table are rounded.
Note: Land Requirements associated with the Jefferson National Forest crossing are provided in section 4.8.1.

2.3.1 Pipelines

Both the MVP and the EEP pipelines combined would total about 309 miles in three states. This would include about 7.8 miles of pipeline route in Pennsylvania, 195.4 miles in West Virginia, and 105.6 miles in Virginia.

Combined, construction of the pipelines for the MVP and the EEP would affect a total of about 5,334 acres, including ATWS, but excluding staging areas, yards, access roads, and cathodic protection beds. Pipeline construction would affect about 90 acres of land in Pennsylvania, 2,897 acres in West Virginia, and 1,551 acres in Virginia. The temporary work areas used during construction of the pipelines would be restored to their pre-construction condition and use after the facilities are built.

The operational permanent easement for the MVP and EEP pipelines combined would cover a total of about 1,868 acres. Operation of the pipelines would affect 46 acres in Pennsylvania, 1,185 acres in West Virginia, and 639 acres in Virginia.

2.3.1.1 Mountain Valley Project

Mountain Valley would generally use a 125-foot-wide construction right-of-way to install the pipeline in uplands and a 75-foot-wide construction right-of-way through wetlands. Right-of-way configurations proposed by Mountain Valley for its pipeline are included in appendix C. Construction of the MVP pipeline would affect about 4,448 acres, excluding ATWS, yards, and access roads; including 2,897 acres in West Virginia, and 1,551 acres in Virginia.

Following construction, Mountain Valley would retain a 50-foot-wide permanent right-of-way to operate the pipeline. Operation of the pipeline would affect a total of about 1,824 acres, including 1,185 acres in West Virginia, and 639 acres in Virginia.

2.3.1.2 Equitrans Expansion Project

The width of the construction right-of-way for the EEP pipelines would vary between 85 feet and 125 feet in uplands, depending on the segment (see table 2.3-2). The typical right-of-way configurations proposed by Equitrans for its pipelines are included in appendix C. Equitrans would use a 75-foot-wide construction right-of-way to cross most wetlands. The construction rights-of-way for the EEP pipelines, excluding ATWS, yards, and access roads; would cover a total of about 90.4 acres; about 90.0 acres in Pennsylvania and about 0.4 acre in West Virginia.

TABLE 2.3-2

Temporary and Permanent Right-of-Way Widths for the Equitrans Expansion Project

Facility	Pipeline Diameter (inches)	Temporary Construction Right-of-Way Width (feet)	Permanent Operational Right-of-Way Width (feet)
H-318	20	100	50
H-316	30	125	50
H-158	12	125 a/	50
M-80	6	125 a/	50
H-305	24	100	50
H-319	16	85	50

a/ The H-158 and M-80 pipelines would share one 125-foot-wide construction right-of-way. The pipelines would be separated by 15 feet.

The new H-318 20-inch-diameter pipeline would extend about 4.3 miles in an east-west direction in Allegheny and Washington Counties, Pennsylvania. Equitrans would use a nominal 100-foot-wide construction right-of-way for the H-318 pipeline in uplands. Construction of the new H-318 pipeline, excluding ATWS, yards, and access roads; would affect about 47 acres.

The new H-316 30-inch-diameter pipeline would extend about 3 miles in an east-west direction, following an existing Texas Eastern corridor in Greene County, Pennsylvania. Equitrans would use a nominal 125-foot-wide construction right-of-way in uplands to install the H-316 pipeline. Construction of the new H-316 pipeline, excluding ATWS, yards, and access roads; would affect about 38 acres.

Both the new 6-inch-diameter M-80 pipeline and the new 12-inch-diameter H-158 pipeline would be about 0.2 mile long. The M-80 and H-158 pipelines would be installed adjacent to each other in the same 125-foot-wide construction right-of-way in uplands. Construction of those two pipelines combined, excluding ATWS, yards, and access roads; would impact about 4 acres total.

The new 24-inch-diameter H-305 pipeline would extend about 540 feet, with a 100-foot-wide construction right-of-way in uplands. Construction of the new H-305 pipeline, excluding ATWS, yards, and access roads; would affect about 1.2 acres.

The new 16-inch-diameter H-319 pipeline would extend for 200 feet, with an 85-foot-wide construction right-of-way in uplands. Construction of the new H-319 pipeline, excluding ATWS, yards, and access roads; would affect about 0.4 acre.

Following construction, Equitrans would retain a 50-foot-wide permanent right-of-way to operate the pipeline segments. Operation of the EEP pipelines would affect a total of about 46 acres (46 acres in Pennsylvania and less than 1 acre in West Virginia). Operation of the new H-318 pipeline would require about 26 acres. Operation of the new H-316 pipeline would utilize about 18 acres. The new adjacent H-158 and M-80 pipelines would share a permanent easement that covers about 1.6 acres total. The new H-305 pipeline would require about 0.6 acre for its permanent easement. The operational easement for the new H-319 pipeline would cover about 0.3 acre.

2.3.2 Aboveground Facilities

Combined, about 121 acres would be affected by construction of aboveground facilities for both projects. Operation of aboveground facilities would utilize a total of about 49 acres. The temporary work areas used during construction of the aboveground facilities would be restored to their pre-construction condition and use after the facilities are built.

2.3.2.1 Mountain Valley Project

The proposed aboveground facilities for the MVP include 3 new compressor stations, 4 new M&R stations and interconnects, 2 taps, 36 MLVs, and 5 pig launcher and receivers. Construction of the new compressor stations would affect a total of 70 acres; all in West Virginia. Operation of the compressor stations would require about 16 acres in total.

Construction of the Bradshaw Compressor Station would affect about 24 acres. Operation of the Bradshaw Compressor Station would use just under 6 acres.

Construction of the Harris Compressor Station would require about 21 acres. Operation of the station would utilize a little more than 4 acres.

Construction of the Stallworth Compressor Station would affect about 25 acres. Operation of the station would utilize about 6 acres.

Construction of the new M&R stations, interconnections, and taps would affect a total of about 24 acres (18 acres in West Virginia and 6 acres in Virginia). Operation of the M&R stations would utilize a total of less than 7 acres.

Construction of the Mobley Interconnect and receipt M&R station would require about 5 acres. This facility would have an operational footprint of less than 1 acre.

Construction of the Sherwood Interconnect and receipt M&R station would affect about 7 acres. The operational footprint for the Sherwood Interconnect would be about 2 acres.

Construction of the WB Interconnect and delivery M&R station would affect about 6 acres. The operational footprint for the WB Interconnect would cover just over 1 acre.

Construction of the Transco Interconnect and delivery M&R station would affect about 6 acres. The operational footprint for the Transco Interconnect and M&R station would cover more than 2 acres.

The taps at Webster and Roanoke Gas would each occupy a site about 1 acre in size. Mountain Valley would design and install the pipeline tap, valve, and piping. The interconnection company would be responsible for the interconnect design, installation, land acquisition, permits, and cost.

A typical MLV would occupy a 50-foot by 50-foot parcel (0.6 acre) within the permanent right-of-way or aboveground facility footprint. Pig launchers and receivers would be installed at all three of the new compressor stations and two of the interconnections (Mobley and Transco).

2.3.2.2 Equitrans Expansion Project

The proposed aboveground facilities for the EEP include a new compressor station, one interconnect, four taps, four pig launcher and receiver sites, and cathodic protection beds; and the decommissioning of an existing compressor station. No M&R Stations or MLVs are associated with the EEP. A 60-foot communication tower would be contained completely within the new Redhook Compressor Station. The communication tower would be a single lattice structure and would not emit any light or noise.

Construction of the EEP aboveground facilities would require a total of about 26 acres. Operation of the aboveground facilities would utilize a total of about 26 acres. Table 2.3-1 lists the land required for each aboveground facility.

Construction of the Redhook Compressor Station would affect about 18 acres at a new site in Greene County, Pennsylvania. Operation of the station would utilize about 18 acres.

Once the new Redhook Compressor Station is built, the existing Pratt Compressor Station, in Greene County, Pennsylvania, would be abandoned, decommissioned, and demolished. The 7.5-acre site would then be used by Equitrans as a storage yard.

Construction of the Webster Interconnect would affect less than 1 acre at a new location in Wetzel County, West Virginia. The operational footprint of the interconnection would cover less than 1 acre.

Construction of the Mobley Tap would affect about 0.4 acre at a new site in Wetzel County, West Virginia. The operational footprint would occupy about 0.4 acre.

Equitrans proposes to install four new pig launcher and receivers, occupying a total of about 0.6 acre combined, excluding the one at the Redhook Compressor Station.

2.3.3 Additional Temporary Workspaces

In constructing the pipeline facilities, ATWS would be required in areas such as the following:

- adjacent to crossings of roadways, railroads, waterbodies, wetlands, or other utilities;
- construction constraints that require special construction techniques, such as horizontal directional drill (HDD) entry and exit locations;
- HDD pullbacks;
- areas requiring extra trench depth;
- certain pipe bends;
- areas for extra spoil storage;
- areas for temporary storage of segregated topsoil;
- locations with soil stability concerns;
- truck turnarounds;
- equipment passing lanes;
- hydrostatic test water withdrawal and discharge locations; and
- staging and fabrication areas.

ATWS would be used only during construction of the projects. After pipeline installations, all of the ATWS would be restored to their pre-construction condition and use. In open, agricultural, and developed and residential land use areas, construction impacts from use of ATWS would be short-term, as these areas would be revegetated in a few years. However, in forest, impacts from use of ATWS would be long-term, as it would take many years for trees to re-establish and mature.

2.3.3.1 Mountain Valley Project

Mountain Valley would use 1,363 ATWS along its pipeline route, affecting a total of about 734 acres combined. Appendix D identifies where Mountain Valley has proposed ATWS.

2.3.3.2 Equitrans Expansion Project

Equitrans would use a total of 43 ATWS during construction of the EEP facilities, affecting a total of about 61 acres. Appendix D identifies where Equitrans has proposed ATWS.

