

APPENDIX J
General Blasting Plan for Jefferson National Forest

Appendix J

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Mountain Valley Pipeline Project

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ACRONYMS AND ABBREVIATIONS

ANST	Appalachian National Scenic Trail
BLM	U.S. Department of the Interior, Bureau of Land Management
c/g	calories per gram
CBI	MVP Chief Blasting Inspector
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
d ₅₀	medium value of particle size distribution
EI	Environmental Inspector
FERC	Federal Energy Regulatory Commission
FS	U.S. Department of Agriculture, Forest Service
f/s	feet per second
g/cc	grams per cubic centimeter
JNF	Jefferson National Forest ¹
lbs	pounds
ms	milliseconds
MVP	Mountain Valley Pipeline, LLC
NFS	National Forest System
OSHA	Occupational Safety and Health Administration
Project	Mountain Valley Pipeline Project
Transco	Transcontinental Gas Pipe Line Company, LLC
USACE	U.S. Army Corps of Engineers

¹ Jefferson National Forest refers to the southern portion of the current George Washington & Jefferson National Forests throughout this document. Originally two separate national forests, the JNF and the George Washington National Forest were administratively combined in 1995 and are administered as a single national forest unit.

Mountain Valley Pipeline Project Blasting Plan

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (MVP), a joint venture between EQM Midstream Partners, LP; NextEra Capital Holdings, Inc.; Con Edison Gas Midstream LLC; WGL Midstream; and RGC Midstream, LLC (collectively referred to as MVP), was issued a Certificate of Public Convenience and Necessity (Certificate) from the Federal Energy Regulatory Commission (FERC) on October 13, 2017, pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the Mountain Valley Pipeline Project (Project) located in 17 counties in West Virginia and Virginia. The Project is an approximately 303-mile, 42-inch-diameter natural gas pipeline to provide timely, cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users, and power generation in the Mid-Atlantic and southeastern markets, as well as potential markets in the Appalachian region.

The pipeline extends from the existing Equitrans, L.P. transmission system and other natural gas facilities in Wetzel County, West Virginia to Transcontinental Gas Pipe Line Company, LLC's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project includes approximately 171,600 horsepower of compression at three compressor stations along the route, as well as measurement, regulation, and other ancillary facilities required for the safe and reliable operation of the pipeline. The pipeline is designed to transport up to 2.0 million dekatherms per day of natural gas.

A 3.5-mile long segment of the Project crosses portions of the Jefferson National Forest (JNF) in Monroe County in southern West Virginia and in Giles, Craig, and Montgomery counties in southwestern Virginia. The JNF is managed by the U.S. Forest Service (FS) of the U.S. Department of Agriculture. Another 60-foot segment of the Project crosses the Weston and Gauley Bridge Turnpike Trail (Weston and Gauley Turnpike) in Braxton County, West Virginia, which is administered by the U.S. Army Corps of Engineers (USACE). Approval to cross land managed by two or more federal agencies is the responsibility of the U.S. Department of the Interior, Bureau of Land Management (BLM) through issuance of a Right-of-Way Grant. Project-wide construction environmental compliance is the responsibility of the FERC. The FS and USACE will also ensure compliance across lands managed or administered by those agencies. Because the majority of federal lands crossed are managed by the FS, this plan focuses on the JNF, noting any additional or different requirements that are specific to the crossing of the Weston and Gauley Turnpike.

Construction of the Project segment that crosses the Weston and Gauley Turnpike was completed in 2018. Construction of the Project segments across the JNF began in 2018 but were not completed and progress is on hold due to a July 27, 2018, order by the U.S. Court of Appeals for the Fourth Circuit vacating and remanding the Right-of-Way Grant and a subsequent Stop Work Order issued by FERC.

The FS is responsible for enforcement of the terms and conditions of the BLM's Right-of-Way Grant on National Forest System lands during the term of the Right-of-Way Grant for the Mountain Valley Pipeline project. Compliance will be monitored on the JNF portion of this project by the FS

Project Manager and the Authorized Officer's designated compliance monitors. FS will have stop work authority per terms outlined in the BLM right-of-way grant. FS will also have stop work authority if unsafe work conditions are encountered during construction.

The Project has potential to impact sensitive environmental resources and, as a result, environmental protection measures have been developed to minimize potential impacts on these resources and will be applied, as applicable, to the Project.

2.0 BACKGROUND

The Mountain Valley Pipeline General Blasting Plan (Plan) outlines the procedures and safety measures that the contractor will adhere to while implementing blasting activities during the construction of the Project. This plan addresses blasting for the pipeline route within the JNF. MVP crossed the Weston and Gauley Turnpike via conventional bore; therefore, no blasting occurred on USACE property.

Information for blast and rip characteristics of the bedrock may be evaluated, at least in a general sense, and applied toward an appropriate bedrock excavation method. The hard and intact nature of the unweathered sedimentary bedrock (sandstones, limestones, and shales) dictates what blasting methods will be utilized. Soft bedrock, such as weathered sandstones, limestones, and shales, may possibly be removed by ripping or mechanical means.

Other geologic features may control the effects of blasting. Rock fabric, or the arrangements of minerals, determines intrinsic rock strength, and thus influences rock excavation. Joint spacing, bedding, and foliation also influence rock excavation.

3.0 GEOLOGIC SETTING

The JNF is located in the Valley and Ridge province, and the Project alignment crosses Lower Devonian and Silurian sandstone and shale through the JNF. It is anticipated that minimal blasting would be required through the JNF. The JNF is located in the area with high seismic hazards; however, these hazards (including soil liquefaction near water crossings and the potential for landslides and rock falls) are not considered severe and can be mitigated with appropriate construction design. Karst hazards are not present along the pipeline alignment within JNF lands. An estimated 888,000 cubic feet of material will be excavated and temporarily stored along the right-of-way within the 3.5 miles of pipeline that cross the JNF. Excess excavation from cut slopes will be hauled to an approved location.

4.0 BLASTING SPECIFICATIONS

Blasting for grade or pipeline trench excavation will be considered only after all other reasonable means of excavation have been evaluated and determined to be unlikely to achieve the required results. MVP may specify locations (foreign line crossings, nearby structures, etc.) where consolidated rock will be removed by approved mechanical equipment, such as rock-trenching machines, rock saws, hydraulic rams, or jack hammers, instead of blasting. Areas where blasting may be required will be surveyed for features such as karst terrain, structures, utilities, and wells. The pre-construction condition of human-occupied buildings will be documented. Occupied buildings and their condition within 150 feet of the blasting area will be documented as to their pre-blast condition, as set forth in Attachment J-1 – Pre-Blast Survey, and their condition after blasting, as set forth in Attachment J-4 – Post-Blast Survey. MVP will provide

verbal notification, followed by written documentation, to the buildings' occupant(s) of any blasting activity during both pre-construction and post-construction within 150 feet of a blast location.

If blasting is conducted within 150 feet of an active water well MVP will conduct a pre-construction evaluation of the well. Upon request by a landowner who had a pre-construction test, a post-construction test will be performed. Landowners will be contacted by an MVP representative, and a qualified independent contractor will conduct the testing.

