

153 FERC ¶ 61,215  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Norman C. Bay, Chairman;  
Cheryl A. LaFleur, Tony Clark,  
and Colette D. Honorable.

Tennessee Gas Pipeline, L.L.C.

Docket No. CP11-161-002

ORDER ON REMAND

(Issued November 19, 2015)

1. This case is before the Commission on remand from the United States Court of Appeals for the District of Columbia Circuit.<sup>1</sup> In the underlying proceeding, the Commission authorized Tennessee Gas Pipeline, L.L.C. (Tennessee) under section 7 of the Natural Gas Act (NGA) to construct and operate expansion facilities on its 300 Line in Pennsylvania and New Jersey, referred to as the Northeast Upgrade Project.<sup>2</sup> The Commission approved the project after finding it was required by the public convenience and necessity and would not have a significant impact on the environment. The court found that the Commission violated the National Environmental Policy Act (NEPA) by: (1) segmenting its environmental review of the Northeast Upgrade Project from that of three other Tennessee pipeline projects on the Eastern Leg of the 300 Line;<sup>3</sup> and

---

<sup>1</sup> *Delaware Riverkeeper Network v. FERC*, 753 F.3d 1304 (D.C. Cir. 2014) (*Delaware Riverkeeper*).

<sup>2</sup> *Tennessee Gas Pipeline Co., L.L.C.*, 139 FERC ¶ 61,161 (2012) (Certificate Order), *order on reh'g*, 142 FERC ¶ 61,025 (2013) (Rehearing Order).

<sup>3</sup> Although not specifically defined, it appears that the court's reference to the "Eastern Leg of the 300 Line" refers to the portion of Tennessee's 300 Line that extends from Compressor Station 313 in Potter County, Pennsylvania, east to Mahwah, New Jersey. All of the pipeline loops associated with the four pipeline projects in question were constructed on this portion of the 300 Line. The "Western Leg of the 300 Line" refers to the portion of the 300 Line that extends from Compressor Station 219 in Mercer County, Pennsylvania to Station 313. We will use these definitions for purposes of this order.

(2) failing to provide a meaningful analysis of the cumulative impacts of the four projects to show that the impacts would be insignificant. Based on the supplemental environmental analysis developed in response to the court's mandate, we conclude that, when considered additively, impacts from the Northeast Upgrade Project and Tennessee's three other projects are not significant. We also conclude that when the projects are considered cumulatively with the Northeast Upgrade Project, there are no significant cumulative impacts.

## **I. Background**

2. On March 31, 2011, Tennessee filed its application in this proceeding requesting authorization to construct and operate the Northeast Upgrade Project, which consists of five pipeline loop segments totaling 40.3 miles of 30-inch-diameter pipeline, modifications and upgrades at four compressor stations, and one meter station. The pipeline loops are collocated with Tennessee's existing 24-inch-diameter 300 Line pipeline for 33.8 miles (84 percent) of the proposed project. The project added capacity necessary to provide 636,000 dekatherms (Dth) per day of firm transportation service for two shippers, Chesapeake Energy Marketing, Inc. (Chesapeake) and Statoil Natural Gas LLC (Statoil).

3. The Northeast Upgrade Project is one of four projects proposed by Tennessee in separate applications between July 2009 and December 2011 involving construction on its 300 Line. The projects are, in chronological order of the date the applications were filed: (1) the 300 Line Project; (2) the Northeast Supply Diversification Project; (3) the Northeast Upgrade Project; and (4) the MPP Project. The Commission considered each application separately and made a finding of no significant environmental impact in each case after developing a project-specific Environmental Assessment (EA) that included a cumulative effects analysis. The Commission ultimately authorized each of the projects.

4. Several environmental groups, including the Delaware Riverkeeper Network (Riverkeeper), raised multiple challenges regarding the Commission's environmental analysis of the Northeast Upgrade Project. As relevant here, Riverkeeper asserted that the Commission had unlawfully segmented the environmental review of the Northeast Upgrade Project from its review of the three other Tennessee projects involving construction along the Eastern Leg of the 300 Line. Riverkeeper also claimed that the Commission's cumulative impact analysis of the Northeast Upgrade Project was deficient because it failed to adequately consider the cumulative impacts of the other three projects.

5. In the May 29, 2012 order certifying the Northeast Upgrade Project (Certificate Order), the Commission rejected claims that the Commission had improperly segmented its environmental review of the Northeast Upgrade Project from the previously authorized 300 Line Project, noting that each project is a stand-alone project designed to provide transportation for a contracted-for volume of gas within different time-frames to

different customers.<sup>4</sup> On rehearing, the Commission affirmed its ruling that it had not improperly segmented its environmental review of the Northeast Upgrade Project from that of the 300 Line Project.<sup>5</sup> The Commission also rejected Riverkeeper's argument that the Commission had improperly segmented its environmental review of the Northeast Upgrade Project from that of the two other projects proposed by Tennessee affecting the 300 Line, namely, the Northeast Supply Diversification Project and the MPP Project. The Commission rejected Riverkeeper's contention that the four projects impacting the 300 Line are functionally and economically interdependent, reiterating that each project has independent utility as each is designed to provide transportation for contracted-for volumes of gas to specific customers and can stand alone.<sup>6</sup> The Commission concluded that the projects were not "connected" actions as that term is defined in section 1508.25(a)(1) of the Council on Environmental Quality's regulations implementing NEPA.<sup>7</sup>

6. The Commission also disagreed with Riverkeeper's assertion that the cumulative impacts analysis performed for the Northeast Upgrade Project was deficient for failing to consider impacts associated with the other three projects on the 300 Line. The Commission explained that it had examined impacts from the 300 Line Project on resources also affected by the Northeast Upgrade Project and found the cumulative impacts to be insignificant.<sup>8</sup> The Commission further found that the impacts from the Northeast Supply Diversification Project were on resources too distant from the Northeast Upgrade Project (over 25 miles) to be included in the cumulative impacts analysis for that project.<sup>9</sup> Finally, the Commission found that it was not required to consider impacts associated with the MPP Project because the potential impacts from that project were not known or reasonably foreseeable at the time the Commission conducted

---

<sup>4</sup> Certificate Order, 139 FERC ¶ 61,161 at P 92.

<sup>5</sup> Rehearing Order, 142 FERC ¶ 61,025 at P 37.

<sup>6</sup> *Id.* PP 39-49. The Rehearing Order also rejected the argument that it had improperly segmented its environmental review of the Northeast Upgrade Project from that of the Northeast Supply Diversification and MPP Projects on procedural grounds because the issue was raised for the first time on rehearing. Rehearing Order, 142 FERC ¶ 61,025 at P 38.

<sup>7</sup> *Id.* P 40 (citing 40 C.F.R. §§1508.25(a)(1)(i)-(iii)).

<sup>8</sup> Certificate Order, 139 FERC ¶ 61,161 at P 195; Rehearing Order, 142 FERC ¶ 61,025 at P 86.

<sup>9</sup> Certificate Order, 139 FERC ¶ 61,161 at P 195.

the environmental review of the Northeast Upgrade Project. The Commission in addition found that the MPP Project impacts were on resources too distant from the Northeast Upgrade Project (over 25 miles) to be included in the cumulative impact analysis for that project.<sup>10</sup>

7. Tennessee constructed the Northeast Upgrade Project and was authorized to place facilities into service between October and December 2013.

## II. Court Opinion

8. In *Delaware Riverkeeper*, the court rejected the Commission's determination that the four Tennessee projects along its 300 Line were not "connected actions" as that term is defined by NEPA regulations. The court found that the Northeast Upgrade Project and the "three other connected, closely related, and interdependent Tennessee Gas upgrade projects on the 300 Line constituted a complete upgrade of almost 200 miles of continuous pipeline."<sup>11</sup> The court found that there was a clear physical, functional, financial, and temporal nexus between the four projects, noting that: (1) the pipeline is linear and physically interdependent in that gas enters the system at one end and passes through each of the new pipe sections and improved compressor stations to reach the ultimate delivery point in New Jersey;<sup>12</sup> (2) the projects were constructed in rapid succession with overlapping proceedings before the Commission;<sup>13</sup> (3) the four projects were not divided based on rational end points as gas does not enter and exit the pipeline between the projects' segments;<sup>14</sup> and (4) the first project allowed for subsequent projects to be constructed at a much lower cost.<sup>15</sup>

9. The court rejected the Commission's argument that the Northeast Upgrade Project had substantial independent utility separate from the other three projects because Tennessee had secured distinct contracts for service utilizing the incremental capacity to be created by the project.<sup>16</sup> The court noted that the no-subsidy requirement of the

---

<sup>10</sup> Rehearing Order, 142 FERC ¶ 61,025 at P 86.

<sup>11</sup> *Delaware Riverkeeper*, 753 F.3d at 1307.

<sup>12</sup> *Id.* at 1308, 1317.

<sup>13</sup> *Id.* at 1317-1318.

<sup>14</sup> *Id.* at 1316-17.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.* at 1316.

Commission's Certificate Policy Statement<sup>17</sup> required Tennessee to contract for increased capacity prior to upgrading the Eastern Leg of the pipeline and the contracts "do not show that the Northeast [Upgrade] Project was driven by independent financial considerations apart from the other projects."<sup>18</sup> The court found that the four projects on the Eastern Leg are financially interdependent because the 300 Line Project made it possible to construct the Northeast Upgrade Project at a lower cost.

10. The court also found the Commission's rationalization "proves too much" and would allow for a project sponsor to have proposed "two-mile segments, or one-mile segments, or one-hundred-yard segments," so long as it produced shipping contracts in anticipation of the increased capacity attributable to each of these new segments.<sup>19</sup> The court dismissed the Commission's reliance on the shipper contracts as "paint[ing] a false picture," finding instead that "[t]here are no 'Northeast [Upgrade] Project customers'" as "[g]as does not enter and exit the pipeline between segments on the Eastern Leg of the 300 Line" and "customers do not take gas from the Northeast [Upgrade] Project portion of the Eastern Leg."<sup>20</sup>

11. The close timing of the four projects was a significant factor in the court's determination.<sup>21</sup> Specifically, the court found that when the Commission issued the certificate for the Northeast Upgrade Project, "it was clear that the entire Eastern Leg was included in a complete overhaul and upgrade . . . ."<sup>22</sup> The court pointed out that the Commission's consideration of the Northeast Upgrade Project application overlapped with its consideration of the applications for the Northeast Supply Diversification and MPP projects. The court emphasized that regardless of whether Tennessee knew at the time it commenced the 300 Line Project that it would ultimately embark on a series of upgrade projects to loop the entire Eastern Leg of the 300 Line, the relevant question is

---

<sup>17</sup> *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227 (1999), *order on clarification*, 90 FERC ¶ 61,128, *order on clarification*, 92 FERC ¶ 61,094 (2000). Pursuant to the Policy Statement, the proponent of an interstate pipeline project must be prepared to financially support the project without subsidization from existing customers.

<sup>18</sup> *Delaware Riverkeeper*, 753 F.3d at 1316.

<sup>19</sup> *Id.* at 1317.

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at 1308, 1317-19.

<sup>22</sup> *Id.* at 1308.

whether “FERC was justified in rejecting commenters’ requests that it analyze the entire pipeline upgrade project once the Northeast [Upgrade] Project was under review and once the parties had pointed out the interrelatedness of the sequential pieces of pipeline which were, in fact, creating a complete, new linear pipeline.”<sup>23</sup>

12. The court also found the Commission’s analysis of the cumulative impacts of the Northeast Upgrade Project and the three other projects deficient.<sup>24</sup> Although the Northeast Upgrade Project’s environmental analysis discussed potential cumulative impacts on multiple resources, the court found the analysis lacked “serious consideration” given the close connection between the four projects.

13. The court remanded these issues for further consideration.

### **III. Tennessee’s System and the 300 Line Projects**

14. Tennessee operates an integrated pipeline system that extends from Texas and Louisiana, and the Gulf of Mexico, through Texas, Louisiana, Arkansas, Mississippi, Alabama, Tennessee, Kentucky, West Virginia, Ohio, Pennsylvania, New York, New Jersey, Massachusetts, New Hampshire, Rhode Island, and Connecticut. The Tennessee pipeline system is highly complex, with multiple interconnections with other interstate pipeline systems, including natural gas storage facilities. In western Pennsylvania, at the discharge of Compressor Station 219 in Mercer County, Tennessee’s multi-looped mainline pipeline splits into two systems, the 200 Line and the 300 Line. The 200 Line and the 300 Line are roughly parallel to each other, separated for most of their lengths by about 80 to 100 miles, before becoming a single system again at Compressor Station 261 in Hampden County, Massachusetts. The 300 Line traverses northern Pennsylvania, New Jersey, New York, and Connecticut, and terminates at the discharge of Compressor Station 261. The 200 Line extends from western Pennsylvania, traverses New York, and continues eastward into Connecticut, Massachusetts, Rhode Island, and New Hampshire.

15. Historically, Tennessee transported natural gas from the Gulf Coast States and offshore Gulf of Mexico via its mainline system, and from Canada via its Niagara Spur, which extends from Tennessee’s interconnect with TransCanada at the International Boundary in Niagara County, New York, to an interconnection with the 200 Line, to markets in the Northeast. However, in recent years, shippers on Tennessee’s system have reduced their traditional reliance on Gulf Coast and Canadian supplies in favor of domestic supply being produced closer to the Northeast market area. Over time, Tennessee has proposed to construct additional facilities, including those proposed as part

---

<sup>23</sup> *Id.* at 1318.

<sup>24</sup> *Id.* at 1319-20.

of the four projects discussed herein, in order to enable it to receive additional volumes of natural gas at points along the 300 Line for transportation to the east and west on its integrated pipeline system. While each of the four Tennessee projects at issue was designed to expand the amount of firm transportation service that Tennessee's 300 Line could accommodate, only the 300 Line Project was designed to enable the transportation of gas west to east across the entire Eastern Leg of the 300 Line to downstream markets in New Jersey. The Northeast Upgrade Project was designed to provide the additional capacity necessary to enable firm transportation service only from primary receipt points east of Compressor Station 317 *eastward* to a primary delivery point at Mahwah, New Jersey. The Northeast Supply Diversification Project, on the other hand, was designed to provide the capacity necessary to accommodate firm transportation service from receipt points near Compressor Station 319 on the Eastern Leg of the 300 Line *westward* to a delivery point near Compressor Station 313, and further west on the 300 Line to ultimate delivery points on the 200 Line in New York and Massachusetts. Similarly, the MPP Project was designed to provide capacity to enable firm transportation service from receipt points on the eastern portion of the Eastern Leg of the 300 Line *westward* beyond the boundary of the Eastern Leg of the 300 Line, across the entire Western Leg of the 300 Line, to delivery points in Ohio and Tennessee. A more detailed description of each project is provided below.

*The 300 Line Project (Docket No. CP09-444-000)*

16. The Market (or expansion) Component of the 300 Line Project is designed to provide capacity to enable 350,000 Dth per day of incremental firm transportation service on Tennessee's 300 Line.<sup>25</sup> Of the 350,000 Dth per day of additional firm service, 300,000 Dth per day is available along Tennessee's entire 300 Line from Compressor Station 219 eastward to delivery points at Mahwah, New Jersey (150,000 per day), River Vale, New Jersey (100,000 per day), and White Plains, New York (50,000 per day).<sup>26</sup> Through the utilization of capacity on upstream portions of Tennessee's system reserved for the provision of 300 Line Project service, project shippers can deliver gas into Tennessee's system at twelve receipt points located in Texas, Louisiana, and the Gulf of Mexico (210,000 Dth per day is sourced from the 500 Line, 45,000 Dth per day from the

---

<sup>25</sup> The 300 Line Project also had a replacement component designed to increase reliability rather than to increase incremental capacity.

<sup>26</sup> See Tennessee's Certificate Application in Docket No. CP09-444-000 at 9; Filing of Firm Service Agreements in Docket No. CP09-444-000 (June 4, 2010). On the Western Leg of the 300 Line (Compressor Station 219 to Compressor Station 313), 120,000 Dth per day of the 300,000 Dth per day of firm transportation is attributable to unsubscribed capacity on the existing facility that Tennessee reserved, pursuant to its FERC Gas Tariff, for utilization in providing 300 Line Project service.

800 Line, and 45,000 Dth per day from the 100 Line).<sup>27</sup> The remaining 50,000 Dth per day of incremental firm transportation made possible by the 300 Line Project is provided from Compressor Station 319, at the interconnection with Tennessee's Stagecoach Lateral,<sup>28</sup> to the delivery point at Mahwah, New Jersey.<sup>29</sup> The 300 Line Project facilities included both pipeline looping on the Eastern Leg of the 300 Line (seven pipeline loop segments totaling 127.4 miles), and additional compression facilities located on both the Western Leg (two new 16,000 horsepower (hp) compressors at Compressor Station 303 and Compressor Station 310), and the Eastern Leg (an additional 23,058 hp of compression from compressor replacements at Compressor Stations 313, 315, and 325). All of the service to be provided by the project was fully subscribed by one shipper, EQT Energy LLC.

*Northeast Supply Diversification Project (Docket No. CP11-30-000)*

17. Tennessee's Northeast Supply Diversification Project is designed to provide capacity to accommodate up to 250,000 Dth per day of incremental firm transportation service on Tennessee's 200 Line and 300 Line by utilizing unsubscribed capacity on the two lines, installing 6.8 miles of pipeline looping in one segment on the Eastern Leg of the 300 Line in Northern Pennsylvania, and utilizing capacity leased from Dominion Transmission, Inc. (Dominion).<sup>30</sup> The firm Northeast Supply Diversification Project transportation service is provided from two receipt points on the Eastern Leg of the 300

---

<sup>27</sup> See Filing of Firm Service Agreements in Docket No. CP09-444-000 (June 4, 2010). The shippers would either contract with the suppliers of their gas to take delivery at the relevant receipt points for 300 Line Project service or separately contract with Tennessee for any necessary transportation service upstream of the project receipt points.

<sup>28</sup> *Id.* Tennessee's Stagecoach Lateral extends approximately 24 miles from the 300 Line near Station 319 to the Stagecoach Storage facility owned by Central New York Oil and Gas Company, LLC.

<sup>29</sup> *Id.*

<sup>30</sup> The capacity on Dominion extends from a primary receipt point at Dominion's Ellisburg Station in Potter County, Pennsylvania to a primary delivery point at Craigs in Livingston County, New York. To support the lease agreement with Tennessee, Dominion filed an application in Docket No. CP11-41-000 to construct facilities referred to as the Ellisburg to Craigs Project. Because both the Tennessee and Dominion facilities were necessary to meet the requested transportation service to be provided by the Northeast Supply Diversification Project, we analyzed them in a single EA and authorized them in a single order. See *Tennessee Gas Pipeline Co., L.L.C.*, 136 FERC ¶ 61,173 (2011).

Line near Compressor Station 319 in a *westerly* direction to a delivery point at Rose Lake<sup>31</sup> near Compressor Station 313 (32,000 Dth per day), then further west on the 300 Line (68,000 Dth per day) or north on Dominion (150,000 per day) for delivery off the 200 Line at Niagara, New York (118,000 Dth per day) or Mendon, Massachusetts (100,000 Dth per day).<sup>32</sup> All the firm transportation service to be made possible by the Northeast Supply Diversification Project was subscribed by Anadarko Energy Services Company, Seneca Resources Corporation, Mitsui E&P USA, LLC, and Cabot Oil & Gas Corporation.

