

Adelphia Gateway Project

Void Mitigation Plan for Karst Terrain and Underground Mining

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Prepared For:

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Adelphia Gateway Project

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ABBREVIATIONS AND ACRONYMS

Adelphia	Adelphia Gateway, LLC
EI	environmental inspector
Existing Mainline	84.2 miles of 18-inch outer diameter pipeline
IEC	Interstate Energy Company
Karst Plan	Void Mitigation Plan for Karst Terrain and Underground Mining
MLV	mainline valve
MP	milepost
NJR	New Jersey Resources Corporation
NV5	NV5, LLC
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Access
Project	Adelphia Gateway Project

1.0 INTRODUCTION

On January 11, 2018, Adelphia Gateway, LLC (Adelphia) filed with the Federal Energy Regulatory Commission (Commission or FERC), pursuant to section 7(c) of the Natural Gas Act and Part 157 of the Commission's regulations, an abbreviated application for Certificates of Public Convenience and Necessity authorizing the acquisition, construction, and operation of certain pipeline facilities and for related authorizations. Adelphia filed an amendment to its application on August 31, 2018 (Docket Nos. CP18-46-000 and CP18-46-001). In its application, as amended, Adelphia proposed to acquire, construct, own, and operate certain facilities, some of which were owned and operated in either oil-only service or in dual-phase oil or natural gas service, and in all cases, non-FERC jurisdictional service, by the Interstate Energy Company LLC. The facilities include: an approximately 84-mile, 18-inch-diameter mainline; an approximately 4.4-mile, 20-inch diameter mainline; and various appurtenant and auxiliary facilities (collectively, the Existing System).

The remainder of the facilities proposed for interstate service are two new compressor stations, the Tilghman and Parkway Laterals, meter and regulator facilities, and various appurtenant facilities along the Existing System (collectively with the Existing System, the Project).

On January 4, 2019, the Commission Staff released its Environmental Assessment (EA) for the Project. The EA concluded that the Project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment. On December 20, 2019, the Commission issued an order granting the certificates that Adelphia requested in its certificate application, as amended (Order). Pursuant to Environmental Condition No. 6 of the Order, Adelphia submitted its Implementation Plan (IP), on February 18, 2020. Adelphia submitted to FERC a supplemental filing to the IP on May 12, 2020 and again on June 16, 2020,

This *Void Mitigation Plan for Karst Terrain and Underground Mining* (Karst Plan) discusses underground voids that could be encountered along the Project, potential risks associated with these features, and measures that Adelphia would implement to prevent and/or mitigate potential associated adverse impacts.

2.0 EXISTING CONDITIONS

2.1 KARST IN THE PROJECT AREA

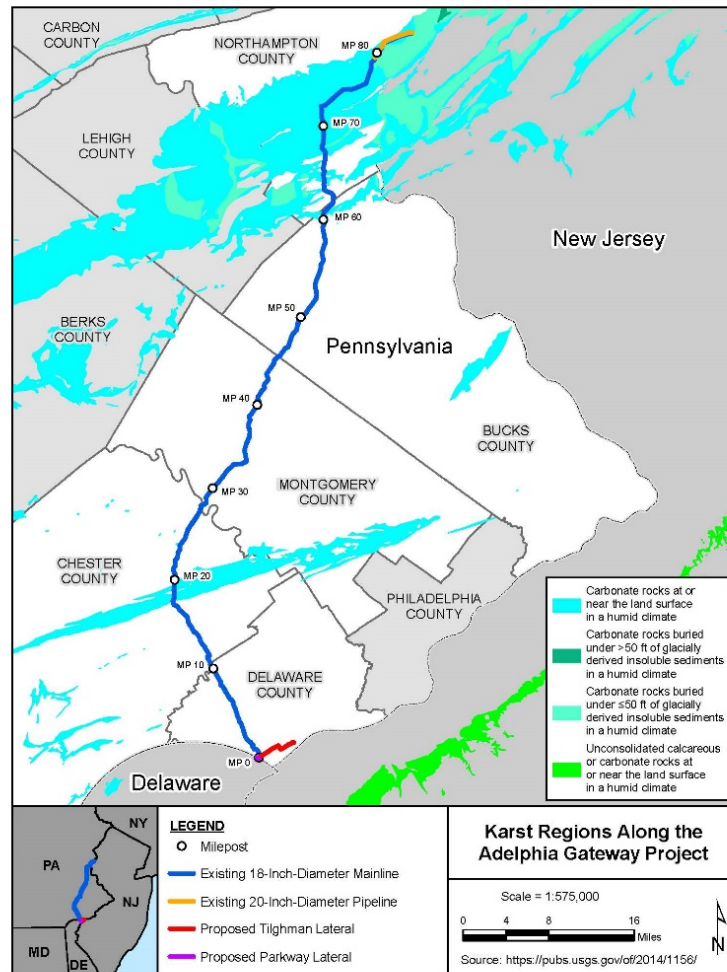
NV5, LLC (NV5) evaluated the United States Geological Survey's *Karst in the United States: A Digital Map Compilation and Database* and the Pennsylvania Department of Conservation and Natural Resources' *Digital Dataset of Mapped Karst Features in Southcentral and Southeastern Pennsylvania* to identify areas of potential karst development and known karst features along the Project. Geologic features such as surface depressions (PASDA 2019) and soluble rock units (USGS 2014) that have the potential for karst features to develop occur along the Existing Mainline in the following approximate locations: milepost (MP) 18.0 to 20.0; MP 59.5 to MP 61.0; and MP 63.5 to MP 84.2 (USGS 2014, PASDA 2019). Figure 1 identifies potential karst areas near the Project.