2.3.4 Yards

Both Mountain Valley and Equitrans would temporarily use yards during construction to store pipe, materials, and equipment; set-up offices; and mobilize workers. The Applicants would grade, modify drainage, import gravel or crushed rock, install buildings (usually prefabricated mobile homes), and construct internal roadways within some of the yards. After pipeline installation, all yards would be restored to their pre-construction conditions and use; unless the landowner requests otherwise. Most of the yards are classified as having open, agricultural (including crops, hay, and pasture), grassland-rangeland, or developed industrial land use. However, some of the yards contain limited forested areas. Any forested areas at the yards, except at MVP-LY-002, would be cleared during construction. Yard MVP-LY-002 is an

existing yard and Mountain Valley would not alter the landscape of this yard. In the case of open, agricultural, grasslands-rangelands, or developed land use at yards, impacts would be short-term, with vegetation re-established in a few years after construction is finished. In the cases where forested land is cleared at a yard, trees would not be replanted after construction; therefore, impacts would be long-term.

2.3.4.1 Mountain Valley Project

Mountain Valley would use eight yards in West Virginia and two yards in Virginia during construction (see table 2.3-3). The yards would temporarily occupy about 147 acres. These yards are depicted on the maps in appendix B.

TABLE 2.3-3

Yards for the Mountain Valley Project

State/Yard Name	Type	MP	County	Land Use a/	Size (acres)
West Virginia					
MVP-LY-001	Laydown Yard	3.5	Wetzel	Forest, developed, open space, and agricultural	4.9
MVP-LY-002	Laydown Yard	17.7	Harrison	Forest, developed, open space, grasslands, and agricultural	19.2
MVP-LY-003	Laydown Yard	25.9	Harrison	Forest, developed, and open space	8.5
MVP-RD-001	Laydown Yard	79.0	Braxton	Agriculture	15.9
MVP-LY-004	Laydown Yard	86.8	Braxton	Barren, open space, developed, grasslands, and agriculture	9.2
MVP-LY-005	Laydown Yard	97.2	Nicholas	Developed and open space	2.6
MVP-LY-007	Laydown Yard	114.3	Nicholas	Forest, developed, open space, and agricultural	20.5
MVP-PY-003	Pipe Yard	155.7	Greenbrier	Forest, developed, open space, and agricultural	28.4
				Subtotal	*109.1*
Virginia					
MVP-PY-006	Pipe Yard	231.3	Montgomery	Forest, developed, open space, and agricultural	22.8
MVP-PY-005	Pipe Yard	262.9	Franklin	Forest, developed, and agricultural	15.0
				Subtotal	*37.8*
				Mountain Valley Project Total	***147.0***

Note: The totals shown in this table may not equal the sum of addends due to rounding.

a/ Land use data from the National Land Cover Database. However, land cover data has changed for several areas since the dataset was last updated. Land cover data presented has been verified, to the extent possible, with recent aerial imagery.

2.3.4.2 Equitrans Expansion Project

Equitrans would use eight yards in Pennsylvania and one in West Virginia (see table 2.3-4). The yards would temporarily occupy a total of about 21.2 acres combined. These yards are depicted on the maps in appendix B.

TABLE 2.3-4

Yards for the Equitrans Expansion Project

Yard Name or Number	County/State	Land Use	Size (acres)
H316-ATWS-08	Greene, PA	Agricultural, forest	1.8
H318-ATWS-08	Washington, PA	Developed, open space, and grasslands	2.5
H-318-ATWS-09	Washington, PA	Forest and open space	1.4
H-318-ATWS-10	Washington, PA	Developed and open space	2.3
H158/M80-ATWS-01 a/	Greene, PA	Forest, developed, open space, and agricultural	3.3
H158/M80-ATWS-02 a/	Greene, PA	Forest, developed, and open space	0.5
Redhook-ATWS-01	Greene, PA	Forest, developed, and open space	1.5
Pratt Compressor Station Site	Greene, PA	Industrial	7.5
H319-ATWS-02	Wetzel, WV	Forest and open space	0.3
		Equitrans Expansion Project Total	***21.2***

a/ Yards for H158/M80 would be used for construction of the H-305 pipeline.

2.3.5 Access Roads

The Applicants would mostly use existing public and private roads to gain access to their respective rights-of-way. However, many existing roads are not suitable for construction traffic. Where necessary, the Applicants would improve existing roads, through widening and/or grading. In addition, some new roads would be built for the projects. After pipeline installation, the Applicants would remove new temporary roads and restore the land to its pre-construction condition and use. Mountain Valley would use 146 roads for operational access. Additional information regarding access roads can be found in appendix E and section 4.8.1.

2.3.5.1 Mountain Valley Project

Outside of public roads, Mountain Valley would use 365 private roads to access the construction right-of-way. The majority of the private access roads (247) are existing. Virtually all of the existing private roads would require improvements. Mountain Valley would build 27 new roads for construction access. Eighty-six of the existing roads and 17 of the new roads would also be used for permanent access during project operation. Additionally, 42 roads that have not yet been surveyed have been identified by Mountain Valley as permanent access roads. Improvements to existing roads, or new access roads built for this project, would affect a total of

about 883 acres during construction. Permanent use of access roads would utilize 247 acres. Appendix E identifies each road improvement proposed for the MVP.

2.3.5.2 Equitrans Expansion Project

In addition to public roads, Equitrans proposes to use 27 private roads for access to the construction right-of-way. Twenty-three of the private roads are in Pennsylvania and four are in West Virginia (see the table in appendix E and maps in appendix B). Most of these private access roads are graveled, dirt, or grass; only four are paved. Seventeen of the access roads for the EEP are existing, while 11 would be new roads built by Equitrans for the EEP. Equitrans has identified 24 existing roads that would need to be improved or modified to handle construction equipment and traffic. Six of the existing roads would be permanently used during project operations. All of the new roads would be used temporarily during project construction. After pipeline installation, Equitrans would restore the temporary new roads to their original condition and use. About 8.4 acres would be affected by access roads during project construction and 2.0 acres during operation. Appendix E identifies each road improvement proposed for the EEP.

2.3.6 Cathodic Protection

After installation of the pipeline, the companies would install cathodic protection rectifiers and groundbeds. For both projects combined, these facilities would affect about 20.0 acres for construction and about 10.8 acres for operation.

2.3.6.1 Mountain Valley Project

Mountain Valley would install cathodic protection at 31 locations along the MVP pipeline route that would impact 19.0 acres during construction and about 9.8 acres during operation (see table 2.1-7).

2.3.6.2 Equitrans Expansion Project

For the EEP, installation of cathodic protection rectifiers and groundbeds would affect a total of about 1.0 acre, for both construction and operation.

2.4 CONSTRUCTION PROCEDURES

The Applicants would design, construct, operate, and maintain their respective pipelines and facilities in accordance with DOT regulations under 49 CFR 192 (Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards) and other applicable federal and state regulations. DOT regulations specify pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welders and operations personnel, in addition to other design standards. The Applicants would also comply with the siting and maintenance requirements under 18 CFR 380.15 and other applicable federal and state regulations, including the requirements of the U.S. Department of Labor, Occupational Safety and Health Administration. These safety regulations are intended to ensure adequate protection of the public, pipeline workers, contractors, and

employees, and to prevent natural gas pipeline accidents and failures. Pipeline safety is discussed further in section 4.12 of this EIS.

2.4.1 Mitigation

Various forms of mitigation are defined by the CEQ in 40 CFR 1508.20, including:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensating for the impact by replacing or providing substitute resources or environments.

Section 4 of this EIS describes the resource-specific measures the Applicants have proposed to minimize environmental impacts, and also includes our additional recommended mitigation measures as well as those recommended or that may be required by other agencies. General approaches to mitigation applicable to the projects are presented below.

2.4.1.1 General Federal Energy Regulatory Commission Mitigation Measures

Mountain Valley agreed to adopt the FERC's general construction, restoration, and operational mitigation measures outlined in our *Upland Erosion Control, Revegetation and Maintenance Plan* (FERC Plan). Equitrans has proposed one modification to our Plan (see table 2.4-1). Mountain Valley and Equitrans have also proposed modifications to our *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures).[2] These plans include measures that:

- minimize impacts on agricultural lands, including segregation of topsoil, repairing irrigation and drainage systems, rock removal, and relief of compaction;
- minimize impacts on residential areas, including restoration of landscaping;
- maximize erosion control, including the use of slope breakers, and sediment barriers;
- minimize impacts on wetlands, through reduction of workspace size, removal of stumps in the trenchline only, and requiring equipment to work off mats or timbers;
- minimize impacts on waterbodies and aquatic species, through timing restrictions, and promotion of dry-crossing techniques;
- enhance revegetation by use of seeding and mulch (except not in wetlands); and
- minimize impacts on vegetation during operation by limiting maintenance mowing.

[2] Our Plan and Procedures are available on the FERC Internet website at http://www.ferc.gov/industries/gas/enviro/guidelines.asp.

Table 2.4-1 lists Mountain Valley and Equitrans's proposed modifications to our Plan and Procedures, their description, and status.

TABLE 2.4-1

Summary of Proposed Modifications to the FERC's Plan and Procedures

Applicable FERC Plan/ Procedures Section	Requested by	Resource Issue	Description	Status	Section Discussed
Plan at Section IV.F.1.b	Equitrans	Spacing of temporary slope breakers	Proposal to use PADEP's slope breaker spacing which is more stringent than the FERC's spacing	Acceptable	2.4.2.8
Procedures at Sections II.A.1, VI.B.1.a, and V.B.2.b	Mountain Valley/Equitrans	Extra workspace positioning relative to waterbodies and wetlands.	Proposal to utilize extra workspace within 50 feet of waterbodies and wetlands at specific locations as listed in appendix D.	Acceptable	4.3.2.2
Procedures at Section V.B.3.c	Mountain Valley	Distance between a parallel waterbody and the pipeline	Proposal to site the pipeline closer than 15 feet when paralleling a waterbody at five locations as listed on table 4.3.2-12 (see section 4.3.2.2).	Acceptable	4.3.2.2
Procedures at Section II.A.2 and VI.A.3	Mountain Valley	Construction right-of-way width in wetlands	Proposal to use a construction right-of-way width greater than 75 feet in wetlands at specific locations as listed in appendix G.	Not Acceptable – Mountain Valley did not provide site-specific justifications for these areas.	4.3.3.3

The FERC Plan and Procedures are available at http://www.ferc.gov/industries/gas/enviro/guidelines.asp.