*Northeast Upgrade Project (Docket No. CP11-161-000)*

18. The Northeast Upgrade Project was designed to provide capacity to accommodate an additional 636,000 Dth per day of incremental firm transportation from three receipt points east of Compressor Station 317 *eastward* to a delivery point with Algonquin Gas Transmission, LLC at Mahwah, New Jersey.<sup>33</sup> The project facilities included pipeline looping on the Eastern Leg of the 300 Line (five separate 30-inch-diameter pipeline loops totaling approximately 40.3 miles) and 22,310 hp of additional compression located on the Eastern Leg of the 300 Line at Compressor Stations 321 and 323. Chesapeake and Statoil contracted with Tennessee for firm service utilizing the full capacity of the project.

*MPP Project (CP12-28-000)*

19. Tennessee's MPP Project was designed to provide capacity to enable the provision of 240,000 Dth per day of incremental firm transportation service from receipt points located between Compressor Stations 313 and 321 in a *westerly* direction to Compressor Station 219 for further transportation and delivery along Tennessee's mainline in the states of Tennessee and Ohio.<sup>34</sup> The project involved the construction of 7.9 miles of 30-inch-diameter pipeline loop, designated as Loop 313, located on the Eastern Leg of the 300 Line, and modifications at Compressor Stations 219, 303, 310, and 313 on the

---

<sup>31</sup> Tennessee interconnects with National Fuel Gas Supply Corporation's system at Rose Lake.

<sup>32</sup> See Filing of Firm Service Agreements in Docket No. CP11-30-000 (December 7, 2011).

<sup>33</sup> See Tennessee's Certificate Application in Docket No. CP11-161-000 at 1; Filing of Firm Service Agreements in Docket No. CP11-161-000 (September 11, 2012).

<sup>34</sup> See Tennessee's Certificate Application in Docket No. CP12-28-000 at 3-4, 7-8, and 11-12.

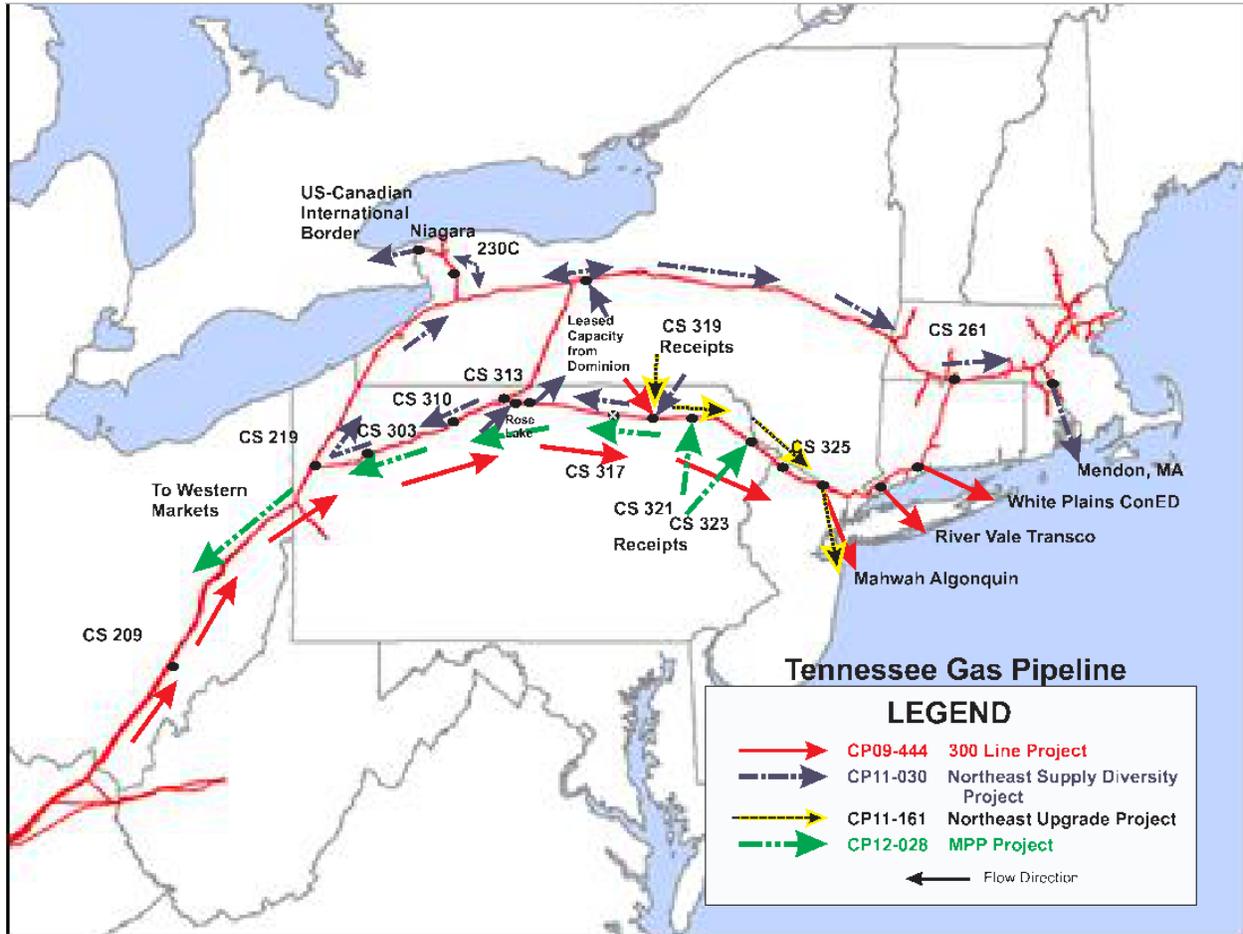
Western Leg to allow for bi-directional flow (*east-to-west*) on the 300 Line. In addition, MPP Project utilized 240,000 Dth per day of existing unsubscribed firm transportation capacity on Tennessee's system from west of Compressor Station 219 to a delivery meter in Tennessee and three delivery meters in Ohio. All of the firm transportation service made possible by the MPP Project was contracted for by two shippers, Chesapeake and Southwestern Energy Services Company.

20. In sum, the four Tennessee projects discussed here added pipeline looping and/or compression facilities which resulted in increased capacity on portions of Tennessee's 300 Line. While it is true that after construction of the four projects, in combination with expansions constructed prior to 2009, there will be pipeline loops along essentially all of the Eastern Leg of the 300 Line, it is also the case that the particular facilities associated with each project, including any segments of pipeline looping, were specifically designed to provide the discrete increment of capacity necessary to accommodate firm transportation from the primary receipt point(s) to the primary delivery point (s) specified in the contracts forming the financial basis for the individual project.<sup>35</sup> Further, the facility modifications made as part of the Northeast Supply Diversification and MPP Projects functioned to enhance the bi-directional capability of the 300 Line, enabling shippers to move gas to Canada and markets to the west, counter to the historical west-to-east flow of gas on the 300 Line. . The following map<sup>36</sup> depicts the receipt and delivery paths for all four projects:

---

<sup>35</sup> As evidenced by the underlying contracts, each project was proposed and designed to meet a distinct market need and could have gone forward regardless of whether any of the others were proposed or approved. Because pipelines are integrated systems, the engineering design of any additions to a pipeline system is necessarily reflective (or "dependent") on the then-existing or anticipated state of the system to which they are being added. However, the fact that the engineering of one expansion recognizes components proposed in another, does not, in and of itself, compel a finding that the two projects are interdependent or connected for purposes of regulatory review.

<sup>36</sup> The map is in color in the copy of this order available in the Commission's E-library system under Docket No. CP11-161-002.



**IV. Discussion**

21. As noted by the court, “an agency impermissibly ‘segments’ NEPA review when it divides connected, cumulative, or similar federal actions into separate projects and thereby fails to address the true scope and impact of the activities that should be under consideration.”<sup>37</sup> In response to the court remand, we directed Commission staff to prepare a supplemental analysis to examine the additive environmental impacts of the four projects, as well as to incorporate the other three projects into the cumulative impacts analysis performed in the EA for the Northeast Upgrade Project. We believe this approach fully addresses the concerns raised by the court, as well as the requirements of the NGA and NEPA. The supplemental analysis is attached as an appendix to this order.

<sup>37</sup> *Delaware Riverkeeper* at 1313.

22. The supplemental analysis includes a new examination of the additive<sup>38</sup> and cumulative impacts of the four projects, based on each application and the four separate EAs prepared for the Northeast Upgrade Project, the 300 Line Project, the Northeast Supply Diversification Project<sup>39</sup> and the MPP Project, as well as new information gathered by Commission Staff. The Commission's review of each of these projects included a scoping period to solicit public input on a proper range of alternatives and environmental issues that could result from the construction and operation of the project prior to the preparation of the EA. Two of the projects, the Northeast Upgrade Project and the 300 Line Project, went through the Commission's pre-filing process which is a "pre-application phase." During the pre-filing process, in which prospective pipeline project applicants voluntarily elect to participate, Commission staff conducts scoping and engages with stakeholders. The purpose of the pre-filing process is to disclose and, if possible, resolve environmental issues prior to the filing of a formal application for a Certificate of Public Convenience and Necessity at the Commission. All substantive comments that were received prior to the Commission's issuance of the EAs were addressed in the respective EAs. Each EA had an associated comment period, and all substantive comments received during the EA comment periods were addressed in the order prepared for each project. Each project was approved by the Commission over various dates from May 2010 to August 2012.

23. The supplemental analysis concludes that when the four projects are considered additively, none of the resource impacts escalated to a significant level or required additional mitigation. With regards to cumulative impacts, the analysis again concludes that there were no significant environmental impacts or a need for additional mitigation. These conclusions are based on:

- the fact that the projects primarily consisted of installation of looping segments (where a pipeline is installed immediately adjacent to an existing pipeline);
- the fact that minimal construction occurred that required a new pipeline right-of-way corridor that was not adjacent to an existing pipeline;

---

<sup>38</sup> By additive impacts, we mean the combined direct and combined indirect impacts of the four projects.

<sup>39</sup> As noted above, both Tennessee and Dominion proposed facilities that were required for Tennessee to meet its project purpose for the Northeast Supply Diversification Project. Because the actions were connected, we prepared a single EA for both projects and include Dominion's facilities in our analysis here, as part of the Northeast Supply Diversification Project.

- the fact that Tennessee overlapped the construction right-of-way for each of its four projects with its existing maintained easement where feasible;
- the limited geographic range of the impacts;
- the timeframe that the impacts occurred; and
- the mitigation measures committed to and implemented by both Tennessee and Dominion.

24. Section 2 of the supplemental analysis addresses the additive impacts on the resource areas covered in the EA prepared for each of the four subject projects, that is, the combined impacts based on a review of all the projects analyzed in the four separate EAs considered together. In the context of additive impacts, the supplemental environmental analysis discusses each resource area including: geology, soils, groundwater, waterbodies, wetlands, hydrostatic test water, fisheries, vegetation, wildlife, threatened and endangered species, socioeconomics, cultural resources, land use, air quality, noise, climate change, and reliability and safety. The impacts from each individual project are considered together, as if the Commission were reviewing all projects in one EA. This combined review does not find a significant environmental impact when considering all of the four projects additively. Instead, the analysis finds that most of the impacts from the four projects were temporary in scope and were remediated soon after construction was complete, sometimes even before construction began on the next project located on the Eastern Leg of the 300 Line. Further, many impacts were geographically isolated. For other impacts, such as air quality affected by the associated compressor stations, it is further explained that regardless of whether all four projects were reviewed as one, the operational emission source must be considered separately because each of the compressor stations is a discrete emissions source (with the exception of Compressor Station 321),<sup>40</sup> evaluated in accordance with the applicable air permitting regulatory requirements and attainment attributes in the air quality control region in which it is located.<sup>41</sup> The analysis also explains that based on modeling analyses completed for the applicable compressor stations, emissions from one facility would be at *de minimis* levels before reaching the air space of the next compressor station, even for the compressor stations located within the same air quality control region.

25. Section 3 of the supplemental analysis discusses the cumulative impacts of the Northeast Upgrade Project with the 300 Line Project, the Northeast Supply Diversification Project, and the MPP Project, as well as the previously disclosed impacts of the non-Tennessee related activities discussed in section 2.10.5 of the Northeast

---

<sup>40</sup> Supplemental Environmental Analysis at 62-63.

<sup>41</sup> Supplemental Environmental Analysis at 25-29.

Upgrade Project EA. The goal is to determine the cumulative impacts in accordance with the court's direction that the Commission "assess cumulative impacts by analyzing the Northeast [Upgrade] Project in conjunction with the other three projects."<sup>42</sup>

26. As defined by the Council on Environmental Quality (CEQ), a cumulative impact "is the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions . . . ."<sup>43</sup> Consistent with CEQ Guidance,<sup>44</sup> to determine the scope of the cumulative impact analysis, Commission staff establishes a "region of influence" to define the area affected by the proposed action in which existing and reasonably foreseeable future actions may also result in cumulative impacts in that defined region of influence. In other words, the Commission analyzes other actions or projects in the vicinity of the proposed project with impacts that overlap the impact of the proposed project in the same space and time. The region of influence is established on a project-by-project basis and is specific to the resource affected and the magnitude of other projects being considered.

27. In considering cumulative impacts, the supplemental analysis follows CEQ Guidance and discusses each resource area (listed above) and the associated region of influence (both geographical and temporal) for impacts. Here, the supplemental environmental analysis assesses the cumulative impacts of the Northeast Upgrade Project when considered with the impacts of the MPP Project, the Northeast Supply Diversification Project, and the 300 Line Project, as well as the previously disclosed impacts of the non-Tennessee related activities discussed in the Northeast Upgrade Project EA. No significant cumulative impacts were found with regards to the Northeast Upgrade Project when considered with the three Tennessee projects, or the other projects discussed in section 2.10.5 of the Northeast Upgrade Project EA. Most cumulative impacts identified in the supplemental analysis were minor and limited to the resources where the 300 Line Project and the Northeast Upgrade Project overlap geographically. In regards to operational air emissions, Commission staff did analyze the cumulative impact at Compressor Station 321 because there was work at that station as part of both the 300 Line Project and the Northeast Upgrade Project; however, the combined modeling did not

---

<sup>42</sup> *Delaware Riverkeeper*, 753 F.3d at 1320.

<sup>43</sup> 40 C.F.R. § 1508.7 (2015).

<sup>44</sup> CEQ Guidance, *Considering Cumulative Effects Under the National Environmental Policy Act* at 11-16 (January 1997).

indicate that the National Ambient Air Quality Standards were exceeded and therefore, there was no significant cumulative impact on air quality.<sup>45</sup>

28. The supplemental analysis also addresses the main concerns raised by Riverkeeper on appeal: habitat fragmentation, edge effects, and deforestation; and hydrology impacts related to wetlands and groundwater.<sup>46</sup> The findings are summarized below.

29. The supplemental analysis concludes that forest fragmentation is reduced with the collocation of looping projects (as compared to new, greenfield pipelines) because most of the forested lands impacted are already bisected by an existing right-of-way. The analysis acknowledges, however, that the projects being reviewed did widen the right-of-way corridor and move the edge effects into new areas of forest. The analysis also acknowledges that although the projects do have impacts on forested land, the areas impacted by Tennessee's projects are not entirely forested, but also consist of agricultural areas and other cleared, non-forested areas. These cleared areas have previously fragmented the forests of Pennsylvania, New York, and New Jersey. The analysis finds that in the context of existing forest resources in these states, the impacts resulting from the projects on forested areas were not significant in the context of either an additive or cumulative analysis.<sup>47</sup>

30. The supplemental analysis also discusses the wetland impacts of the four projects. Wetlands typically function within a watershed. In emergent and scrub-shrub wetlands in the impacted states, restoration of wetlands typically occurs relatively quickly. Because construction of the projects occurred over a large geographic linear distance, many of those impacts occurred in different watersheds and often in different years, allowing time for some wetlands to be completely restored to their original form and function within the temporal timeframe of the cumulative impact analysis. As a result, the analysis concludes that some of the wetlands impacted by the first of the projects had already returned to pre-construction function before construction of the later projects began.<sup>48</sup> In terms of cumulative impacts, the analysis determines that based on the distance and timing, wetland impacts are not significant.<sup>49</sup>

---

<sup>45</sup> Supplemental Environmental Analysis at 62-63.

<sup>46</sup> See *Delaware Riverkeeper*, 753 F.3d at 1311.

<sup>47</sup> Supplemental Environmental Analysis at 19-21, 46-50.

<sup>48</sup> *Id.* at 16-19.

<sup>49</sup> *Id.* at 44-46.

31. The supplemental analysis finds that construction of the four projects did not result in significant groundwater impacts because the majority of construction activities involved shallow, temporary, and localized excavation.<sup>50</sup> Tennessee and Dominion further minimized the likelihood of the impacts as described in the project EAs by the use of best management construction techniques and construction plans to minimize the potential for groundwater impacts associated with an inadvertent spill of fuel, oil, or other hazardous fluids.<sup>51</sup> Tennessee further complied with the Commission's requirement that if any localized impacts on private water wells occur, they be reported to the Commission along with the measures taken to resolve them. Because the impacts were geographically and temporally isolated, and repaired in the case of isolated water well impacts, the additive analysis finds that the four projects did not result in any significant long-term or permanent impacts on groundwater resources or users of groundwater. For the same reasons, cumulative impacts from the Northeast Upgrade and 300 Line Projects (which were generally limited to hydrological connections where the Northeast Upgrade and 300 Line Projects overlapped) were not considered significant.<sup>52</sup>

32. We have reviewed the information and analysis contained in the supplemental analysis regarding both the additive environmental impact of the four projects and the cumulative impacts of the upgrade projects on Tennessee's 300 Line. We agree with the conclusions presented and find that when the four projects are considered additively, none of the resource impacts escalated to a significant level. We also conclude that when each project is considered cumulatively with the Northeast Upgrade Project, there were no significant cumulative impacts. Accordingly, we find that no additional mitigation is required above and beyond those measures that were required by the Commission's May 29, 2012 order authorizing the construction and operation of the Northeast Upgrade Project.<sup>53</sup>

---

<sup>50</sup> *Id.* at 13-15.

<sup>51</sup> *Id.* at 12.

<sup>52</sup> *Id.* at 38-40.

<sup>53</sup> Certificate Order, 139 FERC ¶ 61,161.

The Commission orders:

The Commission adopts the findings in the supplemental analysis and finds that no additional mitigation is required for our authorization of Tennessee's Northeast Upgrade Project, as discussed herein.

By the Commission.

( S E A L )

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

APPENDIX

Supplemental Environmental Analysis



**Federal Energy  
Regulatory  
Commission**

**November 2015**

---

**Tennessee Gas Pipeline Company, L.L.C.**

**Docket No. CP11-161-002**

# **Northeast Upgrade Project Supplemental Environmental Analysis**

Washington, DC 20426

**TABLE OF CONTENTS:**

**1.0 Introduction.....1**

    Purpose of the Analysis .....1

    Scope of the Analysis.....2

    Results of the Analysis.....3

    Background Information on the Projects .....3

**2.0 Analysis of Additive Impacts .....9**

    Geology.....10

    Soils.....10

    Groundwater .....12

    Waterbodies .....13

    Fisheries .....16

    Wetlands .....16

    Vegetation.....19

    Wildlife .....21

    Socioeconomic Impact.....22

    Land Use .....22

    Cultural Resources .....23

    Air Quality .....25

    Noise .....28

    Reliability and Safety.....32

    Climate Change.....32

    Alternatives .....33

**3.0 Analysis of Cumulative Impacts .....33**

    Geology.....35

    Soils.....36

    Groundwater .....38

    Waterbodies .....40

    Fisheries .....43

    Wetlands .....44

    Vegetation.....46

    Wildlife and Listed Species .....50

    Socioeconomic Impact.....52

    Land Use, Visual, and Recreation/Special Use Areas .....54

    Cultural Resources .....57

    Air Quality .....58

    Noise .....64

    Reliability and Safety.....66

    Climate Change.....66

**4.0 Conclusion .....66**

## 1.0 Introduction

### Purpose of the Analysis

The staff of the Federal Energy Regulatory Commission (Commission or FERC) has prepared this supplemental environmental analysis to address the June 6, 2014 Opinion (Opinion)<sup>1</sup> issued by the United States Court of Appeal for the District of Columbia Circuit regarding the Commission’s environmental assessment (EA) prepared for the natural gas pipeline facilities proposed by Tennessee Gas Pipeline Company, L.L.C. (TGP) as part of the Northeast Upgrade Project (NEUP Project). The court found that the Commission had improperly segmented its environmental review of the NEUP Project from three other Tennessee pipeline projects on the eastern leg of the 300 Line, namely, the 300 Line Project, the Northeast Supply Diversification Project (NSD), and the MPP Project. The court also found that the Commission failed to provide a meaningful analysis of the cumulative impacts of the four upgrade projects to show that the impacts would be insignificant. The court remanded the case to the Commission for further consideration of these two issues.