MVP will evaluate, on a timely basis, landowner complaints regarding damage resulting from blasting to wells, homes, or outbuildings. If the damage is substantiated, MVP will negotiate a settlement with the landowner that may include repair or replacement.

Before any blasting occurs, the contractor will complete a project/site-specific blasting plan and provide it to MVP for review. No blasting shall be done without prior approval by MVP. In no event shall explosives be used where, in the opinion of MVP, such use will endanger existing facilities. The contractor shall obtain MVP approval and provide 48 hours' notice prior to the use of any explosives. MVP will provide at least 24 hours' notice to occupants of nearby (within 150 feet of blasting area) buildings, stores, residences, businesses, farms, and other occupied areas prior to initiating blasting operations. These notices will be verbal, followed by written documentation of the 24-hour notice.

4.1 Regulatory Framework

Blasting shall adhere to the following federal, state, county, township, local, and MVP standards and regulations. These standards and regulations are to be considered as the minimum requirements. Should there be a conflict between jurisdictions, standards, and regulations, the most stringent jurisdictions, standards, and regulations shall be followed.

These blasting requirements for the MVP Project are as follows:

- MVP, Design and Construction Manual, Design Standard, Pipeline, 4.11 Blasting Proximate to Buried Pipelines
- 29 CFR Part 1926 Subpart U – Blasting and the Use of Explosives, Occupational Safety and Health Administration (OSHA)
- 27 CFR Part 555 Subpart K, U.S. Bureau of Alcohol, Tobacco, and Firearms
- 49 CFR Part 192, U.S. Department of Transportation
- National Fire Protection Association 495: Explosive Materials Code
- West Virginia Surface Mining Blasting Rule, 199 CSR 1

5.0 PRE-BLAST INSPECTIONS

MVP will conduct pre-blast surveys, with landowner permission, to assess the conditions of structures, wells, springs, and utilities within 150 feet of the proposed construction right-of-way. The survey will include, at a minimum:

- Informal discussions to familiarize the adjacent property owners with blasting effects and planned precautions to be taken on this Project;

- Determination of the existence and location of site-specific structures, utilities, septic systems, and wells;
- Detailed examination, photographs, and/or video records of adjacent structures and utilities; and
- Detailed mapping and measurement of large cracks, crack patterns, and other evidence of structural distress.

The results will be summarized in a Pre-Blast Condition Report that will include photographs and be completed prior to the commencement of blasting. The pre-blast conditions will be documented with the information outlined by “Pre-Blast Survey, MVP Project.” This Pre-Blast Survey Form is considered the minimum information needed. Attachment J-1 presents the Pre-Blast Survey Form. The completion of the Pre-Blast Survey Form is in addition to all other local, county, township, state, or federal reporting/survey data collection and reports.

6.0 MONITORING OF BLASTING ACTIVITIES

During blasting, MVP contractors will take precautions to minimize damage to adjacent areas and structures. Precautions include:

- Dissemination of blast warning signals in the area of blasting, post signs on JNF lands near the blasting zones, and post public announcements on the FS bulletin board and website as authorized to do so by the FS.
- Backfilling if the blast holes with subsoil (no topsoil to be used), blasting mats, or other approved methods.
- Blast warning in congested areas, in shallow waterbodies, or near structures that could be damaged by fly-rock.
- Use of matting or other suitable cover, as necessary, to prevent fly-rock from damaging adjacent protected natural resources.
- Following federal, state, local, and MVP procedures and regulations for safe storage, handling, loading, firing, and disposal of explosive materials.
- Manning adjacent pipelines at valves for emergency response, as appropriate.
- Posting of portable signage, portable barricades, and visual survey of the blast area access ways to prevent unauthorized entrance into the blast zone by spectators and/or intruders.
- Maintain communications between all persons involved for security of the blast zone during any and all blasting/firing.

Excessive vibration will be controlled by limiting the size of charges and by using charge delays, which stagger each charge in a series of explosions.

If the contractor has to blast near buildings or wells, a qualified independent contractor will inspect structures or wells within 150 feet, or farther if required by local or state regulations, of the construction right-of-way prior to blasting, and with landowner permission. Post-blast inspections by the blasting company’s representative will also be performed, as warranted. All blasting will be performed by registered blasters and monitored by experienced blasting inspectors. Recording seismographs will be installed by the contractor at selected monitoring stations under

the observation of MVP personnel. During construction, the contractor will submit blast reports for each blast and keep detailed records as described in Section 7.10.

MVP will notify individuals within ½ mile of the blasting area and conduct surveys on structures within 1000 feet of the blasting area. The effects of each discharge will be monitored at the closest adjacent facilities by seismographs.

If a charge greater than eight pounds per delay is used, the distance of monitoring will be in accordance with the U.S. Bureau of Mines Report of Investigations 8507.

To maximize its responsiveness to the concerns of affected landowners, MVP will evaluate all complaints of well or structural damage associated with construction activities, including blasting. A toll-free landowner hotline will be established by MVP for landowners to use in reporting complaints or concerns. In the unlikely event that blasting activities temporarily impair a water well, MVP will provide alternative sources of water or otherwise compensate the owner. If well or structural damage is substantiated, MVP will either compensate the owner for damages or arrange for a new well to be drilled.

7.0 BLASTING REQUIREMENTS

MVP has standard practices for blasting operations, as outlined by Sections 1.0 and 4.0 of this Blasting Plan. The potential for blasting along the pipeline to affect any wetland, municipal water supply, waste disposal site, well, septic system, spring, or pipelines will be minimized by controlled blasting techniques and by using mechanical methods for rock excavation as much as possible. Controlled blasting techniques have been effectively employed by MVP and other companies to protect active gas pipelines within 15 feet of trench excavation. The following text presents details of procedures for powder blasting.

7.1 General Provisions

The contractor will provide all personnel, labor, and equipment to perform necessary blasting operations related to the work. The contractor will provide a permitted blaster possessing all permits required by the local, county, township, and states in which blasting is required during construction, and having a working knowledge of state and local laws and regulations that pertain to explosives.

Project blasting will be done in accordance with the above referenced specification; all other state and local laws, when required; and regulations applicable to obtaining, transporting, storing, handling, blast initiation, ground motion monitoring, and disposal of explosive materials and/or blasting agents.

The contractor shall be responsible for supplying explosives and blasting materials that are perchlorate-free in order to eliminate the potential for perchlorate contamination of groundwater, except that detonators containing non-combined amounts of perchlorate, such as Dyno Nobel NONEL EZ Det or equivalent, are an industry standard and shall be permitted. Further, while the use of bulk ammonium nitrate is prohibited, the use of emulsion type explosives, including those having ammonium nitrate as a constituent, such as Dyna 1062 Bulk Emulsion or equivalent, shall be permitted, as these types of explosives are considered industry standard for area blasting related to large scale earthwork construction.

