ITEM 5 - ANTIDEGRADATION ANALYSIS

5.1 PROJECT DESCRIPTION

Dominion Transmission, Inc. (DTI) is seeking authorization from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act in support of the proposed Lebanon West II Project (Project). The Project will involve pipeline replacement and changes to existing aboveground facilities in multiple counties in Ohio (OH) and Pennsylvania (PA).

Dominion Transmission, Inc. (DTI) is proposing pipeline replacement and minor modifications to existing aboveground facilities as part of the Project. DTI plans to replace 11 segments of the TL-400 natural gas pipeline totaling 10.07 miles (mi) across Tuscarawas, Licking, Muskingum, Harrison, Coshocton, Columbiana, and Carroll ***c***ounties, OH and in Beaver County, PA. Changes to aboveground facilities will occur in Licking and Fayette ***c***ounties, OH and in Armstrong, Allegheny, and Beaver ***c***ounties, PA.

Specifically, DTI proposes to replace the following TL-400 pipeline segments:

- Segment 14 – 2.05 mi (10,812 feet [ft]) in Coshocton and Tuscarawas ***c***ounties, OH;
- Segment 15 – 0.39 mi (2,082 ft) in Tuscarawas County, OH;
- Segment 16 – 1.09 mi (5,733 ft) in Tuscarawas County, OH;
- Segment 17 – 1.89 mi (9,963 ft) in Harrison County, OH;
- Segment 19 – 1.51 mi (7,980 ft) in Carroll County, OH;
- Segment 20 – 0.95 mi (5,021 ft) in Carroll County, OH;
- Segment 21 – 0.32 mi (1,693 ft) in Columbiana County, OH;
- Segment 22 – 0.79 mi (4,185 ft) in Columbiana County, OH;
- Segment 24 – 0.68 mi (3,568 ft) in Columbiana County, OH;
- Segment 25 – 0.21 mi (1,089 ft) in Columbiana County, OH; and
- Segment 27 – 0.19 mi (986 ft) in Beaver County, PA.

In addition, DTI proposes to make changes to the following existing facilities:

- Newark Compressor Station (Licking County, OH) – additional regulation to reduce the pressure on TL-400;
- Washington Compressor Station (Fayette County, OH) – install four new valves and required 30-inch (in) steel piping to create a bi-directional flow arrangement;
- Coxcomb Gate Assembly (Allegheny County, PA) – addition of a new relief valve on the existing LN-25 pipeline;
- Rural Valley Compressor Station (Armstrong County, PA) – addition of 10,915 horsepower (International Organization for Standardization [ISO] rating) of compression, a gas cooler, a filter separator, replacing the exiting boiler, expansion of the existing compressor building to accommodate the new

centrifugal compressor, installation of additional motor control centers in the existing auxiliary building, and installation of a third blowdown separator/silencer for the new compressor; and
- Beaver Compressor Station (Beaver County, PA) – installation of additional regulation.

An analysis was performed to determine whether there are any reasonable alternatives to the proposed Project. The following criteria were utilized in the alternatives analysis:

- Does the alternative meet the purpose and need of the Project?
- Is the alternative technically and/or economically feasible and practicable?
- Does the alternative offer significant environmental advantages?

5.1.1 Purpose and Need

The purpose of the Project is to provide a transportation of natural gas to Texas Gas Pipeline in Lebanon, OH. This service is proposed to be accomplished by installing an additional 10,915 hp (ISO rating) of compression at the existing Rural Valley Station, installing crossover piping at the existing Washington Station, and replacing segments of the existing TL-400 pipeline to achieve maximum allowable operating pressure of 848 pounds per square inch gauge for the proposed Project described. Multiple sections of TL-400 require replacement due to class location changes along the pipeline. Additionally, regulation must be installed at both Beaver Station and at Newark Station, and a relief valve must be installed at the Coxcomb Gate Assembly. The proposed upgrades will provide additional firm natural gas transportation service of up to 130,000 dekatherms per day (dt/d) for delivery to Texas Gas in Lebanon, OH. The primary customer is R. E. Gas Development LLC (Rex Energy).

The Project in-service date is November 1, 2016.