Specifically, the court found that “FERC acted arbitrarily in deciding to evaluate the environmental effects of the [NEUP Project] independent of the other connected actions on the eastern leg. There were clear indications in the record that the improvement projects were functionally and financially interdependent, and the absence of logical termini suggests that the four projects functioned as one unified upgrade of the eastern leg. And the temporal overlap serves to reinforce this conclusion.”<sup>2</sup>

The court also found that the “[NEUP Project EA] is deficient in its failure to include any meaningful analysis of the cumulative impacts of Tennessee Gas’s projects” and that “[i]n light of the close connection between the various sections of the line that have been upgraded with new pipe and other infrastructure improvements, FERC was obliged to assess cumulative impacts by analyzing the NEUP Project in conjunction with the other three projects.”<sup>3</sup> The Court indicated that the “three Eastern Leg upgrade projects preceding and following the Northeast Project were clearly ‘other actions – past, present, and proposed, and reasonably foreseeable.’”<sup>4</sup>

Herein we<sup>5</sup> address the additive impacts on the resource areas covered in the EAs prepared for each project; that is, the combined impacts that would have been assessed in a review of all four projects together. Our supplemental analysis also specifically looks at the cumulative impacts identified in the NEUP Project EA in relation to additional impacts from the 300 Line Project, the NSD Project, and the MPP Project.

---

<sup>1</sup> *Delaware Riverkeeper Network v. FERC*, 753 F.3d 1304 (D.C. Cir. 2014).

<sup>2</sup> Opinion at 1319.

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> “We,” “us,” and “our” refer to the environmental staff of the Commission’s Office of Energy Projects.

## Scope of the Analysis

The Council of Environmental Quality (CEQ) regulations identify three types of impacts: “direct,” “indirect,” and “cumulative.” Direct and indirect impacts are distinguished from cumulative impacts by an established cause and effect relationship or connection to a proposed project. The direct impacts of a proposed project are caused by the action and occur at the same time and place within the footprint of the action. Indirect impacts are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.”<sup>6</sup> A cumulative impact is an “impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such actions.”<sup>7</sup> Accordingly, a cumulative impacts analysis examines the cumulative impact of the direct and indirect impacts of the proposed action (in this case, the NEUP Project) when added to the aggregate effects of past, present, and reasonably foreseeable future actions.

The purpose of this supplemental analysis is to identify and describe the additive impacts of the projects and then any cumulative impacts that could result from the NEUP Project. If the four TGP projects were assumed to be “one continuous project,” as stated by the court, then the overall direct and indirect impacts of the projects would be evaluated together and the impacts, regardless of the temporal and spatial separation, would be additive.<sup>8</sup> Therefore, this analysis describes the impacts of the projects additively, showing each of the projects’ impacts and then totaling the impact so that the additive effect is demonstrated. The actual impact on the resources collectively, however, does need to consider the impacts over the time frame and distance that those impacts occurred.

The analysis also describes cumulative impacts that are possible from the NEUP Project. In considering cumulative impacts, CEQ advises that an agency first identify the significant cumulative effects issues associated with the proposed action.<sup>9</sup> The agency should then establish the geographic scope for analysis.<sup>10</sup> Next, the agency should establish the time frame for analysis, equal to the timespan of a proposed project’s direct and indirect impacts.<sup>11</sup> Finally, the agency should identify other actions that potentially affect the same resources, ecosystems, and human communities that are affected by the proposed action.<sup>12</sup> The documents that were used to inform the Commission of the impacts of each of the projects (i.e., the EAs and corresponding

---

<sup>6</sup> 40 C.F.R. § 1508.8(b) (2015).

<sup>7</sup> 40 C.F.R. §1508.7 (2015).

<sup>8</sup> We note that this use of the word “additive” to describe an impact in this document is not synonymous with “cumulative.” A cumulative impact for our evaluation requires that the NEUP Project impacts occur in the same temporal and geographic scope as the other TGP Projects. Additive impacts do not require the same temporal and geographic scope.

<sup>9</sup> 1997 CEQ Guidance at 11.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

applications) were utilized for this analysis. Each of the EAs is incorporated by reference and is referred to below.

## **Results of the Analysis**

The analysis concludes that when the four projects are considered additively, none of the resource impacts escalated to a significant level. With regards to cumulative impacts, the analysis concludes that there were no significant cumulative impacts. These determinations are based on:

- the projects primarily consisting of installation of looping segments (where a pipeline is installed immediately adjacent to an existing pipeline);
- minimal greenfield construction occurring that would require a new pipeline right-of-way corridor;
- TGP overlapping the construction right-of-way for each project with its existing maintained easement where feasible;
- the geographic distance of the impacts;
- the timeframe that the impacts occurred; and
- the mitigation measures committed to and implemented by TGP.

The Commission staff's conclusions, therefore, support a recommendation to the Commission that no additional mitigation is required above and beyond those measures that were already required by the Commission's Order Issuing Certificate and Approving Abandonment to TGP on May 29, 2012.<sup>13</sup>

## **Background Information on the Projects**

General information pertaining to the projects is included below. The projects' EAs are herein incorporated by reference.<sup>14</sup> Detailed information about the facilities constructed as part of each project is available in the corresponding EA located in the record of the specific Commission docket for that project (see table 1). As indicated in table 1, all four projects were approved, constructed, and placed into natural gas transportation service between May 2010 and October 2013, prior to the June 6, 2014 Opinion.

TGP's pipeline system consists of approximately 13,900 miles of pipeline that extends from Louisiana, the Gulf of Mexico, and south Texas to the northeastern section of the United States, including New York City and Boston.<sup>15</sup> Part of this system is TGP's 300 Line, which extends from Compressor Station 219 in Mercer County, Pennsylvania through northern Pennsylvania, New Jersey, New York, and Connecticut, and terminates at the discharge of Compressor Station 261 in Hamden County, Massachusetts. For our purposes here, the "eastern

---

<sup>13</sup> *Tennessee Gas Pipeline Co., L.L.C.*, 139 FERC ¶ 61,161 (2012).

<sup>14</sup> The project applications were also utilized when the EAs presented information in different formats.

<sup>15</sup> [http://www.kindermorgan.com/business/gas\\_pipelines/east/TGP/](http://www.kindermorgan.com/business/gas_pipelines/east/TGP/)

leg” of TGP’s 300 Line references the pipeline segment from Compressor Station 313 in Potter County, Pennsylvania to Mahwah, New Jersey.

TGP began looping its original 300 Line east of Compressor Station 313 well before 2010. As specific requests from shippers were received by TGP for natural gas transportation capacity, TGP would expand its pipeline accordingly. One of the first projects involving looping of TGP’s original 300 line was the INGS Pipeline Project (Docket Number CP86-251-000 and CP86-251-001) which involved looping in Tioga and Susquehanna Counties, Pennsylvania. The next project was the Stagecoach Expansion Project (Docket Number CP00-65-000) that involved construction of approximately 4.0 miles of loop in Susquehanna County, Pennsylvania in 2001. The Northeast ConneXion-NY/NJ Project (Docket Number CP05-355-000) that involved construction in Pennsylvania of 2-mile-long and 4-mile-long segments looping the eastern leg of the 300 in Bradford and Susquehanna Counties, respectively, in 2006.

Project and Docket Number(s)	Pre-filing Approval	Application Filing, Notice of Application Issued	Environmental Assessment Issued	Commission Order Issued	1st Notice to Proceed with Construction Issued	Commencement of Service Issued
300 Line Project PF09-1-000 CP09-444-000	11/4/2008	7/17/2009, 7/30/2009	2/25/2010	5/14/2010	8/2/2010	Nov. 2010 – Oct. 2011
NSD Project CP11-30-000	Not Utilized	11/12/2010, 11/24/2010	6/30/2011	9/15/2011	12/22/2011	Sept. 2012 – Oct. 2012
DTI Project CP11-41-000	Not Utilized	11/19/2010, 12/1/2010	6/30/2011	9/15/2011	2/22/2012	Oct. 2012
NEUP Project PF10-23-000 CP11-161-000	7/20/2010	3/31/2011, 4/13/ 2011	11/21/2011	5/29/2012	12/14/2012	Oct. 2013 – Dec. 2013
MPP Project CP12-28-000	Not utilized	12/9/2011, 12/16/2011	5/18/2012	8/9/2012	12/11/2012	Sept. 2013 - Oct. 2013

### 300 Line Project

On July 17, 2009, TGP filed an application for its 300 Line Project in Docket Number CP09-444-000 under section 7 of the Natural Gas Act (NGA) for a Certificate of Public Convenience and Necessity (Certificate) authorizing:

- installation of approximately 127.4 miles of new 30-inch-diameter pipeline loop in seven separate segments in Potter, Tioga, Bradford, Susquehanna, Wayne, and Pike Counties, Pennsylvania; and Sussex and Passaic Counties, New Jersey;
- construction of new compressor stations in Venango and McKean Counties, Pennsylvania (on the 300 Line west of the eastern leg);
- modifications of seven existing compressor stations in Potter, Tioga, Bradford, Susquehanna, and Pike Counties, Pennsylvania, and Sussex County, New Jersey;

- installation of associated appurtenant aboveground facilities including mainline valves and pig<sup>16</sup> launchers and receivers; and
- contractor/pipe yards, and access roads.

TGP also reserved unsubscribed capacity on its existing system for the project. Prior to filing its 300 Line Project application, TGP participated in the Commission's pre-filing process under Docket Number PF09-1-000.

TGP's stated purpose of the 300 Line Project was to expand natural gas delivery capacity to the northeast region of the United States by up to 350,000 dekatherms per day (Dth/d) and improve the reliability of TGP's existing 300 Line system. The 300 Line Project increased natural gas transportation capacity to existing delivery points in New Jersey and New York. In support of construction of the Line 300 Project, TGP entered into a binding precedent agreement with one shipper, EQT Energy, LLC, for all of the additional firm transportation capacity resulting from the project.

### NSD Project

On November 12, 2010, TGP filed an application for its NSD Project in Docket Number CP11-30-000 under section 7 of the NGA for a Certificate authorizing:

- construction of approximately 6.77 miles of 30-inch-diameter loop pipeline in Tioga and Bradford Counties, Pennsylvania (Loop 315), including a new pig receiver at existing Compressor Station 317;
- modifications at TGP's existing Compressor Station 230C in Niagara County, New York (on TGP's 200 Line); and
- modifications to TGP's existing meter stations in Erie, Livingston, and Niagara Counties, New York (on TGP's 200 Line) and Bradford County, Pennsylvania.

TGP's stated purpose of the NSD Project was to, in conjunction with the lease of up to 150,000 Dth/d of transmission capacity from Dominion Transmission, Inc. (DTI), increase its natural gas delivery capability in the northeast region of the United States. TGP reserved unsubscribed capacity on its 200 Line and 300 Line for the NSD project. TGP's NSD Project provided transportation service for up to 250,000 Dth/d of additional natural gas to markets in the northeastern United States. TGP signed a binding precedent agreement with Anadarko Energy Services Company, Cabot Oil & Gas Corporation, Mitsui E&P USA, LLC, and Seneca Resources Corporation for the additional firm transportation capacity resulting from the project.

In order to provide the capacity associated with the lease agreement with TGP, on November 19, 2010, DTI filed an application, in Docket No. CP11-41-000, requesting authority

---

<sup>16</sup> A pig is an internal tool that can be used to clean and dry a pipeline and/or to inspect it for damage or corrosion.

to construct its Ellisburg to Craigs Project.<sup>17</sup> DTI requested a Certificate under section 7 of the NGA authorizing:

- construction of a new compressor station in Wyoming County, New York;
- construction of a new meter station in Livingston County, New York;
- replacement of approximately 2,800 feet of 8-inch-diameter pipeline with 16-inch-diameter pipeline in Livingston County, New York (LN 533); and
- modification of three existing meter stations in Livingston County, New York and Potter County, Pennsylvania.

### NEUP Project

On March 31, 2011, TGP filed an application for its NEUP Project in Docket Number CP11-161-000 under section 7 of the NGA for a Certificate authorizing:

- installation of approximately 40.3 miles of new 30-inch-diameter pipeline loop in five separate segments in Bradford (Loops 317 and 319), Wayne, and Pike Counties (Loops 321 and 323), Pennsylvania, and Sussex (Loop 323), Passaic, and Bergen Counties (Loop 325), New Jersey;
- modifications to four existing TGP compressor stations in Bradford, Susquehanna, and Pike Counties, Pennsylvania, and Sussex County, New Jersey;
- abandonment of an existing meter station and construction of a new meter station in Bergen County, New Jersey;
- installation of associated appurtenant aboveground facilities including mainline valves and pig launchers and receivers; and
- use of contractor/pipe yards and access roads.

Prior to filing its NEUP Project application, TGP participated in the Commission's pre-filing process under Docket Number PF10-23-000.

TGP's stated purpose of the NEUP Project was to expand the natural gas delivery capacity to the northeast region of the United States by up to 636,000 Dth/d. TGP signed binding precedent agreements with two shippers, Chesapeake Energy Marketing, Inc., and Statoil Natural Gas.

### MPP Project

On December 9, 2011, TGP filed an application for its MPP Project in Docket Number CP12-28-000 under section 7 of the NGA for a Certificate authorizing:

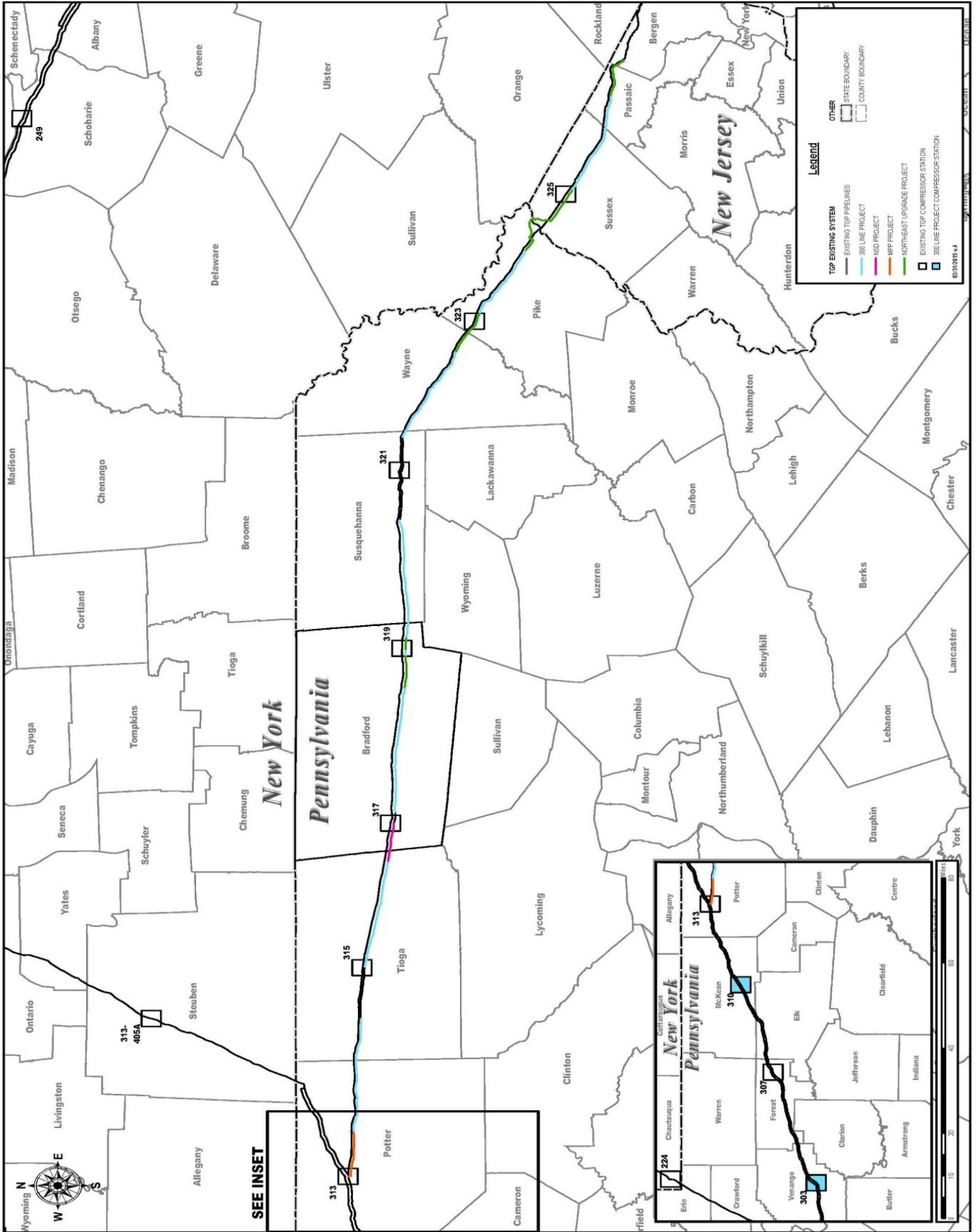
---

<sup>17</sup> Although TGP and DTI proposed to construct facilities to meet the requested capacity of the NSD Project, in separate applications, we analyzed them jointly in one EA. For the purposes of our supplemental analysis, we will treat them as part of the NSD Project.

- installation of 7.9 miles of 30-inch-diameter pipeline loop in Potter County, Pennsylvania;
- pig launcher and miscellaneous aboveground facilities within the boundaries of TGP's existing compressor station 313; and
- modifications to four existing TGP compressor stations to provide bi-directional natural gas flow in Mercer, Venango, McKean (on the 300 Line west of the eastern leg), and Potter Counties, Pennsylvania.

TGP's stated purpose of the MPP Project was to provide additional natural gas delivery capacity to Ohio and Tennessee for up to 240,000 Dth/d. However, the MPP project did not involve construction in Ohio or Tennessee. Rather, TGP constructed the above referenced facilities in Pennsylvania and reserved 240,000 Dth/d of existing unsubscribed firm transportation capacity on its system from Station 219 west to delivery meters in Tennessee and Ohio for the project. TGP signed a binding precedent agreement with Chesapeake Energy Marketing, Inc. and Southwestern Energy Services Company for the additional firm transportation capacity resulting from the project.

The projects were filed at the Commission at various times from 2009 through 2011, and two of the projects (the 300 Line Project and NEUP Project) went through the Commission's pre-filing process (a type of pre-application review). The Commission's NEPA review of the NEUP Project was completed before TGP filed its application for the MPP Project. Project-specific information pertaining to the timing of the Commission's review of all four projects is included in table 1. A map of the projects is included as figure 1; however, the DTI and TGP facilities in New York (as part of the NSD Project) are not depicted because of the distance from TGP's 300 Line. Please see the EA for those projects for that mapping.



## 2.0 Analysis of Additive Impacts

An additive impact is the consideration of all project impacts that were attributable to the four TGP projects, including those associated with the DTI facilities that were constructed in conjunction with the NSD Project. This section discusses those impacts.