The contractor shall be responsible for securing and complying with all necessary permits required for the transportation, storage, and use of explosives. The contractor shall be responsible for all damages or liabilities occurring on or off the right-of-way resulting from the use of explosives. When the use of explosives is necessary to perform the work, the contractor shall use utmost care not to endanger life or adjacent property and shall comply with all applicable laws, rules, and regulations governing the storage, handling, and use of such explosives. MVP will conduct a pre- and post- surficial leak survey along the centerline of each adjacent live pipeline to the planned blast area. The surficial leak survey will be conducted by MVP’s employees and/or designated representative, with the surficial leak survey extending a minimum of 100 feet (both directions) past the limits of the planned blast area.

Avian survey teams will search for nests prior to blasting activities during nesting season (April 1 – August 31). If an active nest is located within the blasting area, a 100-foot buffer area will be marked and blasting will not occur within the 100-foot buffer until the nest is no longer active. Most nesting habitat will have already been cleared prior to the need to blast.

All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified.

MVP will utilize blasting sirens, post warning signs near blasting zones, and post public announcements on FS-JNF existing information kiosks, any new information kiosks determined necessary by the FS, and the FS-JNF website (Alerts & Warnings), as permitted by the FS. MVP will also provide the blasting notices to the BLM and USACE to post on their public notification sites as appropriate. Notifications will be provided to the FS and BLM 24 hours prior to any blasting activities on federal lands.

Blasting activities will strictly adhere to all MVP, local, state, and federal regulations and requirements applying to controlled-blasting and blast-vibration limits in regard to structures, underground gas pipelines, and underground utilities. In addition to following state and federal blasting guidelines, MVP will contact each governmental agency (if the Project is not undertaken within 12 months as of the date of this Blasting Plan) along the proposed route to determine local ordinances or guidelines for blasting (refer to Table 7-1).

Table 7.1			
Contacts and Related Permitting Prior to Blasting			
State	Contact	Agency	Permit/Notification
West Virginia	D. Vande Linde 304-926-0464	West Virginia Office of Explosives and Blasting	Permit and Notification
West Virginia	304-558-2191	WV Fire Marshall	Permit and Notification
West Virginia	Anita Bradburn 304-399-5890	US Army Corps of Engineers- Weston and Gauley Bridge Turnpike Trail	Notification 24 hours prior to blasting within 0.25 mile of the Weston and Gauley Bridge Turnpike Trail
West Virginia and Virginia	Joby Timm 540-265-5118	US Forest Service – Jefferson National Forest Supervisor	Notification 24 hours prior to blasting within 0.25 mile of the Jefferson National Forest
West Virginia and Virginia	Andrew Downs 540-904-4354	Appalachian Trail Conservancy	Notification if blasting is necessary for ANST bore pits.

Table 7.1			
Contacts and Related Permitting Prior to Blasting			
State	Contact	Agency	Permit/Notification
West Virginia and Virginia	Vicki Craft 601-919-4655	BLM for US Army Corps of Engineers-Weston and Gauley Bridge Turnpike Trail and US Forest Service – Jefferson National Forest	Notification 24 hours prior to blasting within 0.25 mile of the Weston and Gauley Bridge Turnpike Trail and the Jefferson National Forest
Virginia	John Cullinane 804-371-7270	State Fire Marshall	Permit and Notification
Virginia	Steven Sites 540-317-7670	State Fire Marshall	Permit and Notification
Virginia	Region 3 Office 276-783-4860	Virginia Department of Wildlife Resources	Notification – 48-hours
Virginia	Office 804-371-0220	Virginia State Fire Marshal	Permit and Notification – 24-hours

The construction contractor will be made aware of all applicable procedures and local requirements, and it will ultimately be the contractor’s responsibility to notify officials and receive appropriate blasting permits and authorization.

Typically, local regulations require copies of the blasting contractor’s certificate of Insurance and License. In some jurisdictions, a Certificate of Bond will also be required, as well as a qualified person hired to oversee the blasting procedure.

The MVP Chief Blasting Inspector (CBI) or designated representative shall have the opportunity to witness all rock excavations or other use of explosives. The contractor shall conduct all blasting operations in a safe manner that will not cause harm to the existing pipelines and structures in the vicinity. If the CBI determines that any project blasting operations have been conducted in an unsafe manner, the CBI will notify the contractor of the unsafe activity. If any further unsafe actions occur on the part of the blasting firm, the CBI will request the contractor terminate the contract of the blasting firm and hire another blasting company.

Any failure to comply with the appropriate law and/or regulations is the sole liability of the contractor. The contractor and the contractor’s permitted blaster shall be responsible for the conduct of all blasting operations, which shall be subject to inspection requirements.

A Blasting Fact Sheet will be distributed to landowners where blasting is proposed and affected landowners will be contacted prior to any blasting activities.

7.2 Storage Use at Sites

Explosives and related materials shall be stored in approved facilities required under the applicable provisions contained in 27 CFR Part 555, Commerce in Explosives. The handling of explosives may be performed by the person holding a permit to use explosives or by other employees under his or her direct supervision, provided that such employees are at least 21 years of age. While explosives are being handled or used, smoking shall not be permitted, and no one shall possess matches, open light, or other fire or flame within 50 feet of the explosives, in accordance with OSHA requirements. Suitable devices or lighting safety fuses are exempt

from this requirement. No person shall handle explosives while under the influence of intoxicating liquors or narcotics at any time during construction of the Project. Original containers or Class II magazines shall be used for taking detonators and other explosives from storage magazines to the blasting area. Partial reels of detonating cord do not need to be in closed containers, unless transported over public highways. Containers of explosives shall not be opened in any magazine or within 50 feet of any magazine. In opening kegs, or wooden cases, no sparking metal tools shall be used; wooden wedges and wood, fiber, or rubber mallets shall be used. Non-sparking metallic slitters may be used for opening fiberboard cases.

No explosive materials shall be located or stored where they may be exposed to flame, excessive heat, sparks, or impact.

Explosives or blasting equipment that are obviously deteriorated or damaged shall not be used. Explosive materials shall be protected from unauthorized possession and shall not be abandoned.

No attempt shall be made to fight a fire if it is determined the fire cannot be contained or controlled before it reaches explosive materials. In such cases, all personnel shall be immediately evacuated to a safe location, and the area shall be guarded from entry by spectators or intruders.

No firearms shall be discharged into or in the vicinity of a vehicle containing explosive materials or into or in the vicinity of a location where explosive materials are being handled, used, or stored.

Contractor shall maintain a daily and/or blast inventory record of all explosive materials transported, used, and returned to off-site storage, when no storage is located on the blast site.