In their respective applications, Mountain Valley and Equitrans provided plans describing how they would construct and maintain their respective projects (see table 2.4-2). These plans also include measures to avoid and minimize potential impacts on the environment.

TABLE 2.4-2

Construction and Restoration Plans for the Mountain Valley Project and the Equitrans Expansion Project

General Plan Name	Mountain Valley Project	Equitrans Expansion Project
Upland Erosion Control, Revegetation, and Maintenance Plan	Modifications from the FERC Plan as discussed in table 2.4-1.	Modifications from the FERC Plan as discussed in table 2.4-1.
Wetland and Waterbody Construction and Mitigation Procedures	Modifications from the FERC Procedures as discussed in table 2.4-1.	Modifications from the FERC Procedures as discussed in table 2.4-1.
Erosion and Sediment Control Plan	*Erosion and Sediment Control Plans* a/	*Erosion and Sediment Control Plan for the Redhook Compressor Station*
HDD Construction and Contingency Plan	N/A	*HDD Contingency Plan* b/
Karst Plans	*Karst Hazards Assessment Report* (Attachment DR2 Resource Report [RR]2-12) c/ *Karst Mitigation Plan* (RR 6, Appendix 6-D) d/	N/A
Karst-specific Erosion and Sediment Control Plan	*Karst-specific Erosion and Sediment Control Plan* a/	N/A
Landslide Mitigation Plan	*Landslide Mitigation Plan* a/	N/A
Water Testing	*Water Resources Identification and Testing Plan* (Attachment DR3 Water Resources-1) h/	N/A
Residential Construction Plan	*Site-Specific Residential Construction and Mitigation Plans* (Attachment DR2 RR8-7b) c/	N/A
Organic Farm Plan	*Organic Farm Protection Plan* (OFPP) (Attachment DR2 RR8-4) c/	N/A
Spill Plan	*SPCCP* a/	*SPCCP* b/,i/ *Preparedness, Prevention, and Contingency and Emergency Action Plans* i/
Blasting Plan	*Draft Blasting Plan* (Attachment DR2 RR6-13) c/	N/A
Wetland Compensatory Mitigation Plan	*Compensatory Wetland Mitigation Plan* a/	N/A
Migratory Bird Habitat Conservation Plan	*Migratory Bird Habitat Conservation Plan* (Attachment DR2 General-5a) c/	*Migratory Bird Conservation Plan* (Attachment 3-21) e/
Invasive Species Management Plan	*Exotic and Invasive Species Control Plan* h/	N/A
Residential Access/Traffic Mitigation Plan	*Traffic and Transportation Management Plan* (RR5, appendix 5-B) d/	*Traffic and Transportation Management Plan* (Attachment 5-13) e/
Fire Suppression Plan	*Fire Prevention and Suppression Plan* (Attachment RR1-4) f/	N/A
Mine Subsidence Plan	*Mining Area Construction Plan* (Attachment DR2 General-5b) c/	*Mine Subsidence Plan* (Attachment 6-15) e/

TABLE 2.4-2 (continued)

Construction and Restoration Plans for the Mountain Valley Project and the Equitrans Expansion Project

General Plan Name	Mountain Valley Project	Equitrans Expansion Project
Cultural Resources Avoidance, Testing, and Treatment Plans	Avoidance Plans filed July 18, 2016. Individual Site Testing Plans for West Virginia included in county survey reports, variously filed. Testing Plans for Virginia archaeological sites filed July 22, 2016. Treatment Plans pending	N/A
Unanticipated Cultural Resources Discovery Plans	*Plan for Unanticipated Historic Properties and Human Remains* (attachment 4-B to draft Resource Report 4) filed with the FERC on April 24, 2015.	*Plan for Unanticipated Historic Properties and Human Remains, Pennsylvania and West Virginia* (Appendix 4-B) g/
Unanticipated Discovery of Paleontological Resources Plan	*Plan for Unanticipated Discovery of Paleontological Resources* (Attachment 1-m) f/	N/A
Unanticipated Discovery of Contamination Plan	*SPCCP and Unanticipated Discovery of Contamination Plan for Construction Activities in West Virginia and Virginia* a/	N/A
Dust Control Plan/Procedures	*Fugitive Dust Control Plan* (Attachment 1-g) f/	*Dust Suppression Plan* (RR1, appendix 1-K) g/
Winter Construction Plans	*Winter Construction Plan* (Attachment RR1-30) f/	*Winterization Plan* (RR1, appendix 1-J) g/
Plan of Development for Crossing of FS and COE managed lands	*Plan of Development* j/	N/A

a/ Mountain Valley's supplemental filing filed February 26, 2016 (accession number 20160226-5404).
b/ Equitrans' supplemental filing filed April 20, 2016 (accession number 20160421-5019).
c/ Mountain Valley's supplemental filing filed April 21, 2016 (accession number 20160422-5012).
d/ Mountain Valley's Application filed October 23, 2015 (accession number 20151023-5035).
e/ Equitrans' supplemental filing filed February 5, 2016 (accession number 20160205-5192).
f/ Mountain Valley's supplemental filing filed January 15, 2016 (accession number 20160119-5076).
g/ Equitrans' Application filed October 27, 2015 (accession number 20151027-5125).
h/ Mountain Valley's supplemental filing filed July 18, 2016 (accession number 20160718-5161).
i/ Equitrans' supplemental filing filed July 14, 2015 (accession number 20160714-5016).
j/ Mountain Valley's supplemental filing filed June 24, 2015 (accession number 20160624-5244).
N/A = Not Applicable

2.4.1.2 General Forest Service Mitigation

The FS has a responsibility to manage the public lands for multiple uses and sustained yield. The effective use of mitigation allows the FS to support a wide variety of resources and land uses across the landscape. According to the FS, mitigation of the impacts from land uses ensures that the varied resources of the public's land continue to provide values, services, and functions for present and future generations.

Mitigation would require the avoidance, reduction, repair, and compensation for unavoidable impacts on all NFS resource values, including but not limited to: biological, ecological, cultural, recreational, wilderness, roadless, socioeconomic, and aesthetic values. Mitigation practices for the MVP would be developed and implemented to offset direct, indirect, and cumulative impacts. Mitigation may use the best science to implement landscape-scale mitigation planning, banking, in-lieu fee arrangements and other practical measures, both on-site and off-site. The FS is committed to maintaining a sustainable resource base.

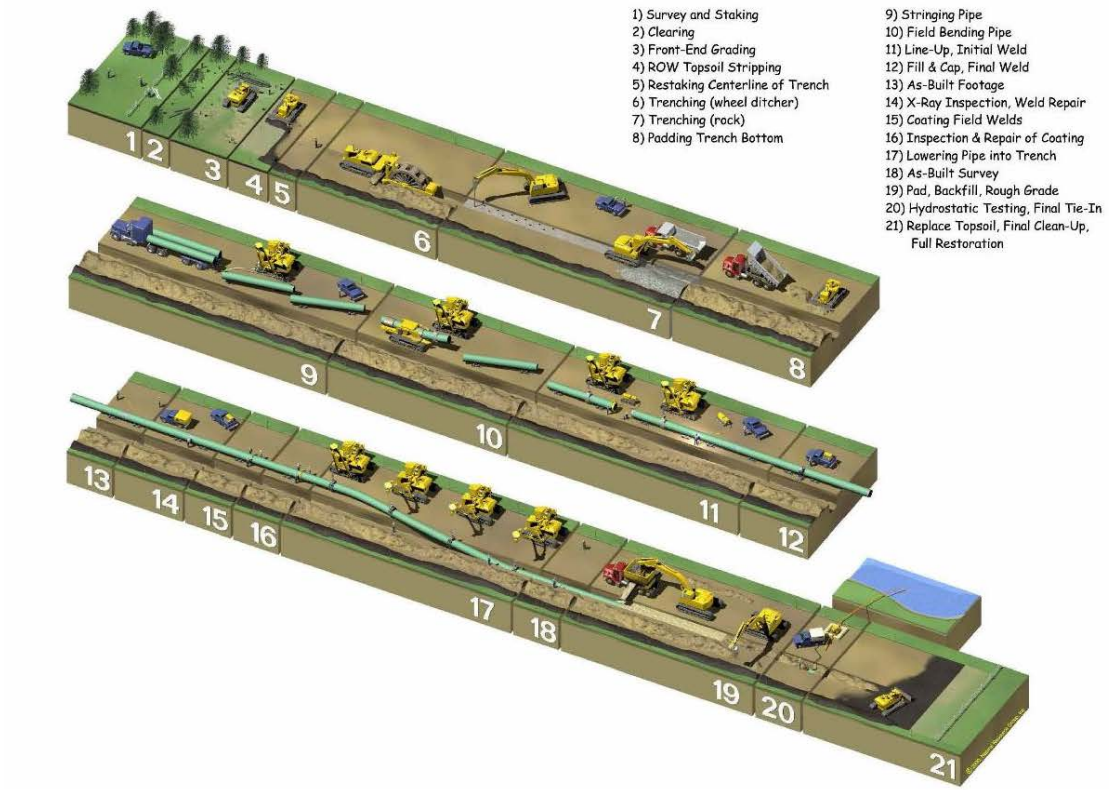
The FS would strive through mitigation to obtain a net benefit to natural resources and their functions. At a minimum, the FS would seek to achieve through mitigation a no net loss goal in natural resources and their functions. The extent to which any of the mitigation elements are used will depend on what is effective and practicable in addressing the impacts of the MVP.