Most of the 183 miles of pipeline associated with the four TGP projects comprised looping of TGP's existing 300 Line with new pipeline segments that were generally aligned immediately adjacent to the existing 300 Line. Minimal greenfield pipeline was installed as part of the projects. Construction work areas often overlapped with TGP's maintained 300 Line right-of-way where possible. In areas where the loops commenced and terminated at the same location, some workspaces were utilized twice. In addition, when construction took place at the same compressor station for multiple projects, the construction area also overlapped. Generally, the impacts that did occur during the construction of the four projects were linear in nature, i.e., not all focused geographically to a single location. The impacts of the four projects also occurred over a multiyear time period. The actual construction of the projects, however, did not overlap, as the 300 Line Project was placed in service before the other projects on the eastern leg commenced construction; therefore, not all of the project-related impacts occurred during the same time periods (what we would consider a phased construction when considered together). Although the construction period for the NEUP and the MPP Projects did overlap, these projects did not include new facilities in the same counties. DTI's facilities were constructed in New York State, with the exception of one modification to an existing meter station occurring in Potter County, Pennsylvania on the border with New York. For DTI's pipeline replacement, the disturbance took place within its existing 50-foot-wide easement with only an additional 25 feet of temporary workspace.

Each FERC-jurisdictional project is required to comply with the measures in our *Upland Erosion Control, Revegetation, and Maintenance Plan (Plan)* and *Wetland and Waterbody Construction and Mitigation Procedures (Procedures)*.<sup>18</sup> Our Plan and Procedures identify the staff's baseline mitigation measures for minimizing erosion, enhancing revegetation, and minimizing the extent and duration of disturbance on wetlands and waterbodies during the construction of FERC-jurisdictional natural gas projects. Due to the nature of pipeline construction, a majority of the associated impacts are limited to a relatively short period during and shortly following active construction.

We conducted inspections of the projects during both construction and restoration to ensure environmental compliance with the Commission's orders. This included daily inspections for both the 300 Line and NEUP Projects and monthly inspections for the NSD and MPP Projects. The NSD Project was considered restored in May 2014, for the Tennessee facilities and in September 2014, for the DTI facilities. Based on the most recent compliance inspections of the other three projects, restoration and revegetation of all areas disturbed during construction

---

<sup>18</sup> Our Plan and Procedures can be accessed at:  
<http://www.ferc.gov/industries/gas/enviro/guidelines.asp>

are proceeding satisfactorily and the right-of-way segments are generally revegetated or restored. All projects were in service prior to the court’s decision.

## Geology

Based on the analysis contained within each project’s EA, we found that construction and operation of the projects would not materially alter existing geologic conditions in the area. The potential for landslides was identified in the EAs for the 300 Line Project, the NEUP Project, and the MPP Project and the EAs found that for each project, landslides would not present a significant adverse impact on project facilities. The EA for the NSD Project only identified a low probability of occurrence for landslides. Although we recognized that over the geographic extent of these three projects, landslides could occur, we conclude this geologic hazard does not present a significant adverse impact on project facilities, collectively. The projects would also not have a significant additive impact on the likelihood of future landslides in the areas impacted by the projects. Although minor areas of slips can occur after disturbance of soils, this would not lead to a significant impact when considered collectively because these slips are typically minor and result in minimal impact on facilities or resources, and when considered additively across the linear distance of the project, do not equate to a significant impact. In summary, we conclude with each of the four projects additively combined, there was not a significant adverse effect on any geological resources, nor were there any significant geological hazard impacts on the project facilities.

## Soils

The soils and their characteristics are fully described by project within the respective EAs. Table 2 below summarizes the soil characteristics crossed by the projects.

Loop	Total Length	Prime Farmland <sup>b</sup>	Highly Erodible			Compact Prone <sup>e</sup>	Stony/Rocky <sup>f</sup>	Shallow to Bedrock <sup>g</sup>	Droughty <sup>h</sup>
			Water <sup>c</sup>	Wind <sup>d</sup>	Hydric <sup>b</sup>				
<b>300 Line Project</b>	127.4	13.5	68.3	0.2	7.3	41.9	110.4	39.0	14.1
<b>NSD Project</b>	6.8	0.9	0.6	0	3.2	2.4	2.6	-	-
<b>DTI Project</b>	0.53	0.50	-	-	0.03	0	-	-	-
<b>NEUP Project</b>	40.3	8.3	3.6	0.3	15.4	4.2	22.3	32.9	7.6
<b>MPP Project</b>	7.9	4.6	2.6	0.0	<0.1	0.1	7.5	-	-
<b>Total</b>	<b>182.93</b>	<b>27.8</b>	<b>75.1</b>	<b>0.5</b>	<b>25.93</b>	<b>48.6</b>	<b>142.8</b>	<b>71.9</b>	<b>21.7</b>

<sup>a</sup> An area may have more than one characteristic.  
<sup>b</sup> As designated by the Natural Resources Conservation Service.  
<sup>c</sup> Includes soils with an average slope greater than 8 percent.  
<sup>d</sup> Includes soils in wind erodibility group designation of two or less.  
<sup>e</sup> Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.  
<sup>f</sup> Includes soils with a cobbly, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class of the surface layer and/or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches.  
<sup>g</sup> Includes soils identified as containing bedrock at a depth of 5 feet or less from the surface.  
<sup>h</sup> Includes soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained.  
Source: U.S. Department of Agriculture, 2003.

The soils affected by construction or modification of aboveground facilities, access roads, or contractor or pipe storage yards for each project are presented in table 3.

Soil impacts (e.g., erosion, compaction, and mixing of topsoil and subsoil) from a project are a relatively local impact. Generally, soil impacts occur only during the construction period and for a brief period of time until vegetation stabilizes the soils (typically within a few months). Each of the EAs indicated the possible impacts on soils that could occur during construction and operation of the projects. The EAs also described the measures TGP and DTI adopted for construction and operation of each of the projects to minimize impact on soils. This includes the specific measures developed for each project in an Environmental Construction Plan (NEUP Project and 300 Line Project) or a project-specific *Upland Erosion Control, Revegetation, and Maintenance Plan* and *Wetland and Waterbody Construction and Mitigation Procedures* (MPP Project, and NSD Project), which we will refer to collectively as the “Project Plans” for the remainder of this document. All modifications proposed by TGP to the Project Plans that varied from the standards in our Plan and Procedures were reviewed, and, as appropriate, found acceptable by the Commission’s staff. Other documents such as *Spill Prevention, Containment, and Countermeasure Plans*<sup>19</sup> (SPCC Plans) were prepared for each project, which staff also reviewed and found acceptable.

TABLE 3

**Soil Characteristics of Aboveground Facilities, Access Roads, and Contractor Yards (Acres)<sup>a</sup>**

Loop	Total acres of soils disturbed	Prime Farmland <sup>b</sup>	Highly Erodible		Compact Prone <sup>d</sup>	Farmland of state-wide importance <sup>e</sup>
			Water Wind <sup>c</sup>	Hydric		
<b>300 Line Project</b>	294.9	137.6	14.1	-	25.1	-
<b>NSD Project</b>	-	7.2	-	44.2 <sup>f</sup>	2.0 <sup>f</sup>	-
<b>DTI Project</b>	32.87	29.45	3.42	9.2	-	-
<b>NEUP Project</b>	200.1	58.4	-	-	21.4	105.4
<b>MPP Project</b>	133.5	-	-	-	-	-
<b>Total</b>	<b>661.37</b>	<b>232.65</b>	<b>17.52</b>	<b>53.4</b>	<b>48.5</b>	<b>105.4</b>

<sup>a</sup> An area may have more than one characteristic. Based the EAs for each project, not all information was included, and therefore, some information is not presented in this table.

<sup>b</sup> Includes soils with an average slope greater than 8 percent.

<sup>c</sup> Includes soils in wind erodibility group designation of two or less.

<sup>d</sup> Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

<sup>e</sup> Includes soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained.

<sup>f</sup> Includes soils associated with construction of the pipeline because the EA did not distinguish impacts by type of facility. The other projects do not include the pipeline loops in this calculation. The pipeline aspects are reported above in table 2 for the other projects.

Source: U.S. Department of Agriculture, 2003.

<sup>19</sup> DTI prepared a Spill Prevention, Containment, and Control Plan which differs in name but functions the same as the other SPCC Plans.

Although the overall amount of soils is presented to understand the collective impact, the impacts took place over different construction periods/years and were not connected as a single impact. The impacts are more accurately described as non-continuous (not all of the projects connect continuously) and temporally isolated. Overlapping impact on soils occurred where projects overlapped at both the looping segments and aboveground facilities.

We conclude that with TGP’s and DTI’s implementation of the measures in its Project Plans, the outcomes of consultations with county conservation districts, and considering that disturbance of each of the projects took place over a different timeframe and over a large geographic area, the collective impact of all of the projects was minimal.

## Groundwater

Each of the four EAs described the aquifers/groundwater resources over the respective project areas. The EAs also detailed possible impacts (e.g., contamination from spills, changes in flow, aquifer recharge, and local water table and well impacts) and the measures that TGP and DTI implemented to minimize possible impacts. Table 4 shows the collective impacts on groundwater resources and possible contaminated sites close to or crossed by the facilities.

The EAs found that construction would not result in significant groundwater impacts because the majority of construction would involve shallow, temporary, and localized excavation. Groundwater impacts were therefore mainly temporary. TGP and DTI further minimized the likelihood of the impacts as described in the EAs by the use of construction techniques contained in the Projects’ Plans. The SPCC Plans developed included preventative and corrective measures that were used to minimize the potential for groundwater impacts associated with an inadvertent spill of fuel, oil, or other hazardous fluids.

Project	Sole Source Aquifers (SSA) Crossed	Wells within 150 feet of the construction workspace	Wellhead protection areas within 150 feet of the construction workspace	Potential contaminated groundwater sites within 0.25 mile of construction workspace <sup>a</sup>
<b>300 Line Project</b>	Northwest New Jersey 15 Basin SSA, Highlands SSA	74	4	31
<b>NSD Project</b>	None	5	0	0
<b>DTI Project</b>	None	0	0	0
<b>NEUP Project</b>	New Jersey Coastal Plain SSA, Northwest New Jersey 15 Basin SSA, Highlands SSA, Ramapo SSA	21	4	35
<b>MPP Project</b>	-	4	-	0
<b>Total</b>	-	<b>104</b>	<b>8</b>	<b>66</b>

<sup>a</sup> The EAs fully describe that these sites are mostly located greater than 200 feet from the projects, are down/side gradient, have been closed, or no contamination was found and therefore no impact would be anticipated.

Assessed together here, we find that project impacts on groundwater from the TGP and DTI projects were temporary and occurred during the construction and restoration activities over multiple aquifers and recharge locations. We find that because each project was constructed with very limited impacts, as described above, in different geographic areas that do not have a hydrological connection (stretching from western New York to north central Pennsylvania to northern New Jersey (areas) over different time periods, and with very limited footprints of aboveground facilities (which mostly utilized existing infrastructure), impacts on groundwater resources were very minor and did not overlap. Therefore, we find no significant additive impact on groundwater from all of the projects.

For the MPP Project and NSD Project, TGP agreed to offer pre- and post-construction well testing to well owners to determine if project construction resulted in impacts on water quality or yield. If well testing were to show an impact, then TGP committed to provide an alternative water source to the landowner. For the NEUP Project and 300 Line Project, TGP was required to file a report with the FERC identifying all water supply wells/systems damaged by construction and how they were repaired and a discussion of any other complaints concerning well yield or water quality and how each problem was resolved. TGP filed these reports in compliance with this requirement. They appropriately documented the issues reported and the measures taken to resolve those issues.

We continue to find that implementation of the construction procedures detailed in each EA, TGP’s mitigation measures, and the recommendations we made in the EAs (which were included as mandatory conditions as a part of the respective Commission Orders) adequately protected groundwater resources, including water wells. This conclusion is based on our confirmation that disturbances were temporary, erosion controls were implemented, and natural ground contours were restored. Further, the Commission’s requirement discussed above ensured that any impacts on water supply systems were repaired. Thus, we find that the projects, additively, did not result in any significant long-term or permanent impacts on groundwater resources or users of groundwater.

## Waterbodies

Table 5 indicates the number of waterbodies collectively impacted by all four projects.

Project	Perennial Waterbodies Crossed	Intermittent Waterbodies Crossed	Waterbodies Within the Workspace, Not Crossed	Waterbodies Adjacent to Aboveground Facilities/Pipe and Contractor Yards	Waterbodies Crossed By or Adjacent to Access Roads
<b>300 Line Project</b>	79	78	29	3	50
<b>NSD Project</b>	10	2	2	0	2
<b>DTI Project</b>	0	1	0	0	0
<b>NEUP Project</b>	50	52	25	3	8
<b>MPP Project</b>	5	6	0	0	1
<b>Total</b>	<b>144</b>	<b>139</b>	<b>56</b>	<b>6</b>	<b>61</b>

Each waterbody was crossed by the pipelines in accordance with TGP's and DTI's Project Plans and other state and federal permit requirements. TGP and DTI utilized one of the following methods to cross each waterbody:

- open-cut crossing method;
- dry-crossing method (including flume or dam and pump); or
- horizontal directional drill;

Each of these crossing methods was defined in the respective EAs, and each EA detailed how TGP and DTI proposed to cross each waterbody and provided further waterbody-specific information. Each of the respective EAs detailed the anticipated project-related impacts on waterbodies during construction and operation of the associated project and found that there were no significant impacts.<sup>20</sup> Although 406 waterbodies were crossed by, adjacent to, or within the workspace of the projects combined, the waterbodies were not impacted at the exact same time and most of the project impacts were realized in differing years. Where TGP employed the HDD method, direct waterbody impacts were avoided.

The majority of impacts on a waterbody occur during a pipeline crossing or construction of an adjacent pipeline. It is during this time that turbidity from work within a stream is greatest and the adjacent right-of-way could result in erosion, leading to subsequent turbidity and sedimentation in a waterbody, causing downstream impacts. Because most of the impacts on waterbodies are temporary and localized, the number of total stream crossings did not result in significant waterbody impacts. The impacts from the projects were spread out geographically (i.e., they took place over an area extending from eastern New Jersey all the way to western New York near Niagara Falls) and over a 4-year period. The impacts were also not necessarily overlapping because the projects crossed different watersheds and different waterbodies.

Where waterbodies were within the same watershed, and tree clearing occurred, stream temperature changes could have resulted in a cumulative impact. For the projects, not all waterbody banks and surrounding areas crossed were completely forested. This means that a new right-of-way in an area with no canopy prior to construction (for instance, a stream crossing through a meadow or where the construction workspace overlapped existing maintained pipeline rights-of-way) would have no additional impact on water temperature. Additionally, most of the riparian cover on affected stream banks is expected to recover over several months to several years; the exception being a 10-foot-wide strip centered over the pipeline that may be maintained

---

<sup>20</sup> Although site-specific conditions at waterbody crossings can change from pre-construction planning to the implementation of a project (including finding unsuspected subsurface conditions or unexpected high water flows), the project plans developed during our review ensure that all crossing methods contain appropriate minimization and mitigation measure which are utilized to minimize impacts to the extent practicable. Any changes an applicant proposes to waterbody crossings after a FERC certificate is issued must be reviewed and approved by FERC and receive all required federal authorizations before the company is authorized to utilize any different crossing method.

in an herbaceous state for pipeline operations. Given the relatively small construction footprint of the right-of-way over individual stream crossings, impacts on the downstream temperature of a waterbody were not significant. TGP also avoided impacts on some waterbodies by utilizing a horizontal directional drill.

The EAs also discuss that TGP and DTI would implement their Project Plans, which are based on our Plan and Procedures. Our Plan and Procedures contain the baseline measures to minimize impacts on waterbodies.

Because the waterbody crossings were completed in accordance with the construction and restoration methods described in each of the EAs, and detailed in TGP's and DTI's Project Plans, and because the projects' impacts were spread out over a 4 year time frame and over a large geographic area, we conclude that additively, the impacts on waterbodies were minor and temporary. We note that other federal and state permitting agencies placed additional restrictions on waterbody crossings that TGP and DTI were required to meet, which further minimized impacts.

Each of the projects was hydrostatically tested, as required by U.S. Department of Transportation regulations, to verify the integrity of the pipelines before placing them into service. This hydrostatic testing utilized water throughout the projects' areas. The sources of this water included municipal water, wells, waterbodies, and ponds. The specific information for each withdrawal, discharge, and source are located in each respective EA. Table 6 summarizes the total amount of water utilized for each project.

Project	Water Amount Used (gallons)	Year Utilized
<b>300 Line Project</b>	23,577,013	2011
<b>NSD Project</b>	1,241,000	2012
<b>DTI Project</b>	57,040	2012
<b>NEUP Project</b>	7,976,200	2013
<b>MPP Project</b>	1,660,000	2013
<b>Total</b>	<b>34,511,253</b>	

Although hydrostatic testing of all projects required over 34,511,253 gallons of water, this use took place over 3 years and was not all within the same watershed. Use of water for hydrostatic testing is generally not consumptive. As the test water is placed back into the hydrological system (discharged adjacent to the right-of-way), free of contaminants, it represents a temporary impact. Some of the water for testing came from municipal sources or wells so that impact on aquatic life was avoided. In addition, the three year time period that the water was withdrawn and used in effectively prevented an intense and focused impact that might have occurred if all of the water came from a single source at one time.

Because the use of hydrostatic test water was not consumptive, was temporary, and spread out over a large geographic distance (multiple watersheds), and occurred over a three year time period, we do not find the additive effects of the water use to be significant.

## Fisheries

The fishery classifications for the waterbodies crossed by each project are presented in table 7. Additional fishery information, including impacts and mitigation measures proposed by TGP for each project, are presented in the respective EAs. No federally designated essential fish habitat was impacted by any of the projects.

Where streams are located within the same watershed and crossed at or about the same time, construction could lead to impacts that could result in additive impacts due to turbidity and sedimentation. Impacts from disturbed bottom habitat might impact limited fishery resources within a watershed if they were to change substrate to the point at which it was no longer able to support pre-construction species.

However, the fisheries were not all crossed within the same year and, because of the linear nature of pipeline construction, the same fisheries were not crossed in the same location more than once. We do not consider the impacts to be significant as streambeds and banks quickly reverted to preconstruction conditions in the areas impacted by the projects. Further, the measures in TGP's and DTI's Project Plans promoted restoration, stabilization of stream banks, and minimized erosion. These measures also helped to minimize any longer-term impacts, such as water temperature increases or loss of cover. Even though loss of cover could impact a fishery, increasing temperatures or making the species more vulnerable to prey, the rights-of-way were limited in size and the reduced cover was not continuous. Therefore we do not consider it a significant additive impact. We conclude that the additive impacts from construction and operation of the projects on waterbodies were not significant.

Project	PA Warmwater Fisheries	PA Coldwater Fisheries	PA High- Quality	PA Exceptional Value	PA Trout Streams (Class A, Wild and Stocked Trout)	NJ Coldwater (trout) Fisheries	NJ Warmwater (non-trout) Fisheries
300 Line Project	29	31	18	2	19	11	5
NSD Project <sup>a</sup>	0	14	1	-	-	-	-
NEUP Project	32	29	25	7	3	29	25
MPP Project	0	11	2	1	11	-	-
<b>Total</b>	<b>61</b>	<b>85</b>	<b>46</b>	<b>10</b>	<b>33</b>	<b>40</b>	<b>30</b>

<sup>a</sup> The DTI Project crossed one warmwater fishery in New York.

## Wetlands

The EAs discuss the federal wetland permitting requirements and the methods used for identification of wetlands within the four project areas. Wetland type and potential impacts were also discussed within each of the EAs. The EAs also provided details on the crossing methods and mitigation measures that TGP committed to implement to minimize impacts on wetlands. Table 8 summarizes the impacts on wetland in acres for the four TGP projects. The DTI facilities did not impact any wetlands.