7.3 Pre-Blast Operations

Prior to commencement of any blasting or pre-blast operation, the contractor is required to submit a planned schedule of blasting operations to the CBI or his designated representative for approval that indicates the maximum charge weight per delay, hole size, spacing, depth, and blast layout. If blasting is to be conducted adjacent to an existing pipeline, approval must be received from the pipeline's engineering department prior to the start of work. The contractor shall provide this schedule to the CBI at least five working days prior to any pre-blast operation for approval and use. Where residences or other structures are within 150 feet of the blasting operation, the CBI may require notification in excess of five days. The blasting schedule is to include the blast geometry, drill hole dimensions, type and size of charges, stemming, and delay patterns and should also include a location survey of any dwelling or structures that may be affected by the proposed operation. Face material shall be carefully examined before drilling to determine the possible presence of unfired explosive material. Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be re-fired before work proceeds. No person shall be allowed to deepen the drill holes that have contained explosives.

Drill holes shall be large enough to permit free insertion of cartridges of explosive materials. Drill holes shall not be collared in bootlegs or in holes that have previously contained explosive materials. Holes shall not be drilled where there is a danger of intersecting another hole

containing explosive material. Charge loading shall be spread throughout the depth of the drill hole or at the depths or rock concentration in order to obtain the optimum breakage of rock.

Loading and firing shall be performed or supervised only by a person possessing an appropriate blasting permit and license. All drill holes shall be inspected and cleared of any obstruction before loading. No holes shall be loaded, except those to be fired in the next round of blasting. After loading, all remaining explosives shall be immediately returned to an authorized magazine.

A maximum loading factor of 4.0 pounds of explosive per cubic yard of rock shall not be exceeded. However, should this loading fail to effectively break up the rock, a higher loading factor shall be allowed if the charge weight per delay is reduced by a proportional amount and approved by the CBI. The minimum safe distance from the blasting area to a live buried pipeline is 10 feet measured horizontally from the edge of the blasting area to the outer edge of the affected pipeline. The site-by-site minimum safe distance between blasting areas and adjacent live natural gas pipelines will be calculated each time blasting is to occur using PIPEBLAST computer modeling program or other recognized industrial standards and applying the measured site conditions. The minimum safe distance and supporting calculations and site measurements are to be submitted for approval to MVP's CBI at least 48 hours before blasting is to occur.

All blasts will be monitored to ensure the peak particle velocity does not exceed the following specified maximum velocities:

- Four inches per second for underground, welded, steel pipeline.
- Two inches per second for underground, coupled, steel pipelines; aboveground and underground structures; or water wells.

The MVP engineering department may approve higher peak particle velocities in writing, given site-specific conditions.

The maximum amplitude of the elastic wave created by any blast shall not exceed 0.0636 inches.

One of the following types of explosive and initiation systems will be used:

Dyno Nobel Unimax® (or equivalent)

An extra-gelatin dynamite with a specific gravity of 1.51 grams per cubic centimeter (g/cc), a detonation rate of 17,400 feet per second (f/s) (unconfined) and a calculated energy of 1,055 c/g. The cartridge size will generally be 2 inches x 8 inches (1.25 lbs/cartridge) or 2 inches x 16 inches (2.50 lbs/cartridge).

Dyno Nobel Unigel® (or equivalent)

A semi-gelatin dynamite with a specific gravity of 1.30 g/cc, a detonation rate of 14,200 f/s (unconfined) and a calculated energy of 955 c/g. The cartridge size will generally be 2 inches x 8 inches (1.15 lbs/cartridge) or 2 inches x 26 inches (2.30 lbs/cartridge).

Dyno Nobel Dynamax Pro™ (or equivalent)

A propagation-resistant dynamite, with a specific gravity of 1.45 g/cc, a detonation rate of 19,700 f/s (unconfined) and a calculated energy of 1,055 c/g. The cartridge size will generally be 2 inches x 8 inches (1.225 lbs/cartridge) or 2 inches x 16 inches (2.45 lbs/cartridge).

Dyno Nobel NONEL® 17 or 25 Millisecond Delay Connectors or Dyno Nobel NONEL EZ Det® (or equivalent)

A nonelectric delay detonator with a 25/350, 25/500, or 25/700 millisecond delay.

Dyno Nobel NONEL® Nonelectric Shock Tube System Detonator (or equivalent)

The Shock Tube will be used to initiate all shots. The Shock Tube will be attached at one point only for initiation of the entire shot and will not be used for downhole priming.

Dyno Nobel 1062 Bulk Emulsion (or equivalent)

An emulsion/gel product commonly used for area blasting such as road alignments or large pads. It contains the following major components: ammonium nitrate (30 to 80% w/w, calcium nitrate, sodium nitrate, and No. 2 diesel fuel (1 to 8% w/w).

Each borehole shall be primed with NONEL EZ Det® system. The total grains of the detonator system should be limited to prevent blowing stemming out of the drill hole. Boreholes shall be delayed with a minimum of 25 milliseconds (ms). Slightly longer delays may be used over steep hills with prior approval of the CBI. Primers shall not be assembled closer than 50 feet from any magazine. Primers shall be made up only when and as required for immediate needs.

Blasting shall not be permitted if any part of an in-service pipeline lies within the perimeter of the crater zone, regardless of size of the blast/shot. The crater zone shall be defined as a circle created by turning a radius along the ground surface equal to the length of the depth below the surfaces where the shot is placed.

Tamping shall be done only with wood rods without exposed metal parts, but non-sparking metal connectors may be used for jointed poles. Plastic tamping poles may be used, provided the authority having jurisdiction has approved them. Violent tamping shall be avoided.

Recommended stemming material shall consist of crushed stone with d_{50} – 3/8 inch, which will not bridge over like dirt and will completely fill voids in the hole.

When safety fuse is used, the burning rate shall be determined and in no case shall fuse lengths less than 120 seconds be used. The blasting cap shall be securely attached to the safety fuse with a standard ring-type cap crimper.

Pneumatic loading of blasting agents in blast holes primed with electric blasting caps or other static-sensitive initiation systems shall comply with the following requirements:

- A positive grounding device shall be used for the equipment to prevent accumulation of static electricity;

- A semi-conductive discharge hose shall be used; and
- A qualified person shall evaluate all systems to assure they will adequately dissipate static charges under field conditions.

No blasting caps or other detonators shall be inserted in the explosives without first making a hole in the cartridge for the cap with a wooden punch of proper size or standard cap crimper.

After loading for a blast is completed, all excess blasting caps or electric blasting caps and other explosives shall immediately be removed from the area and returned to their separate storage magazines.

7.4 Discharging Explosives

Persons authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution, including, but not limited to, warning signals, flags, barricades, or woven wire mats to ensure the safety of the general public and workmen.

The contractor shall obtain MVP's approval and provide them at least 48-hour notice prior to the use of any explosives. The contractor shall comply with local and state requirements for pre-blast notifications, such as the One-Call regulations in West Virginia and Virginia, which require a minimum 72-hour notice.

Whenever blasting is being conducted in the vicinity (within 150 feet) of gas, electric, water, fire alarm, telephone, telegraph, and other utilities as identified by the West Virginia or Virginia one call system, the blaster shall notify the appropriate representatives of such utilities at least 24 hours in advance of blasting. Verbal notice shall be confirmed with written notice. In an emergency, the local authority issuing the original permit may waive this time limit. MVP's CBI is to be notified, both verbally and copied, with the written notice for notifications.