5.2 PREFERRED DESIGN

The preferred design approach taken during the Project planning include minimizing workspace through wetlands to a 75 ft ROW, compared to the typical 105 ft workspace used throughout the upland areas. Although this is not preferred due to construction constraints, it is the most effective way to minimize waterbody ***and wetland*** impacts within the Project's LOD. Old pipe will be removed ***or abandoned in place by capping and grouting. The Project existing pipeline construction table outlines the work to be performed on the old line.***

Segment 14 includes two reroutes which avoid steep sideslopes and a large wetland area. Segment 17 was rerouted around a portion of the existing permanent ROW to avoid extensive impacts to an existing National Wetland Inventory wetland located along the existing pipeline ROW. Alternatives to the reroute included replacement of the line in the existing ROW, which will result in impacts to the wetland during construction, and also future impacts while using the ROW for access and routine ROW maintenance, such as mowing.

The Preferred Design is the method proposed for construction of the Project.

5.3 MINIMAL DEGRADATION ALTERNATIVE

The minimal degradation alternative approach would be similar to the preferred design; however, the existing pipeline would remain in place and would be abandoned ***throughout the entire Project***. Also, ***Segments 14 and 17*** would have a longer reroute which would avoid additional impacts to a large wetland along that Segment. Additional land owner affects would result if the pipeline were to have a longer reroute.

5.4 NON-DEGRADATION ALTERNATIVE

The non-degradation alternative would include Horizontal Directional Drilling (HDD) of streams and wetlands as well as leaving the old pipeline in the ground. The non-degradation alternative would result in greater landowner affects due to additional workspace needed to properly HDD the pipe. Additional workspace would be needed outside of the existing permanent ROW to both string pipe, mix drilling mud, and to set equipment. The extra workspace would also result in additional tree clearing. This alternative was not chosen as a result of all these ***potential impacts***.

5.5 ADDITIONAL ALTERNATIVE INFORMATION AND ECONOMIC CONSIDERATIONS

The No-Action Alternative will result in not implementing the proposed Project and will avoid the potential environmental impacts that will be associated with the Project; however, the Project objectives (purpose and need) will not be met. Under this scenario, the volumes of gas requested for transfer into the recipient pipeline systems will not be accommodated.

The No-Action Alternative will likely require the use of other energy sources to meet the portion of the growing demand that will not be met by the Project. DTI evaluated the feasibility of using alternative sources of energy to satisfy the need intended to be served by the Project, such as the use of other fossil fuels (i.e., fuel oil and coal), hydroelectric power, wind, geothermal, wood and other biomass, solar, and nuclear. Because energy demand is projected to increase (Energy Information Administration [EIA] 2014) through 2040, the use of these energy alternatives, whether alone or in combination, is not anticipated to provide a commercially viable and environmentally preferable alternative to the Project in the near term.

The increased use of alternative fossil fuel sources (i.e., fuel oil and coal) will have their own environmental impacts associated with their extraction, refinement, transportation, and end use. Natural gas has many attributes that make its use more attractive than other fossil fuel sources. Overall, natural gas is the most readily available, dependable, economically viable, and environmentally acceptable fuel for residential, commercial, and industrial markets. Relative to natural gas, reliance on liquid fuels or coal to generate electricity will result in higher emissions of air pollutants, such as particulate matter, nitrogen oxides, and sulfur dioxide, as well as carbon dioxide and other greenhouse gases, leading to reductions in air quality and increases in global warming.

Coal is a readily available alternative energy source to natural gas in the Project area. However, coal extraction results in increased environmental impacts compared to natural gas. Coal extraction sites are also subject to potential land subsidence and require long-term and expensive land reclamation. The burning of coal also requires disposal of the resulting ash, whereas this by-product is not created through the use of natural gas. The use of coal as an energy alternative is not preferred because of the increased long-term environmental impacts associated with the extraction and combustion of coal compared to natural gas.

Hydroelectric power generation is also not considered to be viable as an alternative energy source to natural gas. The Project region does not have a high potential for hydroelectric power generation, even using low head/low power technologies. Although efficiency upgrades at existing hydroelectric power generation facilities are expected to produce incremental additions of electric power in the coming years, environmental concerns and a scarcity of new large-scale sites will limit conventional hydroelectric power production. Therefore, it is unlikely that new and/or significant hydroelectric power generation facilities will be developed in the region or available as a reliable alternative to natural gas.