All wetlands were allowed to revert to preconstruction conditions with the exception of those wetlands that were forested within a 30-foot maintained corridor centered over the pipeline (as further described in maintenance activities in the Procedures).<sup>21</sup> These permanently-affected wetlands are maintained as emergent or scrub-shrub wetland during operation. The forested wetland impacts include 64.4 acres affected during construction and 19.4 acres of forested wetland permanently affected by regular maintenance clearing within the 30-foot maintained corridor.

Although we added all the wetland impacts in the table below, wetlands have many functions, one of which may include functioning within a watershed for water storage. Since the projects occurred over a large geographic area, many of the wetlands were in different watersheds. In addition, the impacts occurred over a time span of a few years. Thus, similar to waterbodies, the linear nature and differing timeframe for construction of the projects prevents the focused impact on wetlands that would occur if all projects occurred in a single watershed at a single time (as would be the case with a non-linear project constructed in a single location having the same impacts). The impacts did not occur to a single wetland (or wetland complex in the same watershed) in the same year, but were instead spread out over a large distance and impacted wetlands that function independent of one another.

Wetland function, in many cases, would have returned prior to any subsequent TGP project construction (even though the final vegetation type allowed to revegetate the right-of-way might not yet have been achieved). Based on our experience in this region of Pennsylvania and New Jersey, emergent and scrub shrub wetlands return relatively quickly, both in form and function. As noted in the EAs, impacts on wetlands are greatest during and immediately following construction. The majority of these effects are short-term in nature and cease when (or shortly after) the wetlands are restored and vegetated. This is especially true for emergent and scrub-shrub wetlands. Following revegetation, these wetlands transition back into a community with functionality similar to that of the pre-construction state. In emergent wetlands, the herbaceous vegetation regenerates quickly (typically within 1 to 3 years, but closer to 1 or less in the Projects areas). Scrub-shrub wetlands return to their preconstruction state generally in less than 10 years, although in most areas impacted by the Projects, it is typically a lot sooner. Forested wetlands within the temporary workspace would represent a long-term impact, returning to forested wetland conditions after 10 years or more.

Forested wetland conversion would be the greatest impact on wetlands from construction, but this impact does not result in a loss of wetland, just a change of form. This change in form can result in a slight degradation of the wetland quality as it becomes an emergent or scrub-shrub wetland. However, as mentioned above, the forested wetland impacts do not take place within a single watershed but are spread out geographically. The forested wetlands also return to a functioning wetland, although in a different form, in the timeframe discussed above.

---

<sup>21</sup> Part of the 300 Line Project proposal included 0.8 acre of wetland that was to be permanently filled for Compressor Station 303 in Venango County, Pennsylvania. However, during construction, TGP agreed to avoid the 0.8 acre of fill at Compressor Station 303, preventing permanent fill and wetland loss from occurring.

TABLE 8  
Summary of Wetland Impacts for the Projects

Project	Emergent Wetland		Scrub-Shrub Wetland		Forested Wetland		Total Wetland Impacts	
	Con <sup>a</sup>	Oper <sup>b</sup>	Con	Oper	Con	Oper	Con	Oper
<b>300 Line Project</b>	69.0	9.3	<sup>c</sup>	<sup>c</sup>	39.2	13.6	108.2	22.9 <sup>d</sup>
<b>NSD Project<sup>e</sup></b>	2.13	0.18	0.18	0.04	2.56	0.45	4.87	0.67
<b>NEUP Project<sup>f</sup></b>	24.9	0.0	1.9	0.2	22.4	5.3	49.1	5.5
<b>MPP Project<sup>f</sup></b>	0.19	0.0	0.0	0.0	0.25	0.04	0.44	0.04
<b>Total</b>	<b>96.2</b>	<b>9.5</b>	<b>2.1</b>	<b>0.24</b>	<b>64.4</b>	<b>19.4</b>	<b>162.6</b>	<b>29.1</b>

<sup>a</sup> Con = Construction Impacts. Construction impacts are based on a proposed nominal 75-foot-wide construction right-of-way for the pipeline facilities in wetlands and areas where the right-of-way is wider than the nominal 75-foot-wide configuration, which may include staging areas and additional temporary workspaces.

<sup>b</sup> Oper = Operational impacts. Operational impacts on forested wetlands were calculated based on a 30-foot-wide permanent maintenance corridor. Operational impacts on scrub-shrub wetlands were calculated based on a 10-foot-wide permanent maintenance corridor.

<sup>c</sup> Scrub-shrub is included in the emergent wetland numbers based off of the EA for the 300 Line Project.

<sup>d</sup> 0.8 acre of wetland was permanently filled and converted to upland for operational purposes.

<sup>e</sup> The DTI Project did not impact any wetlands.

<sup>f</sup> If a forested component was present in a wetland it was classified as forested. If a wetland only had an emergent component it is classified as emergent.

In Pennsylvania, New York, and New Jersey, there are approximately 346,281 acres of palustrine emergent wetland, 439,610 acres of palustrine scrub-shrub wetland, 1,627,071 acres of palustrine forested wetland, and 212,993 acres of other palustrine wetlands.<sup>22</sup> Altogether, approximately 2,625,955 acres of palustrine wetland exist in these three states. In order to understand the impact in terms of the context of available wetland acreage in each state, table 8a shows the percentage of wetland impacts disturbed over the project areas when considered with the total amount of each wetland type for all three states. As shown in the table, the total acreage of each wetland type disturbed during construction is the greater impact, and each of those is less than 0.03 percent. Overall, only 0.006 percent of the total palustrine wetland acreage of all three states was impacted during construction and only 0.001 percent was impacted during the operation of the projects. Again, in terms of wetland function, these impacts are temporary, but differ in duration. These percentages illustrate that minimal impact on wetlands that the projects had in context of the wetlands that exist in each state.

<sup>22</sup> Tiner, Ralph W. 2010. Wetlands of the Northeast: Results of the National Wetlands Inventory. U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 71 pp.

TABLE 8a

**% of Acres of Total Palustrine Wetland Acreage Disturbed in Pennsylvania, New Jersey, and New York**

	Emergent Wetland		Scrub-Shrub Wetland		Forested Wetland		Total Wetland Impacts	
	Con. <sup>a</sup>	Oper. <sup>b</sup>	Con.	Oper.	Con.	Oper.	Con.	Oper.
<b>All Project Impacts (acres)</b>	96.2	9.5	2.1	0.24	64.4	19.4	162.6	29.1
<b>% of total</b>	<b>0.03</b>	<b>0.003</b>	<b>0.0005</b>	<b>0.00005</b>	<b>0.004</b>	<b>0.001</b>	<b>0.006</b>	<b>0.001</b>

<sup>a</sup> Con = Construction Impacts. Construction impacts are based on a proposed nominal 75-foot-wide construction right-of-way for the pipeline facilities in wetlands and areas where the right-of-way is wider than the nominal 75-foot-wide configuration, which may include staging areas and additional temporary workspaces.

<sup>b</sup> Oper = Operational impacts. Operational impacts on forested wetlands were calculated based on a 30-foot-wide permanent maintenance corridor. Operational impacts on scrub-shrub wetlands were calculated based on a 10-foot-wide permanent maintenance corridor.

Therefore, because the impact occurred over a large geographical area involving different watersheds, the impacts did not involve a permanent conversion from wetland to upland, the timing of the impacts occurred over multiple years, and the combined project impacts on wetlands were not significant when considered in the context of existing palustrine wetland resources in New Jersey, New York, and Pennsylvania, we conclude that the additive impact was not significant for the projects collectively.

## Vegetation

Each of the projects' respective EAs details the vegetation types impacted and discusses potential impacts. A summary of the impacts by vegetation type is included in table 9. As noted in the EAs, the impact on forested land is one that requires a considerable period of time to achieve restoration. The 1,360 acres of forest cleared for the four projects is a long-term impact, as restoration of work areas to their previous condition could take decades. Of that acreage, 297 acres can be considered a permanent impact because that portion of the right-of-way or aboveground facilities would be maintained without forest for the life of the project. Overall, the EAs discussed that with looping projects (or replacement projects as in the case of DTI), impacts are reduced by paralleling TGP's existing lines, rather than creating new, greenfield corridors.<sup>23</sup> Looping reduces impacts related to habitat fragmentation (as fragmentation already occurred from installation of the original 300 Line); however, we acknowledged that edge effects would be moved into new areas of forest.

While the combined impact of forest clearing seems substantial, the linear pipeline activities occurred in noncontiguous sections over a substantial geographic area, from western Pennsylvania to northeastern New Jersey and in New York with the DTI facilities. Estimations of forest cover are approximately 16.7 million acres in Pennsylvania, 2.1 million acres in New

<sup>23</sup> In the case of the NEUP Project, a 6.4-mile greenfield route (out of the 40.3 total miles) had to be adopted because of a permitting conflict associated with another federal agency.

Jersey, and 18.9 million acres in New York.<sup>24</sup> Based on the 37.7 million acres of forest over the three states, the long-term impact of forested areas cleared amounts to 0.003 percent of the total forest available and a permanent conversion of 0.0007 percent of the total forest available.

TABLE 9  
Summary of Vegetation Impacts for the Projects<sup>a</sup>

Project	Upland Forest		Open Land		Agricultural Land		Developed Land <sup>e</sup>	
	Con <sup>b</sup>	Oper <sup>c</sup>	Con <sup>b</sup>	Oper <sup>c</sup>	Con <sup>b</sup>	Oper <sup>c</sup>	Con <sup>b</sup>	Oper <sup>c</sup>
<b>300 Line Project</b> <sup>d</sup>	996.2	187.2	467.7	104.7	731.7	107.5	180	6.3
<b>NSD Project</b>	53.69	19.76	-	-	21.95 <sup>g</sup>	3.53 <sup>g</sup>	35.36 <sup>h</sup>	27.54 <sup>h</sup>
<b>DTI Project</b>	0.02	0.00	0.29	0.29	14.14	7.78 <sup>i</sup>	24.25	7.78 <sup>i</sup>
<b>NEUP Project</b> <sup>d</sup>	267.2	78	112.4	17	208.4	13.4	114.5 <sup>f</sup>	3.9 <sup>f</sup>
<b>MPP Project</b>	43.24	12.84	37.17	23.97	68.75 <sup>g</sup>	10.41 <sup>g</sup>	86.87	2.3
<b>Total</b>	<b>1360.35</b>	<b>297.8</b>	<b>617.56</b>	<b>145.96</b>	<b>976.19</b>	<b>142.62</b>	<b>440.98</b>	<b>47.82</b>

<sup>a</sup> Includes proposed and modified compressor station sites, meter stations, and access roads associated with new compressor station sites.  
<sup>b</sup> Con = Construction Impacts.  
<sup>c</sup> Oper = Operational impacts.  
<sup>d</sup> Excludes access roads except as indicated in footnote a; land cover impacts associated with access roads included in appendix D of the 300 Line Project EA and appendix C of the NEUP Project EA.  
<sup>e</sup> Developed land includes residential land, commercial/Industrial land, and road/railroad crossings, and is often devoid of vegetation. However, planted trees, ornamental shrubs, maintained lawns, as well as naturally occurring opportunistic plants and grassy/weedy assemblages may be present.  
<sup>f</sup> Includes special use area (e.g., school land, municipal and state-owned land) crossings.  
<sup>g</sup> Includes scrub/shrub type reported in the project EA.  
<sup>h</sup> Includes open space/open land in the project EA.  
<sup>i</sup> Both the application and the EA do not distinguish between the permanent vegetation type to be impacted. Therefore, the number is repeated under both columns to ensure vegetation is adequately accounted for and is considerably overestimated.

Further, the impact on forested lands was not continuous and did not extend over the entire 100-foot-wide corridor over all four projects and into New York on the DTI facilities. Forested tracts are interspersed with various agricultural areas and developments throughout the project areas, and the projects generally include loops that were aligned immediately adjacent to an existing maintained right-of-way. Consequently, forest fragmentation is already an existing condition of the environment. In addition, the impacts did not occur simultaneously in time, but were scattered over a multi-year period as discussed above. The forest loss did not occur in one location, so the impact was distributed over a broad geographic expanse of land including northern Pennsylvania, northern New Jersey, and southwestern New York. As mitigation, TGP was also required to comply with New Jersey regulations in certain areas that require replanting of trees in areas of temporary workspace to expedite restoration.

The other (i.e., non-forested) vegetation types listed above typically revert to pre-construction conditions soon after construction and restoration. As such, we find that the

<sup>24</sup> [http://www.fs.fed.us/nrs/pubs/rb/rb\\_nrs82.pdf](http://www.fs.fed.us/nrs/pubs/rb/rb_nrs82.pdf);  
[http://www.fs.fed.us/ne/newtown\\_square/publications/brochures/pdfs/state\\_forests/nj\\_forest.pdf](http://www.fs.fed.us/ne/newtown_square/publications/brochures/pdfs/state_forests/nj_forest.pdf);  
and <http://www.dec.ny.gov/lands/309.html>

projects' impacts were temporary and most areas where workspaces from more than one project overlapped were restored or trending toward successful revegetation before the next subsequent project was constructed.

We recognize that clearing forested areas are long-term impacts and can have effects in surrounding uncleared forested areas (such as from fragmentation and edge impacts). However, the combined project impacts on forested lands were not significant when considered in the context of existing forest resources in New Jersey, New York and Pennsylvania, and the collocation of the projects with TGP's existing 300 Line. Therefore, based on the majority of the impacts being temporary, the minimal amount of forests cleared in the context of the states impacted, and the impacts being confined mostly to a linear easement over a few-year construction period, we do not find any significant additive impacts on vegetation.

## **Wildlife**

Wildlife species vary over the projects' areas as noted in each of the EAs. The EAs also detailed the anticipated impact on the various wildlife species, including migratory birds. Because the projects were not constructed simultaneously or within a close geographic territory, the pressures exerted on wildlife described are less than if all the impacts occurred at once in one small geographic area. For the most part, the only portions of habitat that was permanently lost were those that were encumbered with new, aboveground facilities or where tree clearing was to be performed over the life of the projects. Overall, we conclude that the impacts were minor given the mobile nature of most wildlife in the area, the availability of similar habitat adjacent and near the projects, and the compatible nature of the restored right-of-way with species occurring in the area. These impacts were also minimized by collocating the loops, to a large extent, with TGP's existing maintained rights-of-way and by implementing the restoration methods outlined in TGP's Project Plans.

## Threatened and Endangered Species

Prior to the Commission allowing any construction activities to proceed, the Commission needs to ensure that consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service (FWS) is complete. None of the projects resulted in the determination that the projects would be *likely to adversely affect* a federally listed species.<sup>25</sup> The FWS concurred with our determinations of effect. In doing so, it considered the total available resources in the project areas, the measures agreed to by TGP to avoid impact, our recommendations, and other factors. Therefore, the determination that none of the projects would adversely affect a federally listed species has already been made with the other projects in mind. The additive impact of the projects does not trigger any new consultation requirements and does not result in a significant impact on threatened and/or endangered species.<sup>26</sup> State-

---

<sup>25</sup> We found that DTI's facilities had *no effect* on federally listed species.

<sup>26</sup> As the project is already built and no new mitigation will be required as the result of our analysis herein, there would be no new impacts to federally listed species, and no additional  
(continued ...)

listed species are subject to the regulations and restrictions required by each state. These regulations ensure that impacts from projects do not threaten the existence of a species within that respective state. It also ensures that impacts from all projects within a region do not add up to result in placing a species in peril. Therefore, on the basis of our consultations, we do not find any significant additive impact on threatened and endangered species.

### **Socioeconomic Impact**

The socioeconomic impact of a project typically relates to construction of a project and the temporary workforce impact on population, public services, housing, traffic, jobs, property tax revenues, and income associated with employment. For the most part, these impacts were limited to the construction period and did not overlap for the four projects; the impacts were realized over multiple years. Although traffic created by the construction of any of the four projects could have occurred in the same geographic area, the impact was at different times and not necessarily focused in one specific geographic area. The same can be said for the demand on housing and public services. If local skills were utilized for temporary jobs, the overall job force in northern Pennsylvania, New York, New Jersey could have realized a multi-year beneficial impact. The increased spending on a regional basis by employees, TGP, and DTI for construction materials would also have a beneficial additive impact on the economy of the projects' areas.

During operation, there can be an increase in tax revenue where projects were constructed in the same administrative jurisdictions as a previous project, providing more monies to any taxing jurisdiction. This increase in tax revenue would be additive and considered a long-term beneficial impact.

Overall, because of the multi-year timeframe and expansive geographic territory for construction over which the socioeconomic impacts occurred, we do not believe that the additive socioeconomic impacts of the projects were significant.

### **Land Use**

Specific information about the land use types impacted by each project is discussed in the respective EAs. Land acreage required for each of the projects is presented in table 10. The respective EAs also discussed special land use types (such as recreation and special interest areas), residential construction, and visual impacts.

For all of the projects, 639.28 acres of land was required for operations, with about half being forested and the other half being open/agricultural/developed land. The majority of the projects involved looped sections and utilized portions of TGP's existing 300 Line right-of-way, which minimized land use impacts. DTI's pipeline facilities utilized an existing easement for its replacement pipeline, and most other facilities were constructed within or adjacent to existing

---

consultation under section 7 of the Endangered Species Act is warranted.

aboveground facilities. These projects consisted mainly of facilities sited next to existing facilities or rights-of-way that were already impacted by an easement. Adding this additional easement over the additive distance of the projects does not significantly impact land use, because existing land uses can be maintained over most of the rights-of-way. Land use impacts took place over multiple years which further minimized impacts with regards to recreational uses in the projects' areas of impact (these include federal, state, and local properties such as forests, trails, baseball fields, wildlife refuges, etc.). Most of the recreation areas were only crossed by one of the projects. Thus, while recreational impacts might have occurred, they were mostly separated by considerable distances and time frames, not all occurring at the same time nor affecting the same recreational users.

TABLE 10		
Land Required for the Projects (acres)		
Project	Land Affected During Construction	Land Affected During Operation
300 Line Project	2,628.7	439.2
NSD Project	154.8	44.6
DTI Project	38	11.08
NEUP Project	810	120.6
MPP Project	236.4	23.8
<b>Total</b>	<b>3,867.90</b>	<b>639.28</b>

Visual impacts resulted from widening the existing right-of-way or constructing greenfield segments (where required). It is in these greenfield construction areas (mostly associated with the NEUP Project) that visual impacts are most evident. In the other areas, visual impact consisted of widening an already existing maintained easement. Over half of the projects' area were not forested adjacent to the right-of-way prior to construction (i.e., were open field, lawns, etc.). The visual impact was less noticeable as these areas tended to quickly return to preconstruction conditions and the restored right-of-way may not even be visually discernable. In any event, a viewer cannot see the additive effect of the visual impact of each project together unless viewing from an elevated point, such as from a mountain top or airplane, or at a road crossing where two of the projects meet. Therefore, we do not find that the additive visual impact is significant, especially since it was broken up with non-forested areas over the approximately 183 miles of non-continuous looping across the projects' areas. In areas where additional facilities were added to existing aboveground facilities, the additional facilities would be consistent with the view shed of the previous existing facilities. In areas where brand new compressor stations were constructed, visual impacts occurred, but we did not find these significant, and when considered additively, each of them are located at a distance apart where the visual impacts would not add to one another (i.e., you cannot see one aboveground facility from another) to reach the threshold of a significant impact. Based on this analysis and our analysis within each of the EAs, when considered additively, we conclude that there was no significant impact on land use including visual.