Blasting operations, except by special permission of the authority having jurisdiction and MVP, shall be conducted during daylight hours.

When blasting is done in congested areas or in proximity to a significant natural resource, structure, railway, highway, or any other installation that may be damaged, the blast shall be backfilled before firing or covered with a mat, constructed so it is capable of preventing fragments from being thrown. In addition, all other possible precautions shall be taken to prevent damage to livestock and other property and inconvenience to the property owner or tenant during blasting operations. Any rock scattered outside the right-of-way by blasting operations shall immediately be hauled off or returned to the right-of-way.

Precautions shall be taken to prevent accidental discharge of blasting caps from currents induced by lightning, adjacent power lines, dust and snow storms, or other sources of extraneous electricity. These precautions shall include:

- Suspension of all blasting operations and removal of all personnel from the blasting area during the approach and progress of an electrical storm; and
- Mandatory use of lightning detectors.

No blast shall be fired until the blaster in charge has made certain that all surplus explosive materials are in a safe place, all persons and equipment are at a safe distance or under sufficient cover, and an adequate warning signal has been given.

No loaded holes shall be left unattended or unprotected. Explosive shall not be primed or fused until immediately before the blast. After each blasting sequence, the blasting contractor shall inspect the site for cut-offs and misfires. All explosives or blasting agents shall be verified as discharged prior to starting/resuming excavation.

Only the person making connections between the cap and fuse system shall fire the shot. All connections should be made from the bore hole back to the source of ignition. If there are any misfires while using cap and fuse, all persons shall remain away from the charge for at least 15 minutes. Misfires shall be handled under the direction of the person in charge of the blasting, and the construction right-of-way shall be carefully searched for the unexploded charges.

Explosives shall not be extracted from a hole that has once been charged or has misfired unless it is impossible to detonate the unexploded charge by insertion of a fresh additional primer.

7.5 Waterbody Crossing Blasting Procedures

Mountain Valley will cross waterbodies within the JNF using the conventional bore method. The conventional bore method will not require blasting within waterbodies.

7.6 Wetland Crossing Blasting Procedures

Blasting for trench excavation crossing a wetland will only be considered after all other reasonable means of excavating have been evaluated and determined to be unlikely to achieve the required trench grade.

Blasting should not be conducted within or near a wetland without MVP's Environmental Inspector (EI) review and development of a Wetland Crossing Blasting Plan that includes protective measures to minimize damage to wetlands. At a minimum, the individual Wetland Crossing Blasting Plan will be provided to the appropriate federal, state, and local authorities for review and approval five working days prior to conducting the blasting.

Blasting will be conducted in a manner that will not compromise the structural integrity of the wetland hydrology of known wetlands. If rock is required to be blasted to achieve trench grade, then the following parameters will be adhered to:

- a. The excavation will be carefully inspected for any voids, openings, fractures, or other telltale signs of dewatering activity by MVP's EI.
- b. If the rock removal intercepts an open void, channel, or fracture, the work in that area will be stopped until a remedial assessment can be carried out by MVP's EI.
- c. All use of explosives will be limited to low-force charges that are designed to transfer the explosive force only to the rock which is designated for removal (e.g., maximum charge of two inches per second ground acceleration).

7.7 Rock Disposal Due to Blasting

During the course of blasting for grade and trench excavation excess rock fragments that are deemed as unacceptable for trench backfill may be incurred. This excess rock may be used in the restoration of the disturbed right-of-way limits, with the rock buried within the reclamation limits of the right-of-way. With the execution of individual landowner agreements for the placement of this excess rock, the rock placement will be to a depth that will help stabilize the right-of-way restoration and will be below the root zones of the cover vegetation.

If the excess rock is to be removed from the construction area, it is to be hauled to an approved local- and state-permitted disposal site. This disposal facility will need to demonstrate that it is permitted to accept and dispose of the excess rock from the blasting operations. MVP will obtain a copy of the disposal facility's permit, as issued by the local jurisdiction having authority over the disposal facility and the disposal site within.

7.8 Disposal of Explosive Materials

All explosive materials that are obviously deteriorated or damaged shall not be used and shall be destroyed according to applicable local, state, and federal requirements.

Empty containers and packages and paper or fiberboard packing materials that have previously contained explosive materials shall not be reused for any purpose. Such packaging materials shall be destroyed by burning (outside of the construction right-of-way) at an approved outdoor location or by other approved method. All personnel shall remain at a safe distance from the disposal area.

All other explosive materials will be transported from the job site in approved magazines per local and/or state regulations.

7.9 Blasting Records

Within 48 hours following a blast, the blasting contractor must provide a Blast Report to the MVP's CBI. The Blast Report shall provide, at a minimum, the information outlined in Attachment J-2, "Blast Report," which includes the following data for each blast:

- Name of company or contractor;
- Location, date, and time of blast;
- Name, signature, and license number of contractor and blaster in charge;
- Blast location referenced to the pipeline station/milepost;
- Picture record of the blast area disturbance and of blasted trench;
- Type of material blasted;
- Number of holes, depth of burden and stemming, and spacing;
- Diameter and depth of holes;
- Volume of rock in shot;
- Types of explosives used, specific gravity, energy release, pounds of explosive per delay, and total pounds of explosive per shot;

- Delay type, interval, total number of delays, and holes per delay;
- Maximum amount of explosives per delay period of 17 milliseconds or greater;
- Power factor;
- Method of firing and type of circuit;
- Direction and distance in feet to nearest structure and utility neither owned or leased by the person conducting the blasting;
- Weather conditions;
- Type and height or length of stemming;
- If mats or other protection were used; and
- Type of detonators used and delay periods used.

In addition, the blast design is to be attached and made part of the Blast Report. The Blast Report is in addition to all other local, county, township, state, or federal reporting requirements.

At the conclusion of each blasting event, the blasting contractor is to conduct and inventory blasting/explosive materials with a written inventory report attached to the Blast Report. All blasting/explosive materials are to be accounted for. Any discrepancies are to be immediately reported to the governing agencies and the MVP's CBI.

When the effects of the discharge are monitored by seismographs, the person taking the seismograph reading shall accurately indicate the exact location of the seismograph and show the distance of the seismograph from the blast. Seismograph records, where required, should include:

- Name of person and firm operating and analyzing the seismograph record;
- Seismograph serial number;
- Seismograph reading; and
- Maximum number of holes per delay period of 17 milliseconds or greater.

Within 72 hours following a blast, at sites monitored by a seismograph, the blasting contractor must provide a Seismograph Report to the MVP's CBI. Attachment J-3 presents the Seismograph Report Form for the MVP Project. The seismograph readings and written interpretations must also be attached to the Seismograph Report. This reporting is in addition to all other local, county, township, state, or federal reporting requirements. Copies of these Seismograph Reports are to be provided to the CBI.