Other renewable energy sources, such as wind, geothermal, biomass, and solar are not considered viable alternative energy sources to natural gas, as they are not widely available in the region, are not available in sufficient quantities to support market requirements, and are not always reliable. Renewable energy sources are expected to play an increasingly prominent role in meeting United States energy demands in the coming years. Federal, state, and local incentives and continuing research will likely contribute to an increase in the availability and cost effectiveness of these renewable energy sources. Despite the growing support for renewable energy, significant long-term investment and advances in technology and development are necessary before these sources could potentially offset a substantial portion of the projected national energy demand. Therefore, renewable energy sources will not provide sufficient energy supplies in the near future to eliminate the need for the Project.

Nuclear power is not considered to be viable as an alternative energy source to natural gas. Although existing nuclear power plants are expected to continue operating through 2040, the EIA predicts that the total share of generation from nuclear plants will fall from 19 percent in 2010 to 16 percent in 2040 (EIA 2014). Because of the prohibitive costs associated with development of new nuclear facilities, it is unlikely that new nuclear power plants will be sited and developed to serve the targeted markets within a timeframe that will meet Project objectives. Accordingly, the possible use of nuclear energy as a replacement for natural gas is not readily available at this time.

In conclusion, the use of alternative energy sources is not considered a viable, cost-effective, or environmentally-preferred alternative to meet Project objectives, and therefore was not selected.

DTI evaluated the feasibility of using energy conservation measures as an alternative to the proposed Project. However, energy conservation alone will not fully obviate the need for the Project. According to the EIA, although conservation measures aid in reducing current demand for natural gas, the reductions possible through conservation measures alone are not anticipated to meet total current or future demand for natural gas (EIA 2014). Conservation methods are neither uniformly mandated nor followed. Current energy conservation efforts, including the ENERGY STAR program (the joint effort between the United States Environmental Protection Agency and the United States Department of Energy that identifies cost-effective, energy-efficient products that are designed to save consumers money, reduce energy consumption and help protect the environment), will aid in reducing the amount of natural gas used in the production of a dollar's worth of economic output. In addition, local natural gas distribution companies typically provide its customers with information and incentives for energy conservation, including programs that promote the benefits of conservation through education, rebate offers, and targeted low-income initiatives. However, conservation does not negate the need for the Project. Therefore, energy conservation is not considered a viable project alternative solely by itself, in consideration of the Project objectives.

5.5.1 System Alternatives

As defined by FERC's guidance manual for environmental report preparation (FERC 2002), system alternatives are those alternatives that could meet the objectives of the Project, but will use a different (often existing) system or a different configuration of facilities that will obviate the need to construct all or part of the Project. FERC requires that system alternatives be analyzed for large projects and for projects where there are significant concerns about the disturbance of particular resources.

The point of identifying and evaluating system alternatives is to determine if the potential environmental impact associated with the construction and operation of the proposed facilities could be avoided or minimized by using an existing pipeline system. Environmental considerations with system alternatives include, but are not limited to, new right-of-way (ROW) requirements, land use effects, and stream and wetland disturbances. A system alternative could make it unnecessary to construct DTI's Project; although changes or additions to its system or another system may be required. While modifications or additions to existing systems could result in environmental impact, this impact may be less, the same, or more than the impact associated with the proposed Project.

The only other interstate natural gas pipelines in the vicinity of DTI's system, which could reasonably assist in providing this proposed service, are operated by the Tennessee Gas Pipeline Company and Columbia Gas Transmission Company. However, neither pipeline could provide the proposed services due to the location of their facilities without constructing new facilities, which will more than likely include compression and new pipelines. Consequently, these system alternatives will likely have a similar if not greater impact than the proposed Project.

DTI performed hydraulic modeling of its system to identify various configurations that might be capable of supplying the additional transportation services. DTI determined that the Project's objectives could be met by looping[1] or replacing segments of its existing pipeline, along with adding compression at the existing Rural Valley Compressor Station. It should be noted that the environmental impacts of looping versus replacing segments is essentially the same. This is because DTI's contractual service obligations to its customers preclude taking the existing pipeline out of service for any significant period of time. Consequently, the replacement pipeline will need to be constructed adjacent to the existing pipeline (similar to a loop) and readied for service before the existing pipeline is taken out of service. This alternative will require looping of approximately 92.2 mi of 24-inch-diameter pipeline in four locations in PA and OH. Building this length of pipeline loop will have more environmental impact than the proposed Project. Specifically, constructing 92.2 mi of new pipeline loop will likely impact at least 800 acres of land, assuming a 75-foot-wide construction ROW is used. Additionally, only a portion of this land will comprise existing ROW or areas that were disturbed by construction of the original pipeline. Potential impacts could occur on forest land, wildlife habitat, wetlands, and stream crossings. It will also have considerably higher air pollutant emissions during construction than the proposed Project.