## Cultural Resources

Section 106 of the National Historic Preservation Act, as amended, requires the FERC to take into account the effects of its undertakings on properties listed on or eligible for listing on

the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. TGP, as a non-federal party, assisted us in meeting our obligations under Section 106. For each project, TGP initiated Section 106 consultations with the appropriate State Historic Preservation Offices (SHPO) and federal land managing agencies. These include the Pennsylvania, New Jersey, and New York SHPOs. Each of the four EAs analyzed the effects of the undertakings on properties listed on or eligible for listing on NRHP and afforded the ACHP an opportunity to comment.

TGP conducted cultural resources surveys for the proposed facilities, except for work in previously disturbed areas that had received SHPO clearance. DTI's project was entirely within previously disturbed or low probability areas, and DTI received clearance from the New York and Pennsylvania SHPOs that no cultural resource survey was necessary for that project. The surveys are described in the respective EAs. For all projects combined, approximately 6,500 acres were surveyed for cultural resources. Cultural resources survey reports were provided to the FERC and the New Jersey and Pennsylvania SHPOs.<sup>27</sup> Where appropriate, the reports were also provided to the U.S. Army Corps of Engineers (USACE), the FWS, and interested Indian tribes.

In Pennsylvania, survey of all projects areas combined resulted in the identification of 57 archaeological sites; 17 of these were prehistoric sites, 39 were historic sites, and 1 was a multi-component historic and prehistoric site. Eighteen sites were avoided, and 37 were found not eligible for listing on the NRHP. Two sites were found eligible, but did not retain any research value. No additional work was recommended at these sites. Therefore, in Pennsylvania none of the four projects resulted in adverse effects to sites that were eligible for the NRHP.

In New Jersey, survey of all project areas resulted in the identification of 37 archeological sites; 18 of these were prehistoric sites, 18 were historic sites, and 1 was a multi-component prehistoric and historic site. For the 300 Line Project, TGP was unable to avoid adverse effects to Site 28SX273 and the Cherry Ridge Historic District in New Jersey. For the NEUP Project, four historic properties in New Jersey were adversely affected by the project and include archaeological site 28SX471, Skylands Manor Historic District and Skylands Farm Cultural Landscape, High Point State Park, and Appalachian Trail Historic District. Treatment plans for avoidance, minimization, and mitigation were developed and incorporated in Memoranda of Agreement between the New Jersey SHPO, TGP, the FERC, and, where applicable, the FWS.

Additively, the five projects impacted cultural resources. The FERC staff, in compliance with Section 106, considered the effects of the projects on historic properties. To the extent possible, the effects to historic properties were avoided, minimized, or mitigated through data recovery or alternative measures. The Treatment Plans developed for these projects documented the measures to protect and minimize effects to some of the historic properties, and included mitigation for those that could not be avoided. Mitigation measures, which included archeological excavation and local and regional studies, ensured that the information about the

---

<sup>27</sup> No cultural resource surveys were undertaken in New York.

past was gathered and preserved for future study. Although the impact of multiple projects on cultural resources is a decrease in intact historic properties, it also produces an increase in our understanding about the past. Therefore, although there was an additive impact, the avoidance, minimization, and mitigation of historic properties affected by the projects prevented a significant additive impact on cultural resources.

## Air Quality

Project-specific information about the existing air quality, including the attainment status for each county, is discussed in the respective EAs.

### Construction Emissions

Table 11 summarizes the additive construction emissions for the projects. Although the overall amount of construction emissions is presented to understand the collective impact, the impacts took place over different construction periods/years and did not constitute a single impact. Additionally, air quality requirements delegate evaluation of construction emissions on a calendar year basis. The impact is more accurately described as non-continuous (not all of the projects connect continuously) and temporally isolated.

Project	Pollutants (tons)							
	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	HAPs	GHGs <sup>b</sup>
<b>300 Line Project</b>	364.7	42.12	519.74	0.54	321.32	56.60	9.28	36,566.43
<b>NSD Project</b>	22.00	3.79	53.53	0.05	34.32	4.78	0.83	-- <sup>a</sup>
<b>DTI Project</b>	63.23	6.28	19.99	-- <sup>a</sup>	18.81	4.7	-- <sup>a</sup>	19,880.24
<b>NEUP Project</b>	66.33	9.51	124.52	0.12	122.92	18.64	2.16	6,955.9
<b>MPP Project</b>	28.10	4.85	110.87	0.47	35.67	5.50	1.48	3,184
<b>Total</b>	<b>544.36</b>	<b>66.55</b>	<b>828.76</b>	<b>1.18</b>	<b>576.44</b>	<b>90.22</b>	<b>14.87</b>	<b>66,409.47</b>

<sup>a</sup> Emissions not included in the application.  
<sup>b</sup> Carbon dioxide equivalents calculated from global warming potentials presented in the Intergovernmental Panel on Climate Control's Fourth Assessment Report.  
 NO<sub>x</sub> = nitrous oxides  
 VOC = volatile organic compound  
 CO = carbon monoxide  
 SO<sub>2</sub> = sulfur dioxide  
 PM<sub>10</sub> = particulate matter less than 10 microns in diameter  
 PM<sub>2.5</sub> = particulate matter less than 2.5 microns in diameter  
 HAPs = hazardous air pollutants  
 GHG = greenhouse gas

Each of the EAs described the possible impacts (e.g., increase in emissions of criteria pollutants and hazardous air pollutants, fugitive dust) on air quality that could occur during construction of the projects. The EAs also indicated the measures TGP and DTI adopted for construction of each of the projects to minimize impacts on air quality. To minimize construction emissions, TGP and DTI complied with all federal and state air quality regulations regarding construction emissions and implemented best management practices discussed in TGP's and DTI's respective Project Plans, including the use of dust suppression (e.g., watering); using newer, cleaner operating equipment; and encouraging the use of low-emission fuels.

Also, construction emissions for pipeline transmission projects were temporary, intermittent, and highly localized along the right-of-way and/or at the construction or meter station sites. Once construction was complete for each project component, the fugitive dust and construction equipment emissions subsided and the construction-related impact on air quality terminated.

Given the geographic and temporal separation of the projects, the temporary and highly localized nature of pipeline transmission construction emissions, and TGP's and DTI's mitigation measures employed during construction of the projects, we conclude that the additive air quality impacts related to construction were not significant.

### *General Conformity*

The General Conformity regulations do not apply to air quality emissions from multiple projects; however, we are providing an applicability determination for all projects additively in this document. Table 12 shows the projects' applicable indirect and direct emissions in the affected Air Quality Control Regions (AQCR)/Designated Areas.

Air Quality Control Region/Designated Area	Project <sup>a</sup>	Attainment Status	Pollutants (tons)	
			NO <sub>x</sub>	VOC
<b>2010-2011</b>				
New Jersey-New York-Connecticut Interstate	300 Line	Nonattainment – ozone (moderate)	57.12	6.16
<b>2012</b>				
Buffalo-Niagara Falls Area	NSD Project	Nonattainment – ozone (moderate)	1.54	0.11
Rochester, New York Area				
Genessee-Finger Lakes Area	NSD Project	Nonattainment – ozone (moderate)	54.54	5.44
<b>2013</b>				
New Jersey-New York-Connecticut Interstate	NEUP	Nonattainment – ozone (moderate)	30.93	4.47
<sup>a</sup> A General Conformity Applicability Determination was not conducted for the MPP Project because the project did not impact areas designated as non-attainment.				

The NSD and DTI projects were constructed within the same calendar year, but the applicable emissions occurred in different AQCRs and there were no exceedances of the General Conformity thresholds. Therefore, a General Conformity Determination is not required. Even if the AQCRs were affected in the same calendar year, the conclusion would still be the same, as the applicable emissions in each AQCR would be below the applicable General Conformity thresholds. As shown in table 12, the estimated project emissions generated in each AQCR were well below the applicable General Conformity thresholds (100 tons per year for NO<sub>x</sub> [nitrogen oxides] and 50 tons per year for VOC [volatile organic compounds]); therefore, a General Conformity Determination is not required.

## Operational Emissions

The stationary emission sources associated with each project is listed below. For the 300 Line Project, operational emissions were from:

- a new Compressor Station 303 in Venango County, Pennsylvania;
- a new Compressor Station 310 in McKean County, Pennsylvania;
- a new electric-driven compressor unit at the existing Compressor Station 313 in Potter County, Pennsylvania;
- a new natural gas-driven compressor unit at the existing Compressor Station 315 in Tioga County, Pennsylvania;
- new natural gas-driven compressor units at the existing Compressor Station 321 in Susquehanna County, Pennsylvania; and
- two new natural gas replacement compressors at the existing Compressor Station 325 in Sussex County, New Jersey.

For the NEUP Project operational emissions were from:

- a new natural gas-driven compressor unit at the existing Compressor Station 321 in Susquehanna County, Pennsylvania; and
- a new electric-driven compressor unit at Compressor Station 323 in Pike County, Pennsylvania.

The electric-driven compressor units at Compressor Stations 313 and 323 were not considered to contribute additively or cumulatively to air quality operational impacts because there are no emissions associated with the electric-driven compressor units. The only stationary emission source associated with the NSD Project was the modification at Station 230C in Niagara, New York. The stationary emission source associated with the DTI facilities was one new 10,800-horsepower compressor station in Wyoming County, New York (Silver Springs Compressor Station). There was no stationary emission sources associated with the MPP Project.

Table 13 shows the additive operational emissions from the projects. Although the overall total operational emissions is presented to understand the collective impact, the impacts took place at discrete emissions sources and do not constitute a single impact, with the only exception at Compressor Station 321 in Susquehanna County, Pennsylvania.<sup>28</sup> Even if all the above compression facilities are considered as a part of a single project, we would not simply add the emissions together as this provides no useful information. Each emission source would be considered separately and in accordance with the applicable air permitting regulatory requirements and attainment attributes for the region it is in.

---

<sup>28</sup> The cumulative impacts at Compressor Station 321 are described in Section 3.

TABLE 13

Additive Operational Emissions									
Project	Source	Emissions (tons per year)						Total HAP	GHG
		NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM <sup>a</sup>			
300 Line	Compressor Station 303	32.06	33.82	18.39	1.88	3.66	1.77	71,933	
	Compressor Station 310	31.14	32.87	17.87	1.83	3.55	1.72	71,933	
	Compressor Station 313 <sup>b</sup>	--	--	--	--	--	--	--	
	Compressor Station 315	32.96	42.82	2.23	3.59	0.31	1.83	71,074	
	Compressor Station 317 <sup>b</sup>	--	--	--	--	--	--	--	
NSD	Compressor Station 321	55.18	74.31	19.95	3.68	1.89	0.99	85,703	
	Compressor Station 325	39.01	40.31	2.27	4.68	5.32	2.16	100,264	
	Compressor Station 230C	37.30	62.43	0.81	0.15	1.62	0.17	30,317	
NEUP	DTI Silver Springs Compressor Station	35.82	61.74	27.04	1.48	0.85	1.42	64,471	
	Compressor Station 321	56.70	71.84	24.41	2.53	4.92	1.27	42,468	
	Compressor Station 323 <sup>b</sup>	--	--	--	--	--	--	--	
	<b>Total</b>	<b>320.17</b>	<b>420.14</b>	<b>112.97</b>	<b>19.82</b>	<b>22.12</b>	<b>11.33</b>	<b>538,163</b>	

<sup>a</sup> Assumes PM = particulate matter less than 10 microns in diameter (PM<sub>10</sub>) = particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>)  
<sup>b</sup> Modification at the compressor station did not result in additional criteria pollutant emissions.  
CO = carbon monoxide  
SO<sub>2</sub> = sulfur dioxide  
HAP = hazardous air pollutants  
GHG = greenhouse gas, expressed as carbon dioxide equivalents

The operational emissions presented in table 13 are associated with discrete emission sources located over a large geographic area, in different counties (some in different states), with the exception noted above for Compressor Station 321. Even if all the compression facilities are considered as a part of a single project, they do not all impact the same air quality control regions. The compressor stations are geographically separated by at least 25 miles from each other, even those located within the same AQCR, and because prevailing winds blow in one direction at a time, air quality between facilities would not be affected by two facilities at the same time. Based on modeling analyses completed for the applicable compressor stations, emissions from one facility would be at *de minimis* levels before reaching the air space of the next compressor station. In addition, TGP was required to obtain air quality permits for operation of each compressor station and/or modification for the 300 Line, NSD, and NEUP Projects from the Pennsylvania Department of Environmental Protection (PADEP), the New York State Department of Environmental Conservation, and the New Jersey Department of Environmental Protection. DTI was also required to obtain a minor source air quality permit for the Silver Springs Compressor Station from the New York State Department of Environmental Conservation. The state permitting requirements would enforce the federal and state regulations designed to protect ambient air quality (thereby protecting public health and welfare) and prevent significant cumulative impacts. For these reasons, we conclude that there would be no significant additive permanent air quality impacts from the projects.

## Noise

Specific information about the ambient noise environment, including the applicable noise ordinances for each project area is discussed in the respective EAs.

## Construction Noise

Construction noise affected the local environment during the construction period along the pipeline routes and at aboveground facilities and contractor/pipe yards. In general, the peak of construction activity can generate noise levels as high as 85 decibels (dB) on the A-weighted scale (dBA) within 50 feet of the noise source. However, because construction-related noise levels vary along the length of a pipeline right-of-way and during each phase of construction, it is not appropriate to simply add the varying noise levels to provide an additive impact of noise during the projects. As sound levels attenuate with distance, the spacing between the noise sources must be considered. On the other hand, although construction-related noise at aboveground facilities is concentrated at the site, each phase of construction would still result in varying noise levels. As a result, the time between noise production must also be taken into account. The construction activities were performed with standard heavy equipment, such as track-excavators, backhoes, bulldozers, dump trucks, cement trucks, and boring equipment; however, not all of the equipment was used in each phase of construction. Construction was planned to occur during normal daytime working hours, except for limited 24-hour work associated with the compressor station blowdown, construction dewatering, HDD, and hydrostatic testing activities. Residences within the immediate vicinity of the construction work area for the pipeline loops and aboveground facilities likely heard construction noise during the daytime, but the overall impact was temporary. Overall, area nighttime noise levels during the projects' construction were normally unaffected, as most construction was limited to daylight hours with the exceptions noted above. Furthermore, the construction work areas were separated by distance and time such that there were no additive noise impacts associated with these activities.

HDD activities potentially occurred over a 24-hour-per-day basis at wetland and major waterbody crossings along the 300 Line Project and the NEUP Project. The respective EAs presented an analysis of the HDD-related noise impacts for each crossing at the nearest noise-sensitive areas (NSA). TGP conducted two HDDs along Loop 325 for the 300 Line Project as well as one HDD along Loop 325 for the NEUP Project. However, as mentioned above, noise levels do not simply add directly for the purpose of a resulting additive effect. Furthermore, the HDD crossings were separated by distance and time such that there were no additive noise impacts associated with the HDD activities.

To minimize the impacts of construction-related noise at any of the nearest NSAs, TGP proposed noise mitigation measures during construction of the projects as noted in the respective EAs, and implemented mitigation measures required by the Commission authorizations for each project. Similarly, DTI implemented noise mitigation measures during construction of its project, including limiting construction to daytime hours. Once the construction activities were complete for each project, the construction-related noise impacts on the nearest NSAs terminated.

We conclude that the projects did not result in any additive construction noise impacts because of the transitory nature of pipeline construction, the varying noise levels during each phase of construction, TGP's and DTI's employed and required noise mitigation measures

during construction of the projects, and the separation of the noise generated by geographically and temporally distant projects.

### Operational Noise

Operational noise impacts from the projects resulted from the additional or new compression added as part of the projects. Table 14 presents the estimated noise impacts at the nearest NSAs from each new compressor station or modification. The modifications to Compressor Stations 317, 319, and 323 as part of the 300 Line Project did not change existing horsepower capacity or modify any existing significant noise sources. As a result there were no changes in sound levels at the NSAs surrounding the stations related to these modifications. The modification to Compressor Station 230C as part of the NSD Project did not include changes in compression horsepower, and the noise environment was not impacted by the modifications. The modifications to Compressor Stations 319 and 325 as part of the NEUP Project did not change existing horsepower capacity or modify any existing noise sources, and as a result, there were no changes in sound levels at the NSAs surrounding the stations as a result of the modifications. For the purposes of this supplemental review, we are providing the two closest NSAs to each new compressor station or modified compressor station (table 14); any NSAs at farther distances from the noise source would experience a lower noise impact and thus do not need to be considered here.

As mentioned previously, noise levels attenuate over distance and should not be added directly for purposes of an additive impacts analysis. Nevertheless, we provide table 14 as a means of compiling the data for the compressor station noise impacts associated with the projects. The noise impacts took place at discrete stations and are not connected as a single impact with the only exception at Compressor Station 321 in Susquehanna County, Pennsylvania. We discuss further the cumulative noise impacts at Compressor Station 321 in Section 3.

TABLE 14								
Compressor Station Noise Impacts								
	NSA	Distance from Station to NSA (feet) <sup>a</sup>	Direction	Calculated Existing L <sub>dn</sub> (dBA)	Estimated L <sub>dn</sub> Contribution of Station (dBA)	Combined Station L <sub>dn</sub> and Existing L <sub>dn</sub> (dBA)	Potential Increase Above Existing L <sub>dn</sub> (dBA)	
<b>300 Line Project</b>	<b>Compressor Station 303</b>							
		1	1,000	East	46.2	50.2	51.7	5.5
		2	1,600	West	45.6	45.3	48.5	2.9
	<b>Compressor Station 310</b>							
		1	4,720	West	38.9	42.2	43.9	5.0
		2	3,880	South	36.8	41.1	42.5	5.6
	<b>Compressor Station 313</b>							
		1	1,170	Southeast	50.7 <sup>b</sup>	48.9	52.9	2.2
		2	1,890	Northeast	47.1 <sup>b</sup>	40.4	47.9	0.8
	<b>Compressor Station 315</b>							
		1	840	Southeast	51.8	52.5	53.4 <sup>c</sup>	1.6
		2	1,010	East-Southeast	51.0	44.9	48.7 <sup>c</sup>	-2.4
	<b>Compressor Station 321</b>							
		1	960	East	52.6	46.3	49.0 <sup>d</sup>	-3.6
		2	680	Southeast	53.9	50.4	51.7 <sup>d</sup>	-2.2
<b>Compressor Station 325</b>								
	1	850	West	51.2	46.4	48.4 <sup>e</sup>	-2.8	
	2	1,100	Southeast	53.7	51.5	52.2 <sup>e</sup>	-1.5	
<b>NEUP Project</b>	<b>Compressor Station 321</b>							
		1	1,100	East	51.4	48.1	53.1	1.7
		2	890	Southeast	49.7	49.0	52.4	2.7
	<b>Compressor Station 323</b>							
	1	900	West-Northwest	48.5	48.0	51.3	2.8	
	2	900	Northwest	48.2	47.7	51.0	2.8	
<b>NSD (DTI Project)</b>		1	700	Northwest	40.1	45.4	46.5	6.4
		2	850	North	42.7	43.4	46.1	3.4

<sup>a</sup> Distance estimated based on aerial photography.  
<sup>b</sup> Measured existing L<sub>dn</sub> includes a reduction to account for horsepower to be replaced during the project.  
<sup>c</sup> The sum of the predicted compressor station noise plus the ambient (non-station) environmental level of 46.3 dBA L<sub>dn</sub>.  
<sup>d</sup> The sum of the predicted compressor station noise plus the ambient (non-station) environmental level of 45.7 dBA L<sub>dn</sub>.  
<sup>e</sup> The sum of the predicted compressor station noise plus the ambient (non-station) environmental level of 44.2 dBA L<sub>dn</sub>.