8.0 POST-BLAST INSPECTION

An independent contractor, with landowner permission, will examine the condition of structures within 150 feet, or as required by state or local ordinances, of the construction area after completion of blasting operations, to identify any changes in the conditions of these properties or confirm any damages noted by the landowner. The independent contractor, with landowner approval, will conduct a resampling of wells within 150 feet, or as required by state or local

ordinances, of the construction area. Should any damage or change occur during the blasting operations, an additional survey of the affected property may be conducted.

Upon receiving notice that a structure or other damages have possibly occurred due to the blasting operations, the Blasting contractor is to conduct a post-blast conditions survey. The post-blast conditions survey shall be conducted within 48 hours after being notified or at the landowner's schedule and permission. The post-blast conditions will be documented with the information outlined in the "Post-Blast Survey for the MVP Project," Attachment J-4. This post-blast form is considered the minimum information needed.

**ATTACHMENT J-1
PRE-BLAST SURVEY**

PRE-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

STRUCTURE INFORMATION

Owner Name:	
Mailing Address:	
Telephone No.:	
Street Address or Physical Address:	
Latitude:	Longitude:
County/Township:	State:
Nearest Pipeline Station/Milepost:	
Company Structure No.:	

OCCUPANT INFORMATION

Occupant Name:
Mailing Address:
Telephone No.:

SURVEYOR'S INFORMATION

Company Conducting Survey:
Mailing Address:
Telephone No.:
Contact Person to Discuss Survey:
Name of Approved Surveyor:
State of Approval:

STRUCTURE LOCATION MAP

Survey Map:	8 1/2" x 11" copy of construction alignment sheet or site specific plan/drawing showing Mountain Valley Pipeline and structure surveyed. Attach map to survey.
-------------	--

SITE PLAN SKETCH

Site Plan:	8 1/2" x 11" sketch showing all structures and relative locations, driveways, sidewalks, outbuildings, water wells, septic systems' components, and other man-made features as applicable. Use arrows to show site grade and slope. Include a North arrow and direction and distance to Mountain Valley Pipeline. The site plan sketch shall show the distance from the blast's end points to the adjacent natural gas pipeline(s).
------------	---

PRE-BLAST SURVEY MOUNTAIN VALLEY PIPELINE PROJECT

Exterior Inspection (Check all that apply)

Page 2

Age of Structure

_____ years

- estimated
- provided by owner or occupant
- other (explain) _____

Use of Structure

- private dwelling
- commercial building
 - retail
 - factory
 - office
 - warehouse/storage
- multi-family dwelling
- single-family rental
- apartment building
- other (explain) _____

Type of Structure

- conventional dwelling
- mobile home
- mobile home with frame addition
- modular
- commercial (describe) _____
- other (explain) _____
- single story
- two story
 - other (describe) _____

Frame Materials

- conventional wood frame
- timber frame
- steel
- masonry

Foundation Material

- poured concrete
- stone block
- cinder block
- concrete block
- other (explain) _____

Foundation Type

- crawl space
 - full basement
 - partial basement
 - block on footing with center piers
 - piers/posts/pillars with underpinning
 - piers/posts/pillars w/out underpinning
 - other (describe) _____
- If dwelling is a mobile home, are tie-downs in use? yes no

Exterior Finish Materials

- brick
- concrete block
- cinder block
- stone
- stucco
- brick or stone laminate
- wood siding
- aluminum siding
- vinyl siding
- shingle (describe type) _____
- other (explain) _____

PRE-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Exterior Inspection (cont.)

(Check all that apply)

Page 3

Roofing Material(s)

- shingles
 - asphalt
 - cedar or other wood
 - other (explain) _____
 - slate
 - tile
 - tin or other metal
 - tar & chip
 - tarpaper
 - other (explain) _____
- Gutters installed yes no
Down spouts installed yes no
Routed away from foundation
 yes no

Roof Configuration

- sloped
- flat

Chimney Material

- block
- brick
- stone
- metal
- other (explain) _____

Sidewalk/Walkway Material(s)

- concrete
- wood
- brick
- pavers/patio blocks
- flagstone
- other (explain) _____

Driveway Material(s)

- concrete
- asphalt
- gravel
- tar & chip
- other (explain) _____

Exterior Photos Labeled to Match Checklist Items.

Comments (including a description of any substandard construction):

PRE-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Well/Water Supply System (check all that apply)

Page 4

- Public Service Water Supply (if not checked, complete the remainder of this page, and include a water analysis of untreated water).

Water Use

- domestic
 irrigation domestic garden
 irrigation commercial crops
 livestock
 combined domestic and agricultural
 commercial (explain) _____
 no water source at the site (explain) _____
 cistern

Size _____ gallons

Age _____ years

Supplied by:

- rainwater
 spring
 runoff/stream

Location:

- aboveground
 buried

Material:

- concrete
 plastic
 metal
 other (explain) _____

- spring
 stream
 other (explain) _____

- dug well
depth _____ ft. age _____
 brick lining
 stone lining
 other (explain) _____
 Pump type & size _____

- drilled well

- steel casing
 plastic casing
 other (explain) _____
Casing depth _____ ft.
Casing diameter _____ in.
Well screen/liner diameter _____ in. Depth
_____ ft. to _____ ft.
Well screen type _____
Vent type/size _____
Well driller _____
Pump type & size _____

Water Quantity

- Has well ever gone dry yes no
Has well capacity ever been measured
 yes no If yes, list
data (recharge rate): _____ gpm
How many people use this water
supply? _____

Water Quality

- Does the water cause staining?
 yes no
Stain color: _____
Items stained: _____

- Are there particulates (solids) in the
water? yes no
If yes describe the particles
(color, texture): _____

- Does the water have an odor?
 yes no If yes describe the odor

PRE-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Water Well/Septic-Sewage System

Page 5

Well/Water Supply (continued)

Is there a treatment system?

yes no

Type of treatment: _____

Is the water sampling point prior to treatment? yes no

Sampling Information

May the well be unsealed to measure depth to and of water? yes no

Depth of water: _____ ft.

Ground level to water: _____ ft.

May the well be pumped to measure recharge characteristics? yes no

Recharge rate _____ gpm

Date measured: _____

Date sampled: _____

Well sample no.: _____

Septic/Sewage Treatment System

public service system

aeration system

package plant

septic tank

concrete

plastic

metal

other (explain) _____

drain field

other (explain) _____

Location Information

water well

latitude longitude

springs

latitude longitude

septic/sewage

latitude longitude

Attach lab analysis of the pre-treatment water and any available written well documentation. Provide source of documentation. Photos of water well(s), water supply, water treatment system, and septic/sewage treatment system and area.

Interior Inspection

Provide written documentation of any defects. Written documentation must be accompanied by photos or room sketches for each interior room.

Each interior room sketch must include type of construction materials and covering for each wall, the floor and the ceiling.

Each wall that is found to be defect free must be labeled "room completely surveyed" or "no defects observed".

Show areas hidden from view (hidden by furniture, etc.).

Interior photos of a room should be appropriately labeled to match written documentation to the photo (i.e. room and wall number).

Include a key to abbreviations used.

Include a floor plan sketch with rooms labeled and indicate direction of progression of the inspection.