Consequently, it was determined that looping was not environmentally preferable compared to the Project. Additionally, the cost of the looping alternative is prohibitive in cost and is estimated to be $283 million more expensive than the proposed Project.

5.5.2 Compressor Station and Gate Site Assembly Site Alternatives

All upgrades to the system will occur at existing facilities. No new major facilities are proposed as part of this Project and therefore station and gate assembly alternatives were not considered feasible. Additionally, there are no impacts to natural resources at the existing facilities located in OH.

5.6 CUMULATIVE IMPACTS

Cumulative impacts represent the total effects of the proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The purpose of this cumulative impact analysis is to identify and describe potential cumulative impacts that could result from the construction and operation of the Project and other pipeline, utility, or road construction projects that are under construction or are planned in the Project areas. At this time, there are no known plans for future projects in the Project vicinity, and therefore cumulative impacts do not apply to this Project. The cumulative impacts for the Project will be equal to the total Project impacts. ***A more detailed cumulative impact assessment was filed with FERC on January 9, 2015 under the Lebanon West II Project [Docket No. CP14-555-000 § 375.308 (x)].***

[1] A loop is a segment of pipe that is usually installed adjacent to an existing pipeline and connected to it at both ends. The loop allows more gas to be moved through the system.

5.7 CONSTRUCTION STORM WATER MANAGEMENT CONSIDERATIONS

Prior to any earth disturbance, a Notice of Intent will be filed with the Ohio Environmental Protection Agency, outlining specific erosion and sedimentation (E&S) control measures throughout the Project construction limits of disturbance. The E&S plan will follow industry standard techniques for constructing linear Projects. Also, the plan will incorporate state regulations as well as FERC guidelines outline in the FERC Plan and Procedures.

5.7.1 STANDARD STREAM AND WETLAND CROSSING TECHNIQUES

FERC Plan and Procedures for work in streams and wetlands will be followed, including restoration. Restoration in streams and wetlands will be as follows, per FERC guidelines Version 01/17/2013.

Stream Restoration

1. Use clean gravel or native cobbles for the upper 1 ft of trench backfill in all waterbodies that contain coldwater fisheries.
2. For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.
3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.
4. Application of riprap for bank stabilization must comply with the USACE, or its delegated agency, permit terms and conditions.
5. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.
6. Revegetate disturbed riparian areas with conservation grasses and legumes or native plant species, preferably woody species.
7. Install a permanent slope breaker across the construction ROW at the base of slopes greater than five percent that are less than 50 ft from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.
8. Items 3 through 6 above also apply to those perennial or intermittent streams not flowing at the time of construction.

Wetland Restoration

1. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology.
2. For each wetland crossed, install a trench breaker at the base of slopes near the

boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction ROW at the base of a slopes greater than 5 percent where the base of the slope is less than 50 ft from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

3. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate land management or state agency.
4. Consult with the appropriate land management or state agency to develop a project-specific wetland restoration plan. The restoration plan should include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of undesirable exotic species (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.
5. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction ROW with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).
6. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.
7. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful.

5.8 POST-CONSTRUCTION STORM WATER MANAGEMENT PLANS

This linear Project will be restored to preconstruction contours, and restored to a well vegetated state. Although some tree clearing will occur for temporary workspace and new permanent ROW, restoration techniques such as decompaction will result in a minimal increase in stormwater water runoff. With the exception of additional permanent ROW along Segments ***14, 15,*** 16, 17, and 20, the temporarily cleared areas will be stabilized by seeding and mulching, and then allowed to return to their natural vegetated state. The new permanent ROW will be maintained by standard ROW mowing and tree clearing. ***Post-construction stormwater management facilities are not proposed or considered necessary due to the nature of this Project.***

5.9 REFERENCES

Energy Information Administration. 2014. "Annual Energy Outlook" (Early Release). March 2014. http://www.eia.doe.gov/oiaf/aeo/index.html. Accessed March 26, 2014.

Federal Energy Regulatory Commission. 2002. "Guidance Manual for Environmental Report Preparation." Office of Energy Projects. August 2002.

Dominion Transmission, Inc. *Lebanon West II Project FERC filing*. September 30, 2014.