The authorized FS officer may incorporate mitigation from the decision document into the Right-of-Way Grant through stipulations, terms and conditions, conditions of approval, so that they are requirements of the authorization. The authorized officer may expressly condition approval on the proponent's commitment to implement all mitigation measures as described in the decision document. To guarantee implementation of the mitigation obligations, the authorized officer may require financial assurances.

2.4.2 General Upland Overland Pipeline Construction Methods

Constructing the MVP and the EEP pipelines would generally be completed using typical upland overland sequential pipeline construction techniques, which include survey and staking; clearing and grading; trenching; pipe stringing, bending, and welding; lowering-in and backfilling; hydrostatic testing; commissioning; and cleanup and restoration (see figure 2.4.2-1). These construction techniques would generally proceed in an assembly line fashion with construction crews moving down the construction right-of-way as work progresses. Construction and restoration at any particular point along the pipeline route would take about 3 weeks to complete; although progress could be delayed by topography, weather, or other factors.

Typical Pipeline Construction Sequence



Source: NRG, 2000

Typical Pipeline Construction Sequence	**Figure 2.4.2-1** **Mountain Valley & Equitrans Expansion Projects**

2.4.2.1 Survey and Staking

The first step of construction involves engineering and land survey crews staking the limits of the construction right-of-way, the centerline of the proposed trench, ATWS, and other approved work areas. The Applicants would mark approved access roads using temporary signs or flagging, and the limits of approved disturbance on any access roads requiring widening. The Applicants would fence off environmentally sensitive areas (e.g., waterbodies and wetlands, special status species habitat, and historic properties) where the construction right-of-way may be constricted. Property markers and old survey monuments would be referenced and marked, and replaced during restoration. The Applicants would contact the One-Call system for each county and state to locate, identify, and flag existing underground utilities to prevent accidental damage during pipeline construction. Typically, land surveying is done using all-terrain vehicles (ATV) and pick-up trucks.

2.4.2.2 Clearing and Grading

Clearing and grading would remove trees, shrubs, brush, roots, and large rocks from the construction work area and would level the right-of-way surface to allow operation of construction equipment. The specified construction right-of-way widths would be cleared, including ATWS. Existing fences may not be removed, but new gates may be cut, and fences reinforced.

Vegetation would generally be cut or scraped flush with the surface of the ground, leaving rootstock in place where possible. Merchantable timber would be cut to useable lengths and stacked on the edge of the right-of-way. Typically, cut timber would be disposed in accordance with landowner wishes; unless the Applicants purchase the timber as part of their compensation agreements.

Brush cleared from the construction corridor would be open burned (MVP only), windrowed, or chipped/mulched. According to Mountain Valley, chipped brush would be blown off of the right-of-way with landowner approval. Chips would not be blown into environmentally sensitive areas (i.e., waterbodies, wetlands, and habitat for special status species). Any open burning would be conducted on a site-specific basis, in accordance with applicable state and local regulations and Mountain Valley's *Fire Prevention and Suppression Plan*. Burning of cleared slash would only take place in upland areas, away from residences, waterbodies, and wetlands. No burning would be done within the Jefferson National Forest. Impacts on air quality during burning are discussed in section 4.11.1.

Grading would be conducted where necessary to provide a reasonably level work surface. More extensive grading, referred to as two-tone construction, would be required in uneven terrain and where the right-of-way traverses steep slopes and side slopes. Equipment used for clearing and grading activities could include grinding machines, motor-graders, bulldozers, trackhoes, and dump trucks.

The Applicants have indicated that they would separate topsoil from subsoil in residential and agricultural areas. The Applicants would segregate at least the top 12 inches of topsoil where 12 or more inches of topsoil is present. In soils with less than 12 inches of topsoil, the

Applicants would segregate the entire topsoil layer. See section 4.2 for additional information regarding topsoil segregation.

Temporary erosion controls would be installed along the construction right-of-way immediately after initial disturbance of the soil and would be maintained throughout construction. Temporary erosion control measures would remain in place until permanent erosion controls are installed or restoration is completed. Each Applicant has committed to employing Environmental Inspectors (EIs) during construction to help determine the need for erosion controls and ensure that they are properly installed and maintained. Additional discussion of EI responsibilities is provided in section 2.4.4.

2.4.2.3 Trenching

Soil and bedrock would be removed to create a trench into which the pipeline would be placed. A track-mounted excavator/backhoe or similar equipment would be used to dig the pipeline trench. When rock is encountered, tractor-mounted mechanical rippers or rock trenchers would be used to fracture the rock prior to excavation. Blasting may be used in specific areas where hard bedrock is close to the surface. Blasting is more fully discussed in section 4.1 of this EIS.

Excavated soils would be stockpiled along the right-of-way on the side of the trench away from the construction traffic ("spoil side"). Subsoil would not be allowed to mix with the previously stockpiled topsoil. In accordance with Pennsylvania laws and in order to deter invasive species, Equitrans would temporarily stabilize spoil piles and areas left undisturbed for 4 days or longer with temporary seed and mulch. Excess rock would be trucked to approved disposal areas.

The trench would be dug at least 12 inches wider than the diameter of the pipeline and excavated to a depth of 5.5 feet to 9 feet (for the MVP) and 5 feet to 6 feet (for the EEP) in order to provide sufficient cover over the pipeline in accordance with DOT standards in 49 CFR 192.327 (see table 2.4-3). There would generally be 36 inches of cover over the top of the pipeline in deep soils and 18 inches of cover in areas of consolidated rock. At waterbody crossings, the pipe would be more deeply buried; with a minimum of 4 feet of cover at navigable waterways and a minimum of 2 feet of cover at waterbodies with consolidated rock. Mountain Valley would install its uncased pipeline with a minimum of 10 feet of cover under railroads; and a minimum of 5.5 feet of cover for cased pipe under a railroad.

TABLE 2.4-3

Minimum DOT Specifications for Depth of Cover over Natural Gas Pipelines

Location a/	Normal Soil (cover depth in inches)	Consolidated Rock (cover depth in inches)
DOT PHMSA Class 1	36	18
DOT PHMSA Class 2, 3, and 4	36	24
Actively cultivated agriculture	48	24
Drainage ditches of public roads	36	24
Navigable river, stream, or harbor	48	24
Minor stream crossings	36	24

a/ As defined in 49 CFR 192.5.
Class 1: offshore areas and areas within 220 yards of a pipeline with ≤10 buildings intended for human occupancy.
Class 2: areas within 220 yards of a pipeline with >10 but <46 buildings intended for human occupancy.
Class 3: areas within 220 yards of a pipeline with >46 buildings intended for human occupancy and areas within 100 yards of either a building or a small, well defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period.
Class 4: areas within 220 yards of a pipeline where buildings with four or more stories are prevalent.

2.4.2.4 Pipe Stringing, Bending, Welding, and Coating

After trenching, sections of pipe typically between 40 and 60 feet long (also referred to as "joints") would be transported to the right-of-way by truck, off-loaded by track-hoes or side-boom tractors, and strung beside the trench in a continuous line. The pipe would be delivered to the job site with a protective coating of fusion-bonded epoxy or other approved coating that would inhibit corrosion by preventing moisture from coming into direct contact with the steel.

Individual sections of pipe would be bent using a track-mounted, hydraulic pipe-bending machine to conform to the contours of the ground after the joints of pipe sections are strung alongside the trench. Where multiple or complex bends are required, bending may be conducted at the pipe fabrication factory, and the pipe would be shipped to the MVP and the EEP areas pre-bent.

After the pipe joints are bent, they would be aligned, welded together into a long segment, and placed on temporary supports at the edge of the trench. The Applicants would use welders who are qualified according to applicable standards in 49 CFR 192 Subpart E, American Petroleum Standard 1104, and other requirements. Automated welding may be used by Mountain Valley in areas of flat terrain.

Every completed weld would be examined by a welding inspector to determine its quality using radiographic or other approved methods as outlined in 49 CFR 192. Radiographic examination is a non-destructive method of inspecting the inner structure of welds and determining the presence of defects. Welds that do not meet the regulatory standards would be repaired or removed.

After a weld is approved, a coating crew would coat the area around the weld before the pipeline is lowered into the trench. Prior to application, the coating crew would thoroughly clean

the bare pipe with a power wire brush or sandblast machine to remove dirt, mill scale, and debris. The crew would then apply the coating and allow the coating to dry. The pipeline would be inspected electronically (also referred to as "jeeped" because of the sound of the alarm on the testing equipment) for faults or voids in the coating and would be visually inspected for scratches, and other defects. The Applicants would repair damage to the coating before the pipeline is lowered into the trench. The welded pipe would be placed on wooden skids next to the trench.

2.4.2.5 Lowering-in and Backfilling

The trench would be inspected to be sure it is free of rocks and other debris that could damage the pipe or protective coating before the pipe is lowered into the trench. Trench dewatering may be necessary to inspect the bottom of the trench in areas where water has accumulated. Trench water would be discharged through sediment removal devices in well-vegetated upland areas away from waterbodies and wetlands. The pipeline would then be lowered into the trench by side-boom tractors. Trench breakers (such as sand bags or foam) would then be installed in the trench on slopes at specified intervals to prevent subsurface water movement along the pipeline.

Sandbags may be placed on top of the pipe at the bottom of the trench to protect it from rocks. The first 12 inches at the bottom of the trench above the pipe would be clean fill, absent of rocks. Limestone dust may be brought in and used as padding material only when other local suitable fill is unavailable. The trench would then be backfilled using the excavated material; first with subsoil, then with topsoil. Backfilling could be done by track-hoes, bulldozers, graders, or backfilling machines. A crown of soil may extend above the trench in agricultural, grasslands-rangelands, and open lands, to account for settling. Any excess soils would be spread evenly over the right-of-way.

2.4.2.6 Hydrostatic Testing

The Applicants would hydrostatically test the pipeline after backfilling to ensure the system is capable of withstanding the operating pressure for which it was designed. Hydrostatic testing involves filling the pipeline with water to a designated test pressure and maintaining that pressure for about 8 hours. Actual test pressures and durations would be consistent with the requirements of 49 CFR 192. Any leaks would be repaired and the section of pipe retested until the required specifications were met.