Comments (include any substandard construction): _____

PRE-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Additional Buildings

Page 6

Additional Building (attach additional sheets for each additional building).

Type of building

- barn
- garage
- well house
- storage
- other (explain) _____

Age _____
 estimated
 owner provided

Exterior finish material _____

Frame materials _____

Roof materials _____

Floor materials _____

Foundation materials _____

Is interior finished yes no

Interior finish _____

Provide written documentation and photos of exterior and interior with room sketches for each interior room of the additional building.

Comments

Owner/resident: _____

Surveyor: _____

**ATTACHMENT J-2
BLAST REPORT**

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Blasting Company: _____

Address: _____

Blast Location: _____ to _____
Pipeline Station/Milepost Pipeline Station/Milepost County/Township State

Blast Area: _____
Picture(s) of Blast Area Disturbance Picture(s) of Blasted Trench

Blast Date and Time: _____
Date Military Time

Blaster: _____
Signature of Blaster

Printed Name of Blaster

Blaster's License Number

Blasting Company Name

Blasting Company License Number

Signature of Blasting Company Person in Charge

Printed Name of Person in Charge

Type of Material Blasted: _____
(Geologist Description)

Blast Design: _____
Number of Holes and Diameter

Depth of Burden

Stemming and Spacing

Depth of Holes

Stemming Type and Height/Length

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Page 2

Volume of Shot: _____
Rock Volume of Shot

Explosives and Delays: _____
Type of Explosives Used

Specific Gravity and Energy Release

Pounds of Explosive per Delay

Total Pounds of Explosive per Shot

Type of Delay and Interval

Total Number of Delays and Holes per Delay

Maximum Amount of Explosives per Delay Period of 17 Milliseconds or Greater

Power Factor

Firing: _____
Method of Firing

Type of Circuit

Nearest Structure: _____
Compass Direction and Distance in Feet to Nearest Structure

Nearest Structure Description

Weather: _____
Temperature, Wind and Sky Conditions at Start of Hole Loading

Temperature, Wind and Sky Conditions at Time of Blast

Protection: _____
Mats Description and Weight

Other than Mats Blast Protection

Detonator/Delay: _____
Type of Detonator Used

Delay Period(s) Used

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Page 3

Safety Measures:

Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel
Location of Measure
Dates Safety Measures Placed/Removed
Comments
Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel
Location of Measure
Dates Safety Measures Placed/Removed
Comments
Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel
Location of Measure
Dates Safety Measures Placed/Removed
Comments
Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel
Location of Measure
Dates Safety Measures Placed/Removed
Comments

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Page 4

Safety Measures:

Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel

Location of Measure

Dates Safety Measures Placed/Removed

Comments

Safety Measures Implemented to Protect Blast Area from Unauthorized Personnel

Location of Measure

Dates Safety Measures Placed/Removed

Comments

Communications Systems:

Used to Maintain Safe Blast Area

Location and Use

Comments

Used to Maintain Safe Blast Area

Location and Use

Comments

Used to Maintain Safe Blast Area

Location and Use

Comments

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Page 5

Communications Systems:

_____	Used to Maintain Safe Blast Area
_____	Location and Use
_____	Comments
_____	Used to Maintain Safe Blast Area
_____	Location and Use
_____	Comments
_____	Used to Maintain Safe Blast Area
_____	Location and Use
_____	Comments

Notices of Blast:

_____		Company/Person		
_____	Verbal Date	_____	Military Time	
_____				Written Notice Date
_____				Written Notice Provided By
_____				Company/Person
_____	Verbal Date	_____	Military Time	
_____				Written Notice Date
_____				Written Notice Provided By

BLAST REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Page 6

Notices of Blast:

Company/Person	
_____	_____
Verbal Date	Military Time

Written Notice Date	

Written Notice Provided By	

Company/Person	
_____	_____
Verbal Date	Military Time

Written Notice Date	

Written Notice Provided By	

Company/Person	
_____	_____
Verbal Date	Military Time

Written Notice Date	

Written Notice Provided By	

Company/Person	
_____	_____
Verbal Date	Military Time

Written Notice Date	

Written Notice Provided By	

**ATTACHMENT J-3
SEISMOGRAPH REPORT**

SEISMOGRAPH REPORT

MOUNTAIN VALLEY PIPELINE PROJECT

Seismograph Company: _____

Address: _____

Blast Location: _____ to _____
Pipeline Station/Milepost Pipeline Station/Milepost County/Township State

Blast Date and Time: _____
Date Military Time

Seismograph Locations: _____
Seismograph Serial Number Location Description

_____ Distance from Blast in Feet and Location Compass Direction

_____ Seismograph Reading

_____ Seismograph Serial Number Location Description

_____ Distance from Blast in Feet and Location Compass Direction

_____ Seismograph Reading

_____ Seismograph Serial Number Location Description

_____ Distance from Blast in Feet and Location Compass Direction

_____ Seismograph Reading

_____ Seismograph Serial Number Location Description

_____ Distance from Blast in Feet and Location Compass Direction

_____ Seismograph Reading

Holes per Delay: _____
Maximum Number of Holes per Delay Period of 17 Milliseconds or Greater

Person Analyzing Readings: _____
Signature of Seismograph Reader

_____ Printed Name

_____ Name of Company/Firm Analyzing Readings

The seismograph report, copy of seismograph readings, and location sketch and description documenting the location of each seismograph are to be attached to the Blast Report for each blast where seismograph readings are required.

**ATTACHMENT J-4
POST-BLAST SURVEY**

POST-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

STRUCTURE INFORMATION

Owner Name:	
Mailing Address:	
Telephone No.:	
Street Address or Physical Address:	
Latitude:	Longitude:
County/Township:	State:
Nearest Pipeline Station/Milepost:	
Company Structure No.:	

OCCUPANT INFORMATION

Occupant Name:	
Mailing Address:	
Telephone No.:	

SURVEYOR'S INFORMATION

Company Conducting Survey:	
Mailing Address:	
Telephone No.:	
Contact Person to Discuss Survey:	
Name of Approved Surveyor:	
State of Approval:	

REQUEST FOR POST-BLAST SURVEY

Name of Company/Person Requesting Post-Blasting Survey:	
Mailing Address:	
Telephone No.:	
Physical Address:	
Statement of Damage:	

STRUCTURE LOCATION MAP

Survey Map:	8 1/2" x 11" copy of construction alignment sheet or site specific plan/drawing showing Mountain Valley Pipeline and structure surveyed. Attach map to survey.
-------------	--

SITE PLAN SKETCH

Site Plan:	8 1/2" x 11" sketch showing all structures and relative locations, driveways, sidewalks, outbuildings, water wells, septic systems' components, and other man-made features as applicable. Use arrows to show site grade and slope. Include a North arrow and direction and distance to Mountain Valley Pipeline. The site plan sketch shall show the distance from the blast's end points to the adjacent natural gas pipeline(s).
------------	---