The operational noise levels presented in table 14 are associated with discrete noise sources located over a large geographic area, in different counties of Pennsylvania, Wyoming County, New York, and Sussex County, New Jersey. Noise generated from compressor station facilities is the greatest at the compressor station and can impact noise receptors to varying degrees (based on factors such as topography, vegetation, and noise mitigation equipment) to within one-half mile to a mile from the compressor station, with the noise impacts decreasing as distance from the facility increases. The compressor station associated with the 300 Line, NEUP, NSD, and DTI Projects were at least 25 miles from each other, such that there were no additive permanent noise impacts on the nearby receptors to each compressor station. In addition, TGP was required to comply with the post-construction noise surveys for each applicable compressor station modification as part of the Commission’s authorizations for the projects. The post-construction noise requirements limited noise from each modification to at or below a day-night noise level of 55 dBA at the nearest NSAs to the stations. DTI was also

required to comply with the post-construction noise survey for the Silver Springs Compressor Station, whereby the noise from all of the equipment at the station was limited to at or below a day-night noise level of 55 dBA at the nearest NSAs. For these reasons, we conclude that there are no additive permanent noise impacts from the projects.

### **Reliability and Safety**

The pipeline and aboveground facilities associated with the projects were required to be designed, constructed, operated, and maintained in accordance with the U.S. Department of Transportation Minimum Federal Safety Standards in Title 49 of the Code of Federal Regulations Part 192. These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. There are no attributes of public safety that can be simply summed up for an additive analysis. The addition of one pipeline to an adjacent pipeline, an extension of a pipeline system, or an expansion of an existing compressor station does not constitute an increase of impacts on public safety. Therefore, we conclude that there would be no additive safety impacts from the projects.

### **Climate Change**

Climate is an observation of a given area's weather over a long period of time. Climate change is the change in climate over time, whether due to natural variability or as a result of human activity, and cannot be represented by single annual events or individual anomalies. All of the projects are in the northeast region of the country. The NEUP Project EA discussed the U.S. Global Change Research Program's report on observations of environmental impacts that may be attributed to climate change in the Northeast region.

The greenhouse gas (GHG) emissions from construction and operation of the projects were included in the respective EAs and are also included in tables 11 and 13, with the exception of GHG construction emissions for the NSD Project. However, given that the scope of the NSD Project is less than the 300 Line or NEUP Project, the estimated GHG emissions from construction of the NSD Project would also proportionately be less. Currently, there is no standard methodology to determine how the projects' additive, incremental contribution to GHGs would translate into physical effects on the global environment. However, the emissions would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources, and contribute incrementally to climate change that produces the impacts described in the respective EAs. Because we cannot determine the projects' incremental physical impacts due to climate change on the environment, we cannot determine whether the projects would result in significant impacts related to climate change.

## Alternatives

Each of the EAs discussed alternatives to each of the projects. The four projects make use of looping and modifications to existing aboveground facilities everywhere it was feasible to avoid impacts associated with greenfield pipeline construction. As discussed in the respective EAs, we concluded that such looping and use of existing infrastructure to the extent practicable minimized impacts to an acceptable level. Alternatives to the new aboveground facilities were also examined, and the locations that were authorized were found to be environmentally acceptable. Considering these projects additively does not require consideration of any new alternatives to the pipeline routes.

In each EA, we considered alternatives to each separate project in accordance with the service that the project would provide. Therefore, the alternatives considered in each EA remain valid even if the projects were combined. As a result, we are not considering any new alternatives as part of this analysis.

### 3.0 Analysis of Cumulative Impacts

As demonstrated in section 2 of this supplemental analysis, we've concluded that adding the impacts of the individual TGP projects together did not result in a significant impact on any given resource area. This conclusion is based on the environmental setting of the projects and the type, extent, and duration of the impacts. However, the court has also required the Commission to address any cumulative impacts resulting from construction of the four TGP projects. In the original NEUP Project EA, we considered past, present, and foreseeable future projects or human-related activities near that project. That analysis included non-FERC-jurisdictional activities such as natural gas extraction, production, and delivery; electric generation and transmission projects; and various other transportation, commercial, and residential development projects. It also included several FERC-jurisdictional projects, including TGP's NSD and 300 Line Projects.

In this section, we examine the impacts of the NEUP Project which may be cumulative with those of the NSD Project, the MPP Project, and the 300 Line Project, along with the previously disclosed impacts of the non-TGP related activities discussed in the NEUP Project EA. We also include the DTI facilities, as they were required to be built to meet the service proposed by the NSD Project. Our goal is to determine the cumulative impacts in accordance with the court's direction that the Commission "assess cumulative impacts by analyzing the Northeast [Upgrade] Project in conjunction with the other three projects."<sup>29</sup>

Cumulative impacts are defined as the impacts on the environment that result from the incremental effects of the action when added to other past, present, or reasonably foreseeable actions.<sup>30</sup> Cumulative impacts may result from individually minor, but collectively significant,

---

<sup>29</sup> Opinion at 1320.

<sup>30</sup> 40 C.F.R. §1508.7 (2015).

actions that occur in the same location over a given period of time. Even though certain projects may not occur at the same time or, even years apart, their impacts may be of such duration that overlaying the incremental effects of each could result in a greater cumulative impact. Consistent with the CEQ guidance, to determine the scope of the cumulative impact analysis, Commission staff establishes a “region of influence” to define the area affected by the proposed action in which existing and reasonably foreseeable future actions may also result in cumulative impacts in that defined region of influence.<sup>31</sup> In other words, the Commission analyzes other actions or projects in the vicinity of the proposed project with impacts that overlap the impact of the proposed project in the same space and time. The region of influence is established on a project-by-project basis and is specific to the resource affected and the magnitude of other projects being considered.

For linear pipeline projects, impacts are generally contained within the construction right-of-way and temporary workspaces. Some resources impacted during pipeline construction are impacted very locally (i.e., impacts only extend a short distance beyond the construction rights-of-way and approved workspaces) and the cumulative impacts would be confined to areas only where projects overlap. This limits the geographic scope for consideration of cumulative impacts for such resources as soils, geology, cultural resources, vegetation, land use, and groundwater. For example, erosion control measures would generally keep disturbed soils within work areas. Consequently, most construction impacts would be temporary and localized and are not expected to contribute to regional cumulative impacts. However, construction impacts on forested areas may be cumulative based on the time required to achieve restoration of these areas, especially if a forested area shares connectivity with another forested area also impacted.

Some impacts may also migrate outside of designated work areas. Specifically, construction air emissions, noise impacts, and stream turbidity have the potential to contribute to cumulative impacts outside of immediate project areas.

The construction of the NEUP Project occurred in late 2012 and continued into 2014. Most cumulative temporary resource impacts would be limited to this general temporal scope. A few resources might also have permanent or longer-term cumulative impacts outside of that timeframe (e.g., forest clearing, air quality, etc.).

The MPP Project was constructed during the same year as the NEUP Project, so these projects share the same temporal scope. However, the MPP Project is located over 78 miles (measured in a straight line) from the NEUP Project at its closest point.

Unlike the MPP Project, the NSD Project’s construction was complete prior to TGP beginning construction on the NEUP Project. This different temporal scope prevented certain

---

<sup>31</sup> [http://energy.gov/sites/prod/files/nepapub/nepa\\_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf](http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf) Accessed 4/15/2015.  
<http://www.epa.gov/oecaerth/resources/policies/nepa/cumulative.pdf> Accessed 4/15/2015.

impacts that are commonly associated with pipeline construction from being cumulative, notwithstanding a shared geographic scope. Those are impacts such as erosion of soils and soil stability, impacts on waterbodies from pipeline crossings, disturbance of wetlands, and agricultural land disturbance. These impacts are relatively temporary, and conditions quickly revert to preconstruction conditions, typically within a few months, effectively limiting cumulative impacts for projects constructed at different times. Further, even though they are located partially within the same county, the NSD Project is located over 20 miles west of the NEUP Project at its closest point. The greatest potential for cumulative impacts from the NEUP Project in consideration with the NSD Project would be construction-related air quality impacts, which could occur because construction of the projects took place in the same calendar years.

The DTI facilities are about 80 miles away from the NEUP Project areas and a small portion of construction of the DTI facilities took place in the same calendar year as the NEUP Project.

Most of the loops associated with the 300 Line Project begin or end in close proximity to the beginning or end of loops in the NEUP Project area. In addition, the 300 Line Project and NEUP Project each had facilities that were installed at Compressor Stations 319, 321, 323, and 325. However, the construction time frames (temporal scope) of the projects are different; the NEUP Project was constructed in 2013 and the 300 Line Project was constructed in 2011.

Below we discuss each resource area and associated region of influence (both geographical and temporal) for impacts with regards to the NEUP Project in order to assess the cumulative impacts when considered with the impacts of the MPP Project, the NSD Project, the DTI facilities, and the 300 Line Project and the previously disclosed impacts of the non-TGP related activities discussed in the NEUP Project EA.

## **Geology**

Project-specific geologic impacts can be permanent where a pipeline impacts the bedrock or other subsurface structure of a project area, but such impact is generally limited to the immediate areas disturbed by the construction. Once disturbed, the geology of an area is not completely replaceable to the exact way it was prior to construction. However, lacking sensitive geologic resources such as rare formations, fossils, or unstable features (such as karst), the physical act of cutting through rock in and of itself does not represent a significant impact, even though such project-driven changes are considered permanent.

The modification of geologic resources without some unique feature present, when considered with other projects that also do not impact the same or other unique geologic features does not result in a significant cumulative impact. Although a project could be considered to cumulatively impact the same common rock formation if it were crossed at multiple locations over multiple projects, it would not rise to the level of significance for the reason discussed above. Impacts from a pipeline project on geology, in general, are typically minimal and sometimes non-existent if there are deep soils.

The NSD Project, DTI Facilities, and MPP Project, along with the 300 Line Project all impacted the geology of the area. Other non-TGP Projects could have also impacted the geology of the area. In areas where the construction of projects overlapped, cumulative impacts on geology could have occurred; however, because the NEUP Project didn't impact any significant sensitive or unique geological features, we do not consider this to be significant.

Because no unique or otherwise sensitive geologic resources were impacted by the NEUP Project, the simple disturbing of geology from the NEUP Project would not add significantly to the cumulative impacts on geology. We find that the NEUP Project did not contribute significantly to cumulative impacts on geology when considered with the other TGP Projects, DTI facilities, and the non-TGP activities discussed in section 2.10.5 of the NEUP Project EA.

## **Soils**

During construction, temporary impacts on soils could lead to poor revegetation potential and indirectly affect wildlife and aquatic resources as a result of poor vegetative cover and increased erosion and sedimentation. Impacts on soils are generally limited to the areas directly disturbed during construction. Indirect impacts may also extend up to a few hundred feet off of the right-of-way, accounting for some amount of off right-of-way erosion that causes rilling, furrows, or other surface alterations generally related to water runoff over the terrain; or compaction or topsoil mixing that affects soil productivity.

The facilities associated with the NEUP Project, the NSD Project, the MPP Project, the 300 Line Project, the DTI facilities, and the other projects in the area as discussed in section 2.10.5 of the NEUP Project EA, would have had a direct but temporary impact on near-surface soils. For the FERC jurisdictional projects, soil impacts would have generally been short term, reverting to preconstruction conditions soon after construction once vegetation covered the disturbed areas. Each of the TGP Projects and the DTI Project facilities would also have had a permanent impact on soils associated with the installation of aboveground facilities. There were permanent impacts on soils at aboveground facilities where soils were covered or removed and replaced with gravel or impervious materials.

As described in the NEUP Project EA, the soil stabilization and revegetation requirements included in TGP's ECP would have prevented or minimized any indirect impacts. TGP and DTI avoided and minimized off right-of-way erosion indirect effects through the implementation of soil erosion measures included in their respective erosion control plans. Revegetation of the right-of-way in accordance with TGP's ECP ensured that the disturbed areas were stabilized to prevent erosion. Construction and restoration activities as well as operation and maintenance activities were monitored throughout the process to ensure compliance. In Pennsylvania, the permitting of upstream facilities associated with the development of the Marcellus Shale was under the jurisdiction of the PADEP Bureau of Oil and Gas Management. The PADEP has developed BMPs for the construction and operation of upstream oil and gas production facilities. These BMPs include erosion and sediment control practices; setback requirements from springs, wetlands, and waterbodies; wetland and waterbody crossing procedures; access road construction practices; soil amendment procedures; and right-of-way restoration measures. Implementation of these measures would have also avoided or minimized

significant cumulative impacts of Marcellus Shale development activities on soil resources in the NEUP Project area.

Construction and operation of the Moxie Liberty Generation Plant would result in temporary and permanent impacts on soils within the approximately 30-acre site. However, Moxie Energy would have implemented BMPs as required by the Pennsylvania state agencies to minimize impacts on soils and to control erosion. Therefore, the incremental impacts resulting from the NEUP Project, when added with the impacts resulting from the Moxie Liberty Generation Plant, would not result in significant cumulative impacts on soils.

Soils impacts could overlap and contribute to the amount of cumulative impact if soils were disturbed again or successful revegetation was not established before another project was constructed in the same or nearby location. Because the NSD Project, the DTI facilities, and the MPP Project were 20 to 80 miles away, they were outside the range where off-right-of-way impacts on soils would converge (as noted above, we would anticipate that soil impacts would only extend a few hundred feet off of the right-of-way or be confined to aboveground facilities).

The facilities associated with the NEUP Project had a direct, but temporary, impact on near-surface soils in some of the same areas impacted by the 300 Line Project. In these locations, soils disturbed by the 300 Line Project were disturbed again for the NEUP Project, subjecting them to the possibility of mixing and soil loss due to erosion. Depending on soil conditions, these impacts may have included loss of excavated soil from water and wind erosion, soil compaction from construction equipment, poor revegetation potential, and mixing of topsoil and subsoil. There would also have been permanent modifications of soil with the construction of aboveground facilities for the NEUP Project within the same compressor stations modified as part of the 300 Line Project. Although these added cumulatively to impacts on soils at these aboveground facility locations, all of these modifications took place within the land owned by TGP, some of which had previously been disturbed, and did not impact any unique soils or result in any significant impacts.

As described above and in both the NEUP Project and 300 Line Project EAs, TGP's implementation of the measures in its Project Plans reduced the occurrences of erosion and sedimentation during and after construction through the implementation of erosion and sediment control best management practices. These measures assisted in revegetation in areas of common disturbance. The NEUP, 300 Line, and NSD Projects were also required to comply with the requirements of local county conservation districts and the PADEP/New Jersey Department of Environmental Protection for erosion control.

Other nearby projects under our jurisdiction would be required to implement similar construction and restoration practices to minimize impacts on soils. Consequently, potential cumulative impacts on soils would be temporary and minor with respect to FERC jurisdictional projects. Other nearby projects not within FERC jurisdiction would also have been required by the PADEP to use BMPs to address erosion and sediment control; impacts on wetlands, and waterbodies and soil amendment. Implementation of such measures would have also avoided or minimized cumulative impacts of these activities on soil resources in the NEUP Project area.

Because of the distance between areas of soil disturbance, the different times of soil disturbance, and the mitigation measures used to minimize impacts on soils, when considered with the NEUP Project, we do not consider the projects disclosed in section 2.10.5 of the NEUP Project EA, the NSD Project, the MPP Project, the 300 Line Project, and the DTI facilities to have a significant cumulative impact on soils that would require additional mitigation.

## **Groundwater**

Groundwater impacts from pipeline construction are generally short term and mainly related to subsurface water flow patterns and other hydrologic factors. Generally, natural gas infrastructure construction and operation do not have a long-term or significant effect on aquifers as the limits of disturbance are relatively shallow and steps are taken to minimize soil compaction and flow of water along the trench. Impacts are generally limited to the areas directly disturbed during construction and up to a few hundred feet off of the right-of-way. In areas where aboveground facilities are constructed, infiltration could be increased, reduced, or prevented; however, this is generally a very local impact perhaps occurring over a few acres. Thus, groundwater patterns in a project area generally revert to preconstruction conditions soon after construction, but may occur for up to a few months following construction until soils stabilize with vegetation.

All projects could have had a local impact on groundwater during construction and where permanent aboveground facilities were constructed and altered infiltration. Groundwater impacts could include increased turbidity, reduced water levels, and contamination. Nearby water wells could also be damaged by construction. Generally, in the projects area of construction, the limited area of altered infiltration prevents any significant impact on aquifers, as it does not significantly alter the aquifers recharge capacity.

Groundwater contamination is generally not an issue with the construction of pipeline projects, as construction and operation do not involve the use of contaminating materials, aside from fuels and fluids used to run the construction equipment. A project's SPCC Plan ensures that any fuel or related leaks or spills are quickly contained and cleaned.

Even though the TGP and DTI Projects would result in some permanent aboveground facilities being built which could result in very local permanent modifications to infiltration rates and an aquifer, distances between the impacts, and the nature of aquifers and groundwater flow in the project areas would prevent significant cumulative impacts. The aboveground facilities associated with the TGP and DTI Projects would not cover large enough areas that could result in significant cumulative impacts. Each of these projects also implemented plans to avoid contamination of groundwater (SPCC Plans).

The 300 Line Project and NEUP Project did share an overlap of disturbed areas. However, the timeframe for the 300 Line Project impacts to overlap those of the NEUP Project was at the end of the range where we would expect impacts on groundwater to still be occurring. This is because the 300 Line Project impacts on groundwater were limited mainly to the timeframe of construction and quickly diminished thereafter with very minimal, if any overlap, with impacts from the NEUP Project. Furthermore, the NEUP Project's impacts on groundwater

were avoided or minimized by the use of standard and specialized construction techniques, including those specified in TGP's Project Plans and SPCC Plan. As with the NEUP Project, construction and operation of the 300 Line Project was required to be conducted in accordance with TGP's ECP and SPCC Plan, which minimized the extent and duration of impacts on groundwater. If groundwater was impacted twice at the same location where the NEUP Project and 300 Line Project overlap, TGP would have restored the 300 Line Project areas before the NEUP Project construction began. As a result, the incremental impacts of the NEUP Project on groundwater would not result in any significant cumulative impacts. At aboveground facilities, additional permanent structures could impact groundwater by slightly altering drainage and recharge actions. This could result in a cumulative groundwater impact from both the NEUP Project and the 300 Line Project. However, impacts on groundwater within these areas would be minimized in accordance with TGP's Project Plans and SPCC Plan. TGP also committed to monitor nearby water supply wells and repair affected wells or otherwise compensate landowners for its project-related damage to wells.

In the EA, concerns were noted about contamination of groundwater from other projects occurring in and around the NEUP Project. Overall, we do not anticipate that the NEUP Project would contribute to significant cumulative impacts on groundwater, including by contamination because of the minimal amount of impact that pipeline has on groundwater, the Project Plans adopted by TGP (including its SPCC Plan) that are developed to minimize impacts on groundwater, and the NEUP Project would not preclude the use of groundwater by any other entity. Most often, for groundwater impacts to be cumulative with pipeline construction, they would have to occur within a very close proximity to the pipeline construction, as any groundwater impacts that do occur, are very local. Other agencies have also enacted regulations to specifically protect groundwater resources from potential impacts associated with development of unconventional oil and gas reserves. In response to these concerns in Pennsylvania, the PADEP has updated its regulations governing the drilling, casing, cementing, testing, monitoring and plugging of oil and gas wells, and the protection of water supplies. The recent rulemaking includes updated material specifications and performance testing and amended design, construction, operational, monitoring, plugging, water supply replacement, and gas migration reporting requirements. Oil and gas wells must also be sited at least 200 feet from a drinking water well and at least 150 feet from a spring. According to the PADEP, the additional requirements would provide an increased degree of protection for both public and private water supplies.