Water for hydrostatic testing would be obtained from surface waterbodies (except within the Jefferson National Forest) and municipal water sources for the MVP; and from municipal water sources for the EEP. The Applicants would collect baseline water samples prior to withdrawal and discharge of the hydrostatic test water. In West Virginia, Mountain Valley would analyze baseline sampling data for oil and grease, total suspended solids, and pH. In Virginia, baseline sampling data would be taken for total petroleum hydrocarbons, total organic carbon, total suspended solids, pH, and total residual chlorine. The samples would also be tested for chloroform if the discharge is to be released to a waterbody. Equitrans would analyze baseline water samples in Pennsylvania for suspended solids, oil and grease, iron, total residual chlorine (if chlorinated water was used), dissolved oxygen, and pH. Equitrans' baseline water

samples in West Virginia would be analyzed for suspended solids and oil and grease. Mountain Valley would add a biocide to surface waters used for hydrostatic testing. Prior to discharge, a biocide deactivating agent would be added so the test water could be discharge to a vegetated upland area. Equitrans has not proposed to use biocides.

The pipeline would be tested in segments, with the water moved to each sequential segment along the route. The hydrostatic test water would be discharged through sediment filters in vegetated uplands away from waterbodies and wetlands. Section 4.3.2 provides more information on hydrostatic testing.

2.4.2.7 Commissioning

Test manifolds would be removed and final pipeline tie-ins would be completed after hydrostatic testing. The pipeline then would be cleaned and dried using mechanical tools (pigs) that are moved through the pipeline with pressurized dry air. Mountain Valley would not use a desiccant to dry the pipe while Equitrans may use nitrogen slugs to dry the pipe. Pigs also would be used to internally inspect the pipeline to detect whether any abnormalities or damage exists. Any problems or concerns would be addressed as appropriate.

Pipeline commissioning would then commence. Commissioning involves verifying that equipment has been properly installed and is working, verifying that controls and communications systems are functioning, and confirming that the pipeline is ready for service. In the final step, the pipeline would be prepared for service by purging the pipeline of air and loading it with natural gas. The Applicants would not be authorized to place the pipeline facilities into service until after they have documented to the FERC that restoration activities are proceeding in a satisfactory manner, and the companies have received written permission from the Director of the OEP.

2.4.2.8 Cleanup and Restoration

Within 20 days of backfilling the trench (10 days in residential areas), all work areas would be graded and restored. If seasonal or other weather conditions prevent compliance with these timeframes, temporary erosion controls would be maintained until conditions allow completion of final cleanup. Surplus construction material and debris would be removed from the right-of-way unless that landowner or land-managing agency approves otherwise. Excess rock/stone would be disposed of within the construction right-of-way with landowner approval or at an approved landfill.

After backfilling the trench, the topographic contours would be restored to their original pre-construction condition as close as possible, using graders and bulldozers; except where drainage patterns may cause erosion. Permanent erosion control features, such as slope breakers (waterbars), would be installed on steep terrain. Fences and gates would be repaired. In addition, driveways and access roads would be restored to pre-construction conditions. Markers showing the location of the pipeline would be installed at fence and road crossings in order to identify the owner of the pipeline and convey emergency information in accordance with applicable governmental regulations, including DOT safety requirements. The Applicants would conduct restoration activities in accordance with landowner agreements, permit requirements,

and written recommendations on seeding mixes, rates, and dates obtained from the Wildlife Habitat Council (for the MVP) or the PADEP's *Erosion and Sediment Pollution Control Program Manual* (for the EEP) and in accordance with the Applicants' construction and restoration plans.

The right-of-way would be seeded within six working days following final grading, weather and soil conditions permitting, although seeding would not be required in actively cultivated croplands unless requested by the landowner. Alternative seed mixes specifically requested by the landowner or required by agencies may be used. Any soil disturbance that takes place outside the permanent seeding season or any bare soil left unstabilized by vegetation would be mulched in accordance with the FERC Plan and Equitrans' Plan (see section 4.4).

2.4.2.9 Special Pipeline Construction Procedures

Special construction techniques are required when a pipeline is installed across waterbodies, wetlands, roads and railroads, foreign utilities, steep slopes, residences, agricultural lands, and other sensitive environmental resources, such as the ANST. These procedures are further discussed as they apply to specific resources in section 4.0.

2.4.2.10 Waterbody Crossings

Waterbody crossings would be completed in accordance with the Mountain Valley and Equitrans Procedures, with exceptions as discussed in table 2.4-1 in section 2.4 and measures described in other federal or state issued permits. The MVP pipeline route would require 986 waterbody crossings. The EEP pipelines would require 35 waterbody crossings. The waterbodies that would be crossed and the Applicants' proposed crossing methods for each are listed in appendix F. Waterbody crossings are discussed in more detail in section 4.3.2 of this EIS.

ATWS necessary for waterbody crossings would be placed a minimum of 50 feet from the waterbody edge. The 50-foot setback would be maintained unless site-specific approval for a reduced setback is granted by the FERC and other jurisdictional agencies (see section 4.3.2).

To prevent sedimentation caused by equipment traffic crossing through waterbodies, the Applicants would install temporary equipment bridges. Bridges may include clean rock fill over culverts, equipment pads, wooden mats, free-spanning bridges, and other types of spans. Equipment bridges would be maintained throughout construction. Each bridge would be designed to accommodate normal to high streamflow (storm events) and would be maintained to prevent soil from entering the waterbody and to prevent restriction of flow during the period of time the bridge is in use.

Sediment barriers, such as silt fence and straw/hay bales, would be installed immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers would be properly maintained throughout construction, until replaced by permanent erosion controls or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed areas. Trench plugs, consisting of compacted earth of similar low permeability material would be installed at the entry and exit points of wetlands and waterbodies to prevent water from the

stream or wetland from moving along the trench. After backfilling, streambanks would be re-established to approximate pre-construction contours and stabilized.

The pipelines would be installed below scour depth (see section 4.3.2). In most cases, the Applicants would place at least 4 feet of cover over the pipeline at waterbody crossings; except in consolidated rock, where there would be a minimum of 2 feet of cover. Trench spoil would be placed on the banks above the high water mark for use during backfilling. In some cases, the pipeline would be coated with concrete for negative buoyancy. In accordance with the Applicants' Procedures, construction of minor (10 feet wide or less) waterbody crossings would be completed within 24 hours; while 48 hours would be used for intermediate crossings (between 10 and 100 feet wide).

Most waterbody crossings for the MVP would be dry open-cut crossings. Wet open-cut crossings would be used by Mountain Valley at the Elk River (MP 87.4), the Gauley River (MP 118.6), and the Greenbrier River (MP 170.6). For the EEP, either HDD, flume, or dam-and-pump techniques would be used. These measures are briefly described below.

Flume Construction Method

The flume method is a type of dry open-cut crossing that involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. The first step in the flume crossing method involves placing a sufficient number of adequately sized flume pipes in the waterbody to accommodate the highest anticipated flow during construction. After placing the pipe in the waterbody, sand bags or equivalent dam diversion structures are placed in the waterbody upstream and downstream of the trench area. These devices serve to dam the stream and divert the water flow through the flume pipes, thereby isolating the water flow from the construction area between the dams. Flume pipes are typically left in place during pipeline installation until trenching under the flumes, pipe installation, and final cleanup of the streambed is complete. Once the pipeline is installed, and the streambed and banks restored, the flume pipes are removed, allowing water flow to return to pre-construction conditions.

Dam-and-Pump Construction Method

The dam-and-pump method is similar to the flume crossing method except that pumps and hoses are used instead of flumes to move water across the construction work area. Temporary dams are installed across the waterbody on both the upstream and downstream sides of the construction right-of-way, usually using sandbags or plastic sheeting. Pumps are then set up at the upstream dam with the discharge line (or hoses) routed through the construction area to discharge water immediately downstream of the downstream dam. (At the request of the VDGIF, fish and other aquatic wildlife would be removed from the de-watered area between the dams in Virginia waterbodies). An energy dissipation device is typically used to prevent scouring of the streambed at the discharge location. The pipeline is then installed and the trench backfilled, allowing water flow to be re-established to pre-construction conditions. After backfilling, the dams are removed and the banks restored and stabilized.

Wet Open-Cut Construction Method

The wet open-cut construction method involves trench excavation, pipeline installation, and backfilling in a waterbody without controlling or diverting streamflow (i.e., the stream flows through the work area throughout the construction period). With the wet open-cut method, the trench is excavated across the stream using trackhoes or draglines working within the waterbody, on equipment bridges, and/or from the streambanks. Once trench excavation across the entire waterbody is complete, a prefabricated section of pipe is promptly lowered into the trench. The trench is then backfilled with the previously excavated material, and the pipe section tied-in to the pipeline. Following pipe installation and backfilling, the streambanks are re-established to approximate pre-construction contours and stabilized. Erosion and sediment control measures are then installed across the right-of-way to reduce streambank and upland erosion and sediment transport into the waterbody.

HDD Construction Method

An HDD involves drilling a hole under the waterbody (or other sensitive feature) and installing a pre-fabricated pipe segment through the hole. Mountain Valley is not proposing to use the HDD method. Equitrans proposes to use the HDD method at two locations: 1) the Monongahela River (along pipeline H-318); and 2) the South Fork Ten Mile Creek (along the H-316 pipeline).

The first step in an HDD is to drill a small-diameter pilot hole from one side of the crossing to the other using a drill rig. As the pilot hole progresses, segments of drill pipe are inserted into the hole to extend the length of the drill. The drill bit is steered and monitored throughout the process until the desired pilot hole has been completed. The pilot hole is then enlarged using several passes of successively larger reaming tools. Once reamed to a sufficient size, a pre-fabricated segment of pipe is attached to the drill string on the exit side of the hole and pulled back through the drill hole toward the drill rig. Depending on the substrate and length, drilling and pullback can last anywhere from a few days to a few weeks. Additional information regarding the HDD method is presented in section 4.3.