POST-BLAST SURVEY MOUNTAIN VALLEY PIPELINE PROJECT

Exterior Inspection (Check all that apply)

Page 2

Age of Structure

_____ years

- estimated
- provided by owner or occupant
- other (explain) _____

Use of Structure

- private dwelling
- commercial building
 - retail
 - factory
 - office
 - warehouse/storage
- multi-family dwelling
- single-family rental
- apartment building
- other (explain) _____

Type of Structure

- conventional dwelling
- mobile home
- mobile home with frame addition
- modular
- commercial (describe) _____
- other (explain) _____
- single story
- two story
 - other (describe) _____

Frame Materials

- conventional wood frame
- timber frame
- steel
- masonry

Foundation Material

- poured concrete
- stone block
- cinder block
- concrete block
- other (explain) _____

Foundation Type

- crawl space
 - full basement
 - partial basement
 - block on footing with center piers
 - piers/posts/pillars with underpinning
 - piers/posts/pillars w/out underpinning
 - other (describe) _____
- If dwelling is a mobile home, are tie-downs in use? yes no

Exterior Finish Materials

- brick
- concrete block
- cinder block
- stone
- stucco
- brick or stone laminate
- wood siding
- aluminum siding
- vinyl siding
- shingle (describe type) _____
- other (explain) _____

POST-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Exterior Inspection (cont.)

(Check all that apply)

Page 3

Roofing Material(s)

- shingles
 - asphalt
 - cedar or other wood
 - other (explain) _____
 - slate
 - tile
 - tin or other metal
 - tar & chip
 - tarpaper
 - other (explain) _____
- Gutters installed yes no
Down spouts installed yes no
Routed away from foundation
 yes no

Sidewalk/Walkway Material(s)

- concrete
- wood
- brick
- pavers/patio blocks
- flagstone
- other (explain) _____

Roof Configuration

- sloped
- flat

Chimney Material

- block
- brick
- stone
- metal
- other (explain) _____

Driveway Material(s)

- concrete
- asphalt
- gravel
- tar & chip
- other (explain) _____

Exterior Photos Labeled to Match Checklist Items.

Comments (including a description of any substandard construction):

POST-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Well/Water Supply System (check all that apply)

Page 4

Public Service Water Supply (if not checked, complete the remainder of this page, and include a water analysis of untreated water).

Water Use

- domestic
- irrigation domestic garden
- irrigation commercial crops
- livestock
- combined domestic and agricultural
- commercial (explain) _____

no water source at the site (explain) _____

cistern

Size _____ gallons

Age _____ years

Supplied by:

- rainwater
- spring
- runoff/stream

Location:

- aboveground
- buried

Material:

- concrete
- plastic
- metal
- other (explain) _____

- spring
- stream
- other (explain) _____

dug well

depth _____ ft. age _____

- brick lining
- stone lining
- other (explain) _____
- Pump type & size _____

drilled well

- steel casing
- plastic casing
- other (explain) _____
Casing depth _____ ft.
Casing diameter _____ in.
Well screen/liner diameter _____ in.
Depth ft. to _____ ft.

Well screen type _____

Vent type/size _____

Well driller _____

Pump type & size _____

Water Quantity

Has well ever gone dry yes no

Has well capacity ever been measured

yes no If yes, list

data (recharge rate): _____ gpm

How many people use this water supply? _____

Water Quality

Does the water cause staining?

yes no

Stain color: _____

Items stained: _____

Are there particulates (solids) in the

water? yes no

If yes describe the particles

(color, texture): _____

Does the water have an odor?

yes no If yes describe the odor

POST-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Water Well/Septic-Sewage System

Page 5

Well/Water Supply (continued)

Is there a treatment system?

yes no

Type of treatment: _____

Is the water sampling point prior to treatment? yes no

Sampling Information

May the well be unsealed to measure depth to and of water? yes no

Depth of water: _____ ft.

Ground level to water: _____ ft.

May the well be pumped to measure recharge characteristics? yes no

Recharge rate _____ gpm

Date measured: _____

Date sampled: _____

Well sample no.: _____

Septic/Sewage Treatment System

public service system

aeration system

package plant

septic tank

concrete

plastic

metal

other (explain) _____

drain field

other (explain) _____

Location Information

water well

latitude longitude

springs

latitude longitude

septic/sewage

latitude longitude

Attach lab analysis of the pre-treatment water and any available written well documentation. Provide source of documentation. Photos of water well(s), water supply, water treatment system, and septic/sewage treatment system and area.

Interior Inspection

Provide written documentation of any defects. Written documentation must be accompanied by photos or room sketches for each interior room.

Each interior room sketch must include type of construction materials and covering for each wall, the floor and the ceiling.

Each wall that is found to be defect free must be labeled "room completely surveyed" or "no defects observed".

Show areas hidden from view (hidden by furniture, etc.).

Interior photos of a room should be appropriately labeled to match written documentation to the photo (i.e. room and wall number).

Include a key to abbreviations used.

Include a floor plan sketch with rooms labeled and indicate direction of progression of the inspection.

Comments (include any substandard construction): _____

POST-BLAST SURVEY

MOUNTAIN VALLEY PIPELINE PROJECT

Additional Buildings

Page 6

Additional Building (attach additional sheets for each additional building).

Type of building

- barn
- garage
- well house
- storage
- other (explain) _____

Age _____
 estimated
 owner provided

Exterior finish material _____

Frame materials _____

Roof materials _____

Floor materials _____

Foundation materials _____

Is interior finished yes no

Interior finish _____

Provide written documentation and photos of exterior and interior with room sketches for each interior room of the additional building.

Comments

Owner/resident: _____

Surveyor: _____

POST-BLAST SURVEY
MOUNTAIN VALLEY PIPELINE PROJECT
DAMAGE SUMMARY

Page 7

Damaged Facility: _____
List Facility Damaged

Type of Damage: _____
(Attach sketch of damaged facility, facility location, and photograph)

Date of Blast and Time: _____
Date Military Time
(Attach copy of blast design and blast report)

Pipeline Trench Location: _____ to _____
Pipeline Station/Milepost Pipeline Station/Milepost County/Township State

Pipeline Trench to Damage Location: _____
Distance from Blasting Site (in Feet) and Location Compass Direction

Seismograph Report: _____
(Attach Seismograph Report)

Pipeline Trench Fracture Zone: _____
Length in Feet Width in Feet

Changes Implemented Blast Design: _____
Weight of Change

Distribution of Change in Blast Hole

Weight of Explosive per Delay

Shot Hole Pattern

Supplier/Manufacturer of Explosive

Explosive Grade

Ground Geology: _____
List Changes Before Blast and After Blast

POST-BLAST SURVEY
MOUNTAIN VALLEY PIPELINE PROJECT
DAMAGE SUMMARY

Page 8

Provide Written Comments of: **MVP Chief Blasting Inspector**
 Blaster
 Post-Blast Surveyor
 Seismologist
 Facility Owner

Provide written comments of suggested changes to future blast designs for the Mountain Valley project.

Provide written comments as to actions to be taken to correct the damages.