IEC conducted karst remediation at three IEC areas along the Existing Mainline at approximate MP 70.2, MP 73.2, and MP 81.7. According to a 2018 IEC memo summarizing the remediation activities, two of the areas (MP 70.2 and 81.7) were problematic due to erosion (not issues related to karst terrain). The other area (MP 73.2) was successfully remediated by IEC in 2016 (Warfield 2018).

Martins Creek Station and MLV 2 are the only Project sites in which Project construction will occur near potential karst terrain. Both Project sites are along the Existing Mainline. Martins Creek Station is an existing active power station that was part of the IEC system acquired by Adelphia. It is located at the northern terminus of the Existing Mainline at MP 84.2. Construction activities at the Martins Creek Station would be limited to installation of a chain-link fence area within the station's existing paved/graveled footprint.

With the exception of a new temporary access road (which will not require modifications to existing conditions), construction of MLV 2 at MP 17.9 will take place within existing maintained pipeline right-of-way. Adelphia will clear, grade, and excavate, as necessary to access the existing pipeline. Adelphia would then cut out an approximately 20-foot-long section of the pipe and replace that section with a new valve assembly. Adelphia would then backfill the excavated area with the same material that was removed from the trench and restore the areas to pre-construction conditions. Construction activities at both sites will not change stormwater flows or promote the development of new karst features.

Figure 1. Karst Regions along the Adelphia Gateway Project



2.2 UNDERGROUND MINING IN THE PROJECT AREA

NV5 obtained information regarding coal mining, oil and gas, and industrial mineral mining activities in the Project area in Pennsylvania from the Pennsylvania Geospatial Data Clearinghouse. No mining permits or active, inactive, or abandoned coal mines were identified within 0.25 mile of the Project. There are also no historical, current, or known planned non-fuel mineral resource operations, or oil and gas wells near the Project (PGDC 2018a,b,c,d).

3.0 MITIGATION MEASURES

3.1 KARST TERRAIN

Adelphia will include a discussion of karst terrain in its environmental training program. All Project personnel will be required to complete environmental training prior to working on the Project. Adelphia will provide additional training to its environmental inspectors (EI) on how to identify and monitor the Project alignment for evidence of subsidence, surface cracks, or depressions that could indicate karst formations. EIs will visually monitor the alignment for karst features daily during construction.

Adelphia Engineering staff will contract a company that specializes in karst terrain, such as Advanced Geoservices Corporation, to conduct a biannual survey in areas of known potential karst terrain (i.e., MP 18.0 to 20.0; MP 59.5 to MP 61.0; and MP 63.5 to MP 84.2) for the life of the Project. If additional areas of potential karst terrain are identified during the life of the project Adelphia will include them in the biennial survey. Adelphia field staff will be trained to identify potential karst features (subsidence, surface cracks, or depressions) as part of their annual walking leak survey of the entire line and during their routine patrols. In addition to these inspections Adelphia utilizes monthly aerial ROW surveys to patrol the line for anomalies including subsidence or depressions. A typical post-construction karst inspection will consist of a site visit, a pedestrian survey of the area, visual observations, and reporting. Assuming that no indications of karst formations or subsurface mining are identified, post construction karst monitoring is expected to take one inspection staff approximately two days to complete.

If a karst feature or other subsidence feature is identified during construction or operation, the person that identified the feature would report the feature to Adelphia's Project Manager or Adelphia Engineering staff, work would be stopped within 100 feet of the karst feature (if applicable), and sediment or stormwater management would be installed around the feature, as necessary. Sediment and stormwater best management practices may include sandbags, diversion berms, or other industry standard method(s) to divert stormwater flow away from or around the feature to prevent further development of the feature and to prevent construction stormwater from entering the karst system. If during construction flow cannot be diverted away from the feature, double row silt fence, hay bales, or similar best management practices would be installed to prevent sediment-laden water from entering the karst feature. Adelphia Project Manager or Engineering staff would obtain a geotechnical engineer or karst specialist to evaluate the karst feature identified during Project construction or operations to determine the most appropriate form of mitigation in accordance with Chapter 17 of the Pennsylvania Department of Environmental Protection's (PADEP) *Erosion and Sediment Pollution Control Manual* (see Attachment A) to ensure proper stabilization and mitigate any hazards posed to the pipeline.

3.2 UNDERGROUND MINING

Mine voids are not expected to occur along the Project or present potential associated risks (see Section 2.2). The PADEP's *Erosion and Sediment Pollution Control Manual* does not specify mitigation in regards to potential voids in relation to mining. Therefore, should a mine void of similar size to a karst void be identified in the Project area, it would be mitigated in the same manner as referenced in this report for karst voids. If a mine void is encountered indicating a potentially more complex problem, Adelphia will notify the PADEP within 48 hours of its observation. Because of differences between sinkholes and historical underground mines, mitigation would proceed with direct consultation of a professional geologist and/or professional geotechnical engineer.

4.0 REFERENCES

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ATTACHMENT A

Chapter 17 of the PADEP Erosion and Sediment Pollution Control Manual



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