2.4.2.11 Wetland Crossings

Wetland crossings would be completed in accordance with the Mountain Valley and Equitrans Procedures, and other federal and state permits. For the MVP, about 126 wetlands would be crossed by the pipeline, and 548 wetlands would be crossed by other project components (including access roads). The EEP pipelines would cross a total of 23 wetlands. The wetlands that would be crossed are listed in appendix G and are discussed further in section 4.3.3.

The Applicants would typically use a 75-foot-wide construction right-of-way through wetlands unless site-specific approval for an increased right-of-way width is granted by the FERC and other jurisdictional agencies (see section 4.3.3). ATWS may be required on both sides of wetlands to stage construction equipment, fabricate the pipeline, and store materials. ATWS for wetland crossings would be located in upland areas a minimum of 50 feet from the

wetland edge unless site-specific approval for a reduced setback is granted by the FERC and other jurisdictional agencies (see section 4.3).

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. Stump removal, topsoil segregation, and excavation would be limited to the area immediately over the trenchline. A limited amount of stump removal and grading may be conducted in other areas to ensure a safe working environment. During clearing, sediment barriers, such as silt fence and staked straw bales, would be installed and maintained adjacent to wetlands and within temporary extra workspaces as necessary to minimize sediment runoff.

Construction equipment working in wetlands would be limited to that essential for right-of-way clearing, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. The method of pipeline construction used in wetlands would depend largely on the stability of the soils at the time of construction. Wetlands would be crossed by wet or dry open trench lay, or open ditch push-pull methods.

Where wetland soils are saturated and/or inundated, the pipeline may be installed using the push-pull technique, which involves stringing and welding the pipeline outside of the wetland and excavating the trench through the wetland using a backhoe supported by equipment mats. The water that seeps into the trench is used to "float" the pipeline into place, aided by a winch and flotation devices attached to the pipe. After the pipeline is floated into place, the floats are removed, allowing the pipeline to sink into place. Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. (Mountain Valley has proposed to use aggregate-filled sacks to decrease buoyancy). After the pipeline sinks into position, trench breakers are installed where necessary to prevent the subsurface drainage of water out of the wetland. Then the wetland is backfilled and cleanup completed. Where topsoil has been segregated from subsoil, the subsoil is backfilled first followed by the topsoil. Topsoil is not segregated in saturated wetlands due to the unconsolidated nature of the soils. Equipment mats and timber riprap would be removed from wetlands following backfilling.

For the proposed projects, construction through unsaturated wetlands would be similar to dry upland methods, with one exception; only one travel lane would be used. Up to 1 foot of topsoil from the trench would be segregated where hydrologic conditions allow.

2.4.2.12 Road and Railroad Crossings

The MVP pipeline would cross 220 roads and 11 railroads. The EEP pipelines would cross 13 roads and 5 railroads. The pipelines would be installed at least 3 feet beneath all roads, and at least 10 feet below all railroads for uncased pipe (about 5.5 feet deep for cased pipe).

Construction across roads and railroads would be conducted in accordance with the permits obtained by the Applicants and applicable laws and regulations, including DOT safety standards. Traffic control measures would be coordinated with appropriate state and county transportation and road agencies. The Applicants have developed project-specific *Transportation Management Plans*, as more fully discussed in section 4.9 of this EIS.

All railroads would be crossed with a bore. In general, crossings of paved roads would also be bored, so not to disrupt traffic. Boring involves excavating a pit on each side of the road or railroad, placing the boring equipment in the pit, and then boring a hole under the road or railroad that is at least equal to the diameter of the pipe. Once the hole is bored, a pre-fabricated section of pipe is pushed through the borehole. At particularly long crossings, pipe sections may be welded onto the pipe string just before being pushed through.

If a paved road is open-cut, any asphalt removed during a road crossing would be disposed of at an approved facility. Mountain Valley and Equitrans would not recycle used asphalt.

Most gravel, dirt, and grass roads would be crossed by the open-cut method. Traffic on roads would be maintained during construction by the use of steel plates or detours. At least one lane of the road being crossed would be kept open to traffic except for brief periods when it would be essential to close the road to install the pipeline. Road users would be notified via signage and flagmen. Most open-cut road crossings require only 1 or 2 days to complete. After pipeline installation, all open-cut road crossings would be restored to pre-construction conditions.

2.4.2.13 Residential Areas

Construction work areas would be within 50 feet of 117 residential structures for the MVP. Mountain Valley filed site-specific Residential Construction Plans, as discussed in section 4.8 of this EIS and provided in appendix H.

No residences appear to be within 50 feet of the construction rights-of-way for the EEP pipelines. There are four existing residences within the boundary of the newly proposed Redhook Compressor Station parcel. Equitrans stated that it has purchased one of the properties and has signed sales agreements for two of the properties. Equitrans is still in negotiations for the purchase of the fourth residence (see section 4.8). Measures that the Applicants would implement to minimize impacts on residences located within 50 feet of the construction right-of-way, include, but are not limited to:

- installing safety fence at the edge of the construction right-of-way for a distance of 100 feet on either side of the residence or business establishment;
- installing safety fence around all buildings;
- installing safety fence and temporary end caps on the pipeline at the end of each work day to prevent overnight access to the trench and pipeline;
- fencing the boundary of the construction work area to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- leaving mature trees and landscaping intact within the construction work area unless the trees and landscaping interfere with the installation techniques or present unsafe working conditions;
- reducing temporary workspaces where possible;
- maintaining access, including putting steel plates over the trench;
- using “drag-line” or “stove-pipe” construction methods where feasible;

- ensuring piping is welded and installed as quickly as reasonably possible to minimize the amount of time a neighborhood is affected by construction;
- backfilling the trench as soon as possible after the pipe is installed; and
- completing final cleanup, grading, and installation of permanent erosion control devices within 10 days after backfilling the trench, weather permitting.

2.4.2.14 Foreign Utilities

The proposed MVP pipeline route crosses about 319 existing buried pipelines and other foreign utilities (including fiber optic lines, telephone lines, power lines, sewer lines, water lines, etc.) The EEP pipelines would cross about 30 existing buried pipelines and other foreign utilities (see section 4.8).

In most cases, the Applicants would prefer to install their pipelines below existing pipelines and other foreign utilities. The Applicants would install their pipelines with at least 12 inches of clearance from any other underground utilities as required by DOT standards at 49 CFR 192.325. Larger spoil piles resulting from greater depth of excavation at the crossing of foreign utilities would be stored within ATWS at each crossing. Construction of those crossings would be monitored by the Applicants, and sometimes by representatives of the owner/operator of the other pipeline or utility. Appropriate safety measures would be implemented that meet the standards of the Occupational Safety and Health Administration. To ensure that existing pipelines and other foreign utilities are properly identified, and crossed without damage, the Applicants would:

- contact "One-Call" to locate existing known buried pipelines and other foreign utilities;
- locate existing buried pipelines using a hand-held magnetometer or by probing, as appropriate for the conditions encountered;
- scanning the edges of the right-of-way with passive inductive locating equipment;
- providing advance notice to the owner/operators of the foreign pipelines prior to construction, and allowing representatives to be present during work around their pipelines;
- not use mechanized excavation equipment within 3 feet of another buried foreign pipeline, with the excavations completed by hand shoveling;
- keep construction equipment and spoil piles off the centerline of the foreign pipeline;
- support the foreign pipeline for the length of the span exposed;
- inspect the foreign pipeline before and after the Applicants' pipelines are installed;
- maintain DOT minimum separation distances;
- follow the foreign pipeline operator's requirements; and
- keep a working combustible gas indicator on site.

2.4.2.15 Agricultural Lands

The proposed MVP pipeline route crosses about 39 miles of agricultural lands, and the EEP pipelines combined would cross a total of about 3 miles of agricultural lands. Impacts and

mitigation on prime farmland soils are discussed in section 4.2 of this EIS; while impacts and mitigation for agricultural land use are discussed in section 4.8.

Prior to construction, the Applicants would conduct surveys to identify and flag existing irrigation systems and drainage tiles. The pipeline would typically be installed below drain titles. During restoration, the Applicants would repair or replace any irrigation systems or drain tiles damaged during construction.

The pipelines would be buried deep enough to allow for 48 inches of cover in actively cultivated lands. A minimum of 12 inches of topsoil would be segregated from the full right-of-way in agricultural lands, in accordance with the FERC Plan and Equitrans' Plan. Where topsoil is less than 12 inches deep, the actual depth of the topsoil layer would be removed and segregated. If topsoil fill is necessary, it would be locally sourced to prevent invasive species. Other mitigation measures in agricultural lands would include relief from compaction and removal of rocks from topsoil. Where the MVP would cross organic farms, Mountain Valley has developed an *Organic Farm Protection Plan* (OFPP).

2.4.2.16 Rugged Topography

The MVP would cross 18.5 miles of slopes between 15 and 30 percent grade, and 72.6 miles of slopes greater than 30 percent. The EEP would cross 3.4 miles of slopes between 15 and 30 percent grade and 0.5 mile of slopes greater than 30 percent. The Applicants have developed construction methods for rugged terrain, to allow for the safe operation of equipment, and prevention of severe erosion.

In rugged terrain, temporary sediment barriers would be installed, including silt socks and reinforced "super" silt fence, to keep soils and rolling rocks within the construction right-of-way. Temporary slope breakers would be installed during grading, to divert water into off-right-of-way vegetated areas, through hay bales, or aggregate (all aggregate would be removed during removal of the temporary slope breaker). Temporary slope breakers would remain in place until permanent erosion controls were installed. Sand trench breakers would be installed in the trench to prevent the movement of water. Mountain Valley may also use trench drains to divert water away from the ditch. The drains would consist of perforated tile or pipe surrounded by stone or rock. The drains would extend to a vegetated area at the base of the steep slope, a wooded area off of the right-of-way, or a riprap pad placed at a low point near the edge of the right-of-way. EEP would adhere to PADEP's slope breaker requirements, which are more stringent than the FERC's Procedures.

In areas where the pipeline route crosses laterally along a slope, cut and fill grading, or "two-tone" construction techniques, may be used to create a relatively flat working surface. This would require expanded ATWS (see appendix D). Spoil piles, separated every 50 feet by temporary water bars, may be compacted by bulldozers, then covered by mulch.

Equipment on steep slopes would be suspended from a series of winch tractors. Pipe joints would be stockpiled at the top or bottom of a slope. A side-boom tractor suspended from a winch would carry the pipe up the hill one joint at a time. Joints would be welded together in the trench. The trench would be padded and backfilled by equipment tethered to the winch tractors.

After backfilling, contours would be re-established and permanent slope breakers installed. Erosion control blankets would be placed on the slopes, or hydroseed would be sprayed, to provide stabilization for revegetation.

We received comments stating that steep ridge tops often form property boundaries and these boundaries could be affected by post-restoration changes in topography (i.e., steep ridgelines could be rounded off). Mountain Valley would document property markers, monuments, and/or fencing prior to construction and replace these items following restoration. Mountain Valley would work with landowners to resolve any impacts on property boundaries due to construction of the MVP.

2.4.2.17 Karst Terrain

The MVP would cross areas of karst geology in West Virginia and Virginia. Areas of karst terrain were identified between MPs 171 and 175 and MPs 190 to 237. Mountain Valley developed a *Karst Mitigation Plan* (see section 4.1 of this EIS). Key elements of the *Karst Mitigation Plan* include:

- deployment of a karst specialist to evaluate areas of potential karst prior to and during construction;
- completion of inspections to document any subsidence, rock collapse, sediment filling or other morphologies at identified karst features on a weekly basis;
- coordination with the appropriate state agencies for larger previously unidentified karst features or caves identified during construction; and
- monitoring during and post-construction for any subsidence or karst hazards.

No areas of karst terrain were identified along the EEP pipeline routes. Additional information regarding karst can be found in section 4.1.

2.4.2.18 Winter Construction

Mountain Valley developed a *Winter Construction Plan* and Equitrans developed a *Winterization Plan* to address specialized methods and procedures to protect resources during the winter season. The key elements of these plans include:

- use of special snow plowing equipment to prevent mixing of snow and underlying soil;
- clearing of snow from roads without blocking driveways or other access points;
- use of safety fencing around open trenches in areas used for snowmobiling, hiking, and similar activities;
- suspension of backfill and topsoil replacement if unfeasible due to frozen conditions;
- use of mulch and erosion control devices to stabilize topsoil and subsoil piles; and
- delaying final cleanup activities until soils have thawed.

2.4.3 Aboveground Facility Construction

Construction activities at the proposed compressor stations, M&R stations, interconnects, and tap sites would include access road construction; site clearing; grading; putting in foundations; erecting buildings; installing equipment such as compressors and metering facilities; restoration and laying gravel in the yards; and erecting security fencing. Initial work at the aboveground facilities would focus on excavations for reinforced concrete foundations. Subsurface friction piles may be required to support foundations. Forms would be set, rebar installed, and concrete poured and cured according to industry stations. Concrete batches would be tested. Backfill would be compacted.

Equipment and piping would be transported to the sites by truck and off-loaded by cranes and/or front-end loaders. The equipment and piping would then be placed on the foundations, leveled, and secured. Piping would be welded, and welds inspected using radiography, ultrasound, or other non-destructive examination methods. Aboveground piping would be painted. Piping would be hydrostatically tested prior to being put into service. Safety equipment and controls, including emergency shutdown, relief valves, gas and fire detection, and engine overspeed and vibration protection would be calibrated and tested. Pig launchers and receivers and MLVs would be installed.

2.4.4 Monitoring

2.4.4.1 Construction Monitoring and Quality Control

During construction, the Applicants would provide contractors with all project design documents, including environmental alignment sheets, and copies of all applicable federal, state, and local permits. Construction would be supervised by a company Chief Inspector (CI). At least one EI would be hired per spread, who would report to the CI, and whose duties would be consistent with Section II.B of the FERC Plan and Equitrans' Plan, including:

- the EI would be a full-time position, separate from other activity inspectors;
- the EI would be responsible for ensuring that the company complies with its construction and environmental mitigation plans, complies with all environmental conditions of the Commission Order, and complies with the environmental conditions of other relevant federal and state permits;
- the EI would have "stop-work" authority, and would be empowered to take corrective actions to remedy instances of non-compliance; and
- the EI would conduct environmental training for company employees, maintain records, and write reports.

In section 5.2 of this EIS, we are including a recommendation that the Applicants employ a team of EIs, with a list of explicit duties. We are also recommending that if the projects are authorized, the Commission Order should include a requirement that the Applicants file with the FERC weekly status reports that address construction and restoration activities. These weekly reports would be available to the public on our eLibrary system. The Applicants have agreed to fund a FERC third-party compliance monitoring program during the MVP and EEP construction phase. Under this program, a contractor is selected by, managed by, and reports solely to the

FERC staff to provide environmental compliance monitoring services. The FERC Compliance Monitor would provide daily reports to the FERC on compliance issues and make recommendations to the FERC Project Manager on how to deal with compliance issues and construction changes, should they arise. In addition to this program, FERC staff would also conduct periodic compliance inspections during all phases of construction and throughout restoration, as necessary.

2.4.4.2 Post-Approval Variance Process

The pipeline alignment and work areas identified in this EIS should be sufficient for construction and operation (including maintenance) of the projects. However, minor route realignments and other workspace refinements sometimes continue past the project planning phase and into the construction phase. These changes could involve minor route realignments, shifting or adding new extra workspaces or staging areas, adding additional access roads, or modifications to construction methods. We have developed a procedure for assessing impacts on those areas that have not been evaluated in this draft EIS and for approving or denying their use following any Certificate issuance. In general, biological and cultural resources surveys were conducted using a survey corridor larger than that necessary to construct the facilities. Where survey approvals were denied, Mountain Valley and Equitrans would complete the required surveys following a Certificate issuance. If the Applicants request to shift an existing workspace or require a new extra workspace subsequent to issuance of a Certificate, these areas would typically be within the previously surveyed area. Such requests would be reviewed using a variance process.

A variance request for route realignments or extra workspace locations, along with a copy of the survey results, would be documented and submitted to either the onsite compliance monitors or to the FERC in the form of a "variance request" in compliance with recommended condition number 5 in section 5.2 of this EIS. Minor variance requests, such as new workspace within the previously surveyed corridor that would not require tree clearing or impacts on sensitive resources, would be reviewed by the compliance monitor and could be approved in the field if deemed necessary and acceptable. For larger or more complex variance requests, the FERC would take the lead on reviewing and making a final determination on the request. Typically, no further resource agency consultation would be required if the requested change is within previously surveyed areas and no sensitive environmental resources are affected.

The procedures used for assessing impacts on work areas outside the survey corridor and for approving their use are similar to those described above, except that additional surveys, analyses, and resource agency consultations would be performed to assess the extent of any impacts on biological, cultural, and other sensitive resources and to identify any avoidance or minimization measures necessary. All variance requests for the projects and their approval status would be documented according to the FERC's compliance monitoring program as described above. Any variance activity by any of the applicants (whether submitted through the third-party compliance monitoring program or directly to the FERC) and subsequent FERC action would be available on the FERC's e-library webpage under the docket number for the respective project (CP16-10 or CP16-13).

After the applicants complete any additional surveys, landowner consultation, analyses, and/or resource agency consultations, the new work area and supporting documentation (including a statement of landowner approval) would be submitted to the FERC in the form of a formal variance request, which would be evaluated in the manner described above for approval or denial.

Other regulatory agencies also may include terms and conditions or stipulations as part of their permits or approvals. While there would be jurisdictional differences between the FERC's and other agencies' conditions, the EI program for the MVP would address all conditions placed on the project by all regulatory agencies.

2.4.4.3 Post-Construction Monitoring

The Applicants would conduct follow-up inspections and monitor disturbed areas for at least the first and second growing seasons, including until revegetation thresholds are met and temporary erosion control devices are removed. The Applicants would submit quarterly monitoring reports for at least 2 years following construction. Restoration is deemed complete when the density and cover of non-nuisance vegetation are similar in density and cover to adjacent, undisturbed areas.

The FERC staff would conduct post-construction restoration inspections to monitor for vegetation cover, invasive species, soil settling, soil compaction, excessively rocky soils, drainage problems, and erosion. Those inspections would continue until the problems are corrected and the right-of-way is stable and revegetated.

Other regulatory agencies also may include terms and conditions or stipulations related to post-construction monitoring as part of their permits or approvals.

We recognize that during and after construction, issues or complaints may develop that were not addressed during the environmental proceedings at the Commission, and it is important that landowners have an avenue to contact the Applicants' representatives. Should the Commission approve the MVP and the EEP, we are interested in ensuring that landowner issues and complaints received during and after construction are resolved in a timely and efficient manner. As such, we recommend in section 4.8 that Mountain Valley and Equitrans file detailed environmental complaint resolution procedures and identify related issues in their weekly status reports.

2.4.4.4 Monitoring of the Right-of-Way Grant for Federal Lands

Monitoring is an essential element of project implementation. If the BLM issues a Temporary Use Permit and a Right-of-Way Grant for the MVP, those authorizations would provide the terms and conditions for construction, operation, maintenance, and eventual termination of the facility on federal lands. As cooperating agencies with jurisdiction by law for activities that occur on lands they administer, the FS and COE also have a responsibility to monitor implementation of the MVP to assure that the terms and conditions of the Right-of-Way Grant are carried out (40 CFR 1505.3).

CEQ regulations (40 CFR 1505.2(c)) require that a monitoring and enforcement program be adopted for any project requirements adopted as part of the decision to implement the project. Many POD requirements that are a part of a BLM Right-of-Way Grant on federal lands are project design measures that reduce the environmental consequences of the project on-site. The FS and COE may also propose an off-site mitigation program. In addition to monitoring implementation of the Temporary Use Permit and the Right-of-Way Grant, the FS and COE also have a responsibility to monitor authorized actions, whether they are described in the POD or off-site mitigation measures included in FS and COE mitigation programs.

There are two types of monitoring associated with administering a Right-of-Way Grant. "Implementation monitoring" seeks to verify that the project was implemented according to the terms of the Right-of-Way Grant. Implementation monitoring is typically a checklist to verify that a project is implemented as planned and that requirements, terms, and conditions associated with the project are met. Many of these elements would also be addressed by the FERC in the construction monitoring and inspection processes. As needed for the proposed MVP, agency representatives of the FS and COE would also assure that agency priorities and stipulations are accomplished and agency obligations are fulfilled. Additionally, the FS would have its own inspectors on site, and the FS inspectors would coordinate with FERC monitors and MVP inspectors and have stop-work authority.

"Effectiveness monitoring" is the second type of monitoring. Effectiveness monitoring seeks to verify that the specific requirements in the POD and in the off-site mitigation plans accomplished the desired objective. While virtually every important aspect of the project is subject to implementation monitoring, effectiveness monitoring is typically done on a smaller subset of actions. Where the outcomes of an action are well known and likely to be accomplished merely through implementation, effectiveness monitoring may not be needed, or may only be done on a sample basis. For example, the effects of surfacing roads are well known and not in question, so little if any effectiveness monitoring would be required for this activity. Conversely, some POD requirements or mitigation projects may have less certain outcomes or may be associated with thresholds such as water temperature. In those cases, effectiveness monitoring would be appropriate to ensure that the desired outcome is achieved. This also provides a trigger for adaptive management if the proposed mitigation is not entirely effective. Effectiveness monitoring requires interpretation of land management plan direction and objectives. Therefore, most effectiveness monitoring on federal lands would be accomplished by the agency having jurisdiction over the land being monitored.

Reporting results is a key element of a monitoring plan. The monitoring plan developed by the FS and COE should include a reporting schedule and detailed criteria for judging completion and success of the actions being monitored. Implementation monitoring is typically deemed complete when the action being monitored has been completely implemented. Effectiveness monitoring would not be complete until the project objectives have been accomplished and on NFS lands, could occur in perpetuity, for the life of the project.

The POD developed by Mountain Valley is part of the Right-of-Way Grant application and includes extensive monitoring requirements to ensure that impacts from construction and operation of the project are minimized and that objectives of the federal agencies are

accomplished. Ongoing discussion between the applicant and agencies are expected to result in revisions to the POD.

2.5 CONSTRUCTION SCHEDULE AND WORKFORCE

Mountain Valley estimated that it would take up to 29 months to construct and reclaim its entire project. Construction of Mountain Valley's pipeline would be completed using 11 construction spreads ranging in length from 22.2 miles to 39.5 miles (see table 2.5-1). In addition, there would be seven separate spreads for construction of the aboveground facilities. The peak construction workforce would be 7,865 people for the pipeline and 460 people for the aboveground facilities. Peak construction worker employment would average about 1,320 people per pipeline spread.

TABLE 2.5-1

Construction Spreads for the Mountain Valley Project and the Equitrans Expansion Project

Project/Spread Number	Start MP	End MP	Spread Length (miles)
Mountain Valley Project			
1	0	25.9	25.9
2	25.9	48.1	22.2
3	48.1	77.6	29.6
4	77.6	104.3	26.7
5	104.3	127.9	23.7
6	127.9	154.2	26.3
7	154.2	181.8	27.6
8	181.8	204.8	23.0
9	204.8	234.0	29.3
10	234.0	261.5	27.5
11	261.5	300.8	39.5
Equitrans Expansion Project			
H-316	0.0	3.0	3.0
H-318	0.0	4.3	4.3
Redhook Compressor Station, M-80, H-158, and H-305	N/A	N/A	N/A
Pratt Compressor Station Decommissioning	N/A	N/A	N/A
Webster Interconnect, H-319, Mobley Tap	0.0	<0.1	<0.1

N/A = Not Applicable

Equitrans estimated that construction and restoration for its pipelines would take about 1 year, with an additional 4 months needed to put the new Redhook Compressor Station into service, and 8 more months to complete the demolition of the existing Pratt Compressor Station (2 years total construction period for the entire EEP). The total peak workforce for the EEP,

including pipelines and aboveground facilities, would be about 400 people. Equitrans would have five construction spreads (see table 2.5-1).

Construction crews would typically work 10 hours per day, 6 days per week. Work would be conducted during daylight hours, except where the pipe would be installed using the HDD and bore methods, which require around-the-clock operations and typically last a few days to a few weeks. The rate of pipeline construction would average about 19 days per mile; although progress could be delayed by topography, weather, or other factors.

2.6 OPERATION AND MAINTENANCE

Mountain Valley and Equitrans would maintain and operate their pipelines and aboveground facilities in accordance with the DOT/PHMSA regulations at 49 CFR 192, the FERC regulations at 18 CFR 380.15, and the maintenance provisions found in the FERC Plan (the MVP), Equitrans' Plan, and both Applicants' Procedures. As required by 49 CFR 192.615, the Applicants would establish an operation and maintenance plan and an emergency plan for each project that includes procedures to minimize the hazards in a natural gas pipeline emergency.

The Applicants would also maintain a liaison with the appropriate fire, police, and public officials as part of each Applicants' emergency operating procedures. Communications with these parties would include informational meetings and trainings, periodic emergency response drills and desktop exercises, and emergency contact phone numbers. Pipeline safety measures are outlined in section 4.12 of this EIS. Mountain Valley stated that it would hire 25 new permanent employees for operation and maintenance of the project facilities. These employees would be stationed at various locations along the pipeline or in Equitrans' headquarters.

No additional employees would be added to operate the EEP facilities. The proposed new Redhook Compressor Station would be remotely monitored from Equitrans' Waynesburg, Pennsylvania office. The pipelines, Mobley Tap, and Webster Interconnect would be operated, monitored, and maintained by existing Equitrans staff stationed at its Manning and Logansport offices in West Virginia.

2.6.1 Pipelines

The Applicants would maintain a 50-foot-wide permanent operational easement for their pipelines. In accordance with the FERC Plan and Equitrans' Plan, vegetation removal within the operational easement would not be done more frequently than every 3 years. To facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in an herbaceous state. The Applicants would also selectively cut trees within 15 feet of the centerline in wetlands. In no case would routine vegetation maintenance occur between April 15 and August 1 of any year. Vegetation management is discussed further in section 4.4.

Besides vegetation maintenance, other operational activities on the pipeline right-of-way would include inspections and repairs. Periodic aerial and ground inspections may identify pipeline leaks, erosion or loss of vegetation cover on the right-of-way, and unauthorized

encroachment. The cathodic protection system would also be inspected periodically to ensure that it is functioning properly. In addition, pigs are regularly sent through the pipeline to check for corrosion and irregularities in the pipe in accordance with DOT requirements.

In addition, the Applicants would install a supervisory control and data acquisition system, commonly referred to as SCADA, on each pipeline system, which would continuously monitor gas pressure and flow at specific locations along the pipeline. These systems would be continuously monitored for both projects from Equitrans' Gas Control headquarters in Pittsburgh, Pennsylvania. The systems would provide continuous information to the control center operators and have threshold and alarm values set such that warnings are provided to the operators if critical parameters are exceeded. According to Equitrans, a secondary gas control center is located in Jefferson Hills, Pennsylvania. Representatives from either gas control center would respond immediately to an incident. Primary permanent operational staff for the EEP would be located in Mannington, West Virginia, Logansport, West Virginia, and Waynesburg, Pennsylvania. These staff would conduct inspections, perform maintenance, and respond to safety and operational issues.

Mountain Valley and Equitrans would manage unauthorized off-road vehicle and ATV use on their operational rights-of-way by adhering to Section VI of the FERC Plan and Equitrans' Plan, which includes measures such as signs, fences/gates, and slash, timber, and boulder barriers.

2.6.2 Aboveground Facilities

The Applicants would perform routine inspections of and maintain all equipment at aboveground facilities, including compressor stations, M&R stations, taps and interconnects, MLVs, and pig launchers and receivers. Routine maintenance checks would include calibration of equipment and instrumentation. Safety equipment, such as pressure relief devices and fire and gas detection systems, would be tested for proper operation. Corrective actions would be taken if problems are noted.

The aboveground facilities would be unmanned, with start/stop capabilities controlled from corporate headquarters. A telemetry system would notify operational personal at local offices and the gas control headquarters of the activation of safety systems or alarms. Maintenance personnel would be dispatched to investigate and take corrective actions.

2.7 FUTURE PLANS AND ABANDONMENT

Mountain Valley stated that it has no plans at this time to either expand or abandon the proposed MVP facilities. Currently, the MVP t is fully subscribed at 2.0 Bcf/d; and the facilities were designed accordingly. However, in the future, if market conditions change, Mountain Valley may seek to expand or modify its facilities. For example, additional interconnections or taps may be proposed to provide natural gas to other LDCs, in keeping with the stated purpose of the MVP. For any future expansion, Mountain Valley would either have to file an amendment to its application in CP16-10-000, or file a new application.

The EEP facilities would transport up to about 0.4 Bcf/d of contracted firm capacity of natural gas. Because the EEP facilities have a design capacity of up to 0.6 Bcf/d, Equitrans will continue to search for customers for the unsubscribed capacity that remains. Equitrans would only seek to expand its facilities if it negotiates future contracts in excess of 0.6 Bcf/d of natural gas. Again, to handle any additional capacity, Equitrans would either have to file an amendment to its application in CP16-13-000, or file a new application requesting Commission approval of an expansion.

The Applicants stated that the expected useful lifespan of the projects would be about 50 years. While there is no termination date for a FERC natural gas Certificate, at the end of the 50-year period, the Applicants may need to repair, replace, or abandon facilities. Any of those actions would require permission from the Commission in response to new applications. Abandonment activities would require an application to the FERC under Section 7(b) of the NGA. Facilities could either be abandoned in place or by removal. Typically, the Commission would conduct a separate environmental review under NEPA for a new application. The public would have the opportunity to comment on these applications.