In conclusion, the PADEP and SRBC have recently enacted regulations to specifically protect groundwater resources from potential impacts associated with the development of the Marcellus Shale, and the DRBC is considering further regulation of Marcellus Shale drilling activities. Development of the Marcellus Shale is expected to continue in proximity to and during construction and operation of portions of the NEUP Project in Pennsylvania (the Marcellus Shale does not extend into New Jersey). However, because the NEUP Project and other FERC jurisdictional projects in the area would not have a significant adverse impact on water resources, and considering the significantly greater geographic and time scale for development of the Marcellus Shale, the NEUP Project and other FERC jurisdictional projects in the area would not contribute in any significance to cumulative impacts on water resources that may be associated with development of the Marcellus Shale.

Because groundwater impacts from pipeline are: typically very local and not occurring far from disturbed areas (the DTI facilities, MPP Project, and NSD Project are located over 20 miles away); limited in timeframe to active construction and immediate reclamation of the rights-of-way and some projects; and likely separated by subsurface features which also limit or prevent cumulative impacts, we did not find a significant cumulative impact. In addition, TGP and other FERC-jurisdictional projects would implement the Plan and Procedures and SPCC Plans to minimize groundwater impacts and the states would require BMPs or implementation of regulations for protection of groundwater for projects with which they have oversight. As a result, we would not expect the impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

## **Waterbodies**

Project-specific surface water (waterbody) impacts are generally short-term, limited to the period of construction and possibly continuing until revegetation is established on the adjacent stream bank right-of-way, which prevents erosion and subsequent turbidity. This is typically accomplished within a year of construction. A slight increase in water temperature can occur if waterbody banks are cleared of shading vegetation. Although impacts on waterbodies generally occur at the immediate crossing location, some can occur downstream (turbidity, temperature) for a limited distance. This distance generally ranges from a few hundred yards to a couple of miles, but more than likely under 10 miles. We would not expect impacts from waterbody crossings to extend more than 10 miles from a crossing location, as the main impact would be turbidity and it would more than likely have settled out by this distance.

The greatest potential impacts of pipeline construction on surface waters would result from an increase in sediment loading to surface waters either during active construction within a waterbody or due to runoff from construction near waterbodies. The level of impact of the NEUP Project on surface waters would depend on precipitation events, sediment loads, stream area/velocity, channel integrity, and bed material.

Each of the projects cleared areas adjacent to stream banks and crossed waterbodies, which would have resulted in the impacts described above. These impacts, however, would have only extended a few miles from crossing locations (or waterbodies adjacent to disturbed areas of the NEUP Project) and would not be expected to continue to occur once revegetation has occurred. Most of the projects considered would also have adopted specific erosion control measures to prevent and minimize impacts on waterbodies and all FERC-jurisdictional projects would have to comply with the Plan and Procedures.

Concerns were noted about the use of hydrostatic test water from the NEUP Project in conjunction with use of water from the Marcellus Shale. The NEUP Project EA discloses the current amounts of water withdrawals known in Pennsylvania and the regulatory background for those withdrawals. Approximately 1.9 million gallons of water per day is used for Marcellus Shale development in Pennsylvania, or about 0.02 percent of the 9.5 billion gallons of water withdrawn per day in Pennsylvania (Governor's Marcellus Shale Advisory Commission, 2011).

Withdrawal of water in the Susquehanna River Basin is regulated by the Susquehanna River Basin Commission (SRBC). For each project, SRBC reviews whether a proposed withdrawal would cause adverse impacts on other water uses, fish, wildlife, threatened and endangered species, recreation, flow regime, and other resources, and can place conditions in its approvals to protect these resources. No drilling currently takes place in the Delaware River Basin. The DTI Project, NSD Project, 300 Line Project, and MPP Project also utilized hydrostatic test water: the 300 Line Project utilized 23,577,013 gallons in 2011; the NSD Project utilized 1,241,000 gallons in 2012; the DTI facilities utilized 57,040 gallons in 2012; the MPP utilized 1,660,000 gallons in 2013; and the NEUP Project utilized 7,976,200 gallons in 2013. All of the withdrawals would be subject to the SRBC or other authority, as established, they would have occurred at a different time than that of the NEUP Project, or in a different watershed.

It is important to note that while an impact from withdrawal of hydrostatic test water can be cumulative with other withdrawals, those withdrawals need to be concurrent and in the same watershed, something that the MPP Project, the NSD Project, the 300 Line Project, and the DTI facilities did not share. The reason for the common timing is because the use is not consumptive, and doesn't have a lasting impact outside of testing timeframe. The NEUP Project resulted in a withdrawal of less than 0.09 percent of the water withdrawn per day in Pennsylvania. All of this water would not have been withdrawn at one time, nor within one watershed, or even all within Pennsylvania (some of the NEUP Project facilities were in New Jersey). TGP indicated it would comply with any stipulations within the authority of the DRBC, SRBC, PADEP, and NJDEP in the water withdrawal application approval process. Therefore, we do not find that the NEUP Project's contribution to water withdrawals would result in a significant cumulative impact.

Concerns were also raised about the chemical pollution of surface waters from other activities, such as unconventional oil and gas. Flowback water from fracking operations could also threaten water quality. Operators report that approximately 15 percent of the 5 million gallons of water used on average to fracture a Marcellus Shale well is returned to the surface. The flowback water contains pollutants of concern, particularly high levels of Total Dissolved Solids (TDS); however, some of the municipal waste treatment plants that well drillers previously used to treat and dispose of the flowback water were unable to adequately remove TDS to meet state drinking water standards. At the request of former Governor Corbett, the Pennsylvania well drilling industry agreed to cease taking flowback water to waste treatment plants lacking the appropriate technology to remove TDS. PADEP's recently promulgated Chapter 95 regulations address the remaining treatment facilities and completely eliminate any potential cumulative impact from natural gas development wastewater discharges (Governor's Marcellus Shale Advisory Commission, 2011) and well drillers are implementing other measures, such as recycling, to reduce the volume of flowback water for treatment and disposal. Furthermore, as previously noted, the PADEP requires operators to implement BMPs during construction and operation of upstream facilities, including wells and gathering systems, to avoid or reduce potential impacts on sensitive resources including water resources.

Although other activities occurred during the construction of the NEUP Project, the impact from pollution resulting from the NEUP Project was limited to the possibility of spills. Natural gas itself, and most materials used during the construction of the project would not result

in pollution of surface waters. All FERC-jurisdictional pipelines, including the NEUP Project would be required to comply with their SPCC Plan and Project Plans which would prevent, reduce, or minimize the impact from any spill. We would anticipate that other projects, permitted by state and federal agencies, would also undergo review to ensure that pollution of surface waters would be minimized and not result in degradation that impacts use. We would not anticipate that the NEUP Project would contribute significantly to the degradation of surface waters.

Because there was over 20 miles of distance from the NEUP Project to the waterbody crossings/downstream impacts created by the DTI facilities, the NSD Project, and the MPP Project, we would expect the turbidity to settle out of any possible connected watersheds, prior to the impacts converging. TGP's Project plans would also minimize impacts on waterbodies, further reducing the possibility of turbidity and therefore cumulative impacts.

The NEUP and the 300 Line Projects could have impacted some of the same waterbodies; however we would expect the impact on surface waters to be minimized because of the difference in timeframe over which the impact occurred. This is because the 300 Line Project impacts occurred mainly within a year of construction with very minimal, if any, overlap with impacts from the NEUP Project. Neither NEUP nor the 300 Line crossed the same waterbodies at the same locations, further preventing cumulative impacts. Furthermore, the NEUP Project's impacts on surface waters were avoided or minimized by the use of standard and specialized construction techniques, including those specified in TGP's Project Plans and SPCC Plan. As with the NEUP Project, construction and operation of the 300 Line Project was required to be conducted in accordance with TGP's ECP and SPCC Plan.

In conclusion, the PADEP and SRBC have enacted regulations to specifically protect surface and groundwater resources from potential impacts associated with the development of the Marcellus Shale, and the DRBC is considering further regulation of Marcellus Shale drilling activities. Development of the Marcellus Shale is expected to continue in proximity to and during construction and operation of portions of the NEUP Project in Pennsylvania (the Marcellus Shale does not extend into New Jersey). Because the NEUP Project and other FERC jurisdictional projects in the area would not have a significant adverse impact on water resources, and considering the significantly greater geographic and time scale for development of the Marcellus Shale, the NEUP Project would not contribute in any significance to cumulative impacts on water resources that may be associated with development of the Marcellus Shale.

Further, construction and operation of the proposed Moxie Liberty Generation Plant would also be subject to review and approval by applicable local, state, and federal agencies. We anticipate that these approvals would include BMPs to avoid, minimize, or mitigate for impacts on water resources and; thus, the NEUP Project would not contribute significantly to cumulative impacts on water resources.

Therefore, because some of the projects would be located at distance from the NEUP Project where we would not expect impacts to converge (e.g., the NSD Project, the DTI Facilities, and the MPP Project); some impacts caused by other projects would subside prior to the impact occurring from the NEUP Project, the FERC jurisdictional projects would comply

with the Plan and Procedures, the states/counties also have requirements and BMPs to minimize impacts on water resources; TGP avoided or minimized impacts by the use of standard and specialized construction techniques, including those specified in TGP's Plans and SPCC Plan; and water withdrawals conducted by TGP were in accordance with applicable state and federal regulations and not consumptive, we would not expect the impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

## **Fisheries**

Impacts on fisheries (surface water) are generally short-term, limited to the period of construction and possibly continuing until revegetation, which prevents erosion and subsequent turbidity, is established on the adjacent stream bank right-of-way. This is typically accomplished within a year of construction. The impact on a fishery would occur at the crossing location and possibly downstream (turbidity, temperature), for a limited distance; generally not more than a few hundred yards to a couple of miles at the most, but generally not more than 10 miles.

The most common impacts related to fisheries include direct mortality at stream crossing locations from construction equipment, increased turbidity and sedimentation which can reduce overall fitness and cover fish eggs, interruption of spawning, and disturbance of prey species, which typically subside soon after construction is complete. A slight temperature increase can also occur if waterbody banks are cleared of shading vegetation.

Impacts from the FERC jurisdictional projects on fisheries, would have only extended a few miles from crossing locations or waterbodies adjacent to disturbed areas. This distance would allow for turbidity to settle out of any possible connected watersheds which could help to prevent the impacts from converging. Such is the case with the NEUP Project and the MPP Project, the NSD Project, and the DTI facilities. They are located at a distance where we would not expect the impacts to converge. TGP's Project plans would also minimize impacts on waterbodies, further reducing the possibility of cumulative impacts on fisheries. Other non-FERC jurisdictional projects in the area could also have direct impacts on fisheries through water withdrawal, contamination, direct mortality, sedimentation, etc. We would expect that these projects would have to comply with state regulations to minimize erosion and permitting requirements for direct work within waterbodies that would also minimize impacts on fisheries.

The 300 Line Project and NEUP Project did share an overlap in the geographic range for possible impacts on fisheries. However, the timeframe for those impacts to overlap was at the end of the range where we would expect those impacts to converge. This is because the 300 Line Project impacts on fisheries occurred mainly within a year of construction, with very minimal, if any overlap, with impacts from the NEUP Project. In addition, the majority of impacts which could have been caused by the NEUP Project would not have converged or occurred because the NEUP Project stream crossings did not take place in the same locations (and typically not even the same streams), nor within the same timeframes, as the 300 Line Project.

As mentioned above in section 2.0, tree clearing could result in cumulative impacts on temperature within a watershed, but only a relatively minor amount of tree clearing would occur at each stream crossing and most of the vegetation would be allowed to return to pre-construction conditions at the crossing locations. Some streams were not vegetated with forested lands at the crossing, preventing this impact.

Other projects discussed in section 2.10.5 of the NEUP Project EA that impact the same waterbodies within the area as the NEUP Project and during the same timeframes could result in cumulative impacts on fisheries. Overall, the most concentrated impact on fisheries would occur during the immediate time of crossing of the NEUP Project when the impacts would be greatest and generally dissipate rapidly after. Furthermore, the impacts on surface waters, and therefore fisheries, from the NEUP Project, the NSD Project, the DTI facilities, the MPP Project, and the 300 Line Project, were avoided or minimized by the use of standard and specialized construction techniques, including those specified in TGP's Project Plans and SPCC Plan. In accordance with TGP's Project Plans (or as further restricted by the state), timing windows for stream crossings were conducted during timeframes that overall minimize impacts to fisheries based on life cycles. Most impacts on fisheries from the NEUP Project were limited due to the timeframe of construction. These requirements, would limit the cumulative impacts possible from the NEUP Project in conjunction with other projects. We would also expect other projects would implement BMPs to minimize the possibility of impacts on fisheries resulting from soil erosion.

Therefore, because some of the other activities occurring in the area, both FERC jurisdictional (such as the MPP Project, the DTI Facilities, and the NSD Project) and non-jurisdictional would occur outside of the area or timeframe where we would expect impacts to converge; TGP or other FERC jurisdictional companies would be required to comply with the Plan and Procedures (Project Plans), SPCC Plans, and timing restrictions for stream crossings; other agencies would also require measures to limit direct and indirect impacts on fisheries where those activities cross or are in proximity to waterbodies; and most temporarily disturbed areas would quickly revegetate minimizing further impacts, we would not expect the impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP EA and do not recommend additional mitigation.

## **Wetlands**

Pipeline impact on wetlands is typically a short-term impact for emergent and scrub-shrub wetlands in terms of wetland function. In areas where forested wetlands are cleared, the impact is a long-term to permanent impact as the forested component takes years or decades to recover or may be prevented from returning to forested wetland altogether during operation. In these areas, wetland vegetation changes but the area continues to function as a wetland. Wetland filling, such as when aboveground infrastructure is built, is considered a permanent impact. Project-specific wetland impacts are typically limited to the areas disturbed by a project as the wetland outside the construction areas are not impacted. However, there is the possibility that an impact could extend up to a few hundred feet if turbidity is created in a saturated wetland with water flow.

Wetland impacts did not occur with the DTI Facilities. The 300 Line impacted approximately 108.2 acres of wetland during construction and 22.9 acres during operation (only 0.08 acre of the 300 Line Project was proposed to be filled, the only permanent fill impact disclosed in all of TGP's Project EAs); the NSD Project impacted 4.87 acres during construction and 0.67 acre during operation; the NEUP Project impacted 49.1 acres during construction and 5.5 acres during operation; and the MPP Project impacted 0.44 acre during construction and 0.04 acre during operation (see table 8 for breakdown of impacts by type).

The NSD Project, the DTI Project, and the MPP Project were located over 20 miles from the NEUP Project and/or were constructed during different timeframes. This would effectively limit cumulative impacts from the NEUP Project because the distance would place a lot of the wetlands impacted by the NEUP Project in differing watersheds and/or differing timeframes of construction would have allowed revegetation to occur prior to the subsequent disturbance of wetlands from the NEUP Project. Even though the wetland may not have returned to a pre-construction state, the operational impacts still allow the wetland to return to a functional wetland, although of a different form. The hydrology would have been restored relatively soon after construction through the wetland, which would have also minimized or prevented cumulative impacts. The greatest impact would result from the conversion of forested wetland to non-forested wetland, although as noted above, it would not be permanently converted to upland. Forested wetlands would still be allowed to function as wetlands, but the overall value could be reduced.

The NEUP Project affected wetlands within the same watershed as the 300 Line Project. Construction within wetlands occurred in adherence to TGP's Project Plans, which helped to minimize impacts on wetlands and stimulate restoration. Overall, permanent wetland loss due to fill from the 300 Line was limited to far western Pennsylvania. Because of the geographic separation (impacts in different watershed), and the fact that the NEUP Project EA identified no permanent wetland loss, we do not consider the incremental wetland impact from the NEUP Project to be cumulative with that of this permanent fill..

Wetland permitting authority is delegated to the USACE and the New Jersey Department of Environmental Protection. These agencies also oversee impacts on wetlands to ensure that they are appropriately mitigated and no net loss occurs. Any projects that impact wetlands (including those discussed in section 2.10.5 of the NEUP Project EA) fall under the jurisdiction of these agencies, which also have oversight to ensure that impacts are properly mitigated. As part of the NEUP Project, TGP has proposed wetland enhancement and preservation at two sites in Pennsylvania and one site in New Jersey to mitigate for wetland impacts. Although construction and operation of the NEUP Project, along with the other projects discussed in section 2.10.5 of the NEUP Project EA, could result in the conversion or reduction in the amount of existing wetlands in the vicinity, the creation of new wetlands and restoration or enhancement of existing wetlands as required by the USACE, the States of Pennsylvania, New Jersey, and New York are expected to appropriately mitigate for impacts on wetland resources.

As disclosed in section 2.0, there are approximately 2,625,955 acres of palustrine wetland in New Jersey, Pennsylvania, and New York. In this context, the permanent operational wetland impacts contributed by the NEUP Project (less than 0.0002 percent), would be insignificant

especially in light of the required federal wetland mitigation and continuing function (although perhaps reduced in value) of the wetlands impacted.

Although there was a conversion of forested wetland to scrub-shrub or emergent wetland within watersheds impacted by the TGP Projects and DTI Facilities and other projects in the area could also have had a varying range of wetland impacts, the NEUP Project EA did not indicate any permanent fill of wetlands.

The NEUP Project's impacts were temporary on wetlands in general, and longer term impacts were limited to change in wetland type because wetland impacts from pipelines are: typically very local and do not occur far from disturbed areas (the DTI facilities, MPP Project, and NSD Project are located over 20 miles away); limited in timeframe to active construction and immediate reclamation of the rights-of-way and some projects; and likely separated by surface and subsurface features which limit or prevent cumulative impacts. In addition, TGP and other FERC-jurisdictional projects would implement the Plan and Procedures and SPCC Plans to minimize wetland impacts. For other non-TGP projects or projects outside of FERC's jurisdiction, states would require BMPs or implementation of regulations for protection of wetlands for projects with which they have oversight, and the USACE or NJDEP requires mitigation for wetland impacts. As a result, we do not find impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

## **Vegetation**

Vegetation impacts can vary from short-term, long-term, or permanent, depending on the vegetation type cleared to construct the project and the maintenance of the vegetation during operations. The project-specific impact on vegetation is limited to the areas disturbed or cleared by construction, although edge effects created by clearing can extend inward to intact forests a few hundred feet, which could also include a dust shadow (i.e., dust settling onto adjacent vegetation) if soils are not moist. Fragmentation impacts would be greatest on intact forests, for instance, where a project creates a new right-of-way that has not already been fragmented. The greatest propensity for a cumulative impact would be with respect to forested vegetation, as this impact can take decades to recover to preconstruction conditions. Therefore, we will focus on forested impacts.

As above in table 9, construction of the NEUP Project would impact about 702.5 acres of vegetation, of which about 112 acres would be retained for permanent operation (i.e., subject to periodic vegetation maintenance/mowing). The NEUP Project would result in the long-term impact of 267.2 acres of forest, of which 78 acres would not revert to forested during the life of the project. Construction of the 300 Line Project would impact about 2,375.6 acres of vegetation, of which about 406 acres would be retained for permanent operation. The 300 Line Project would result in the long-term impact of 996.2 acres of forest, of which 187.2 acres would not revert to forested during the life of the project. Construction of the NSD Project would impact about 111 acres of vegetation, of which about 50.8 acres would be retained for permanent operation. The NSD Project would result in the long-term impact of 53.7 acres of forest, of

which 19.8 acres would not revert to forested during the life of the project. Construction of the MPP Project would impact about 236 acres of vegetation, of which about 49.5 acres would be retained for permanent operation. The MPP Project would result in the long-term impact of 43.24 acres of forest, of which 12.84 acres would not revert to forested during the life of the project. Construction of the DTI facilities would impact about 38.7 acres of vegetation, of which about 15.85 acres would be retained for permanent operation. The DTI facilities would result in the long-term impact of 0.02 acres of forest, but all would be allowed to revert to forested areas during the life of the project.

When projects are constructed in the same general location and time frame, they could have a cumulative impact on local vegetation. As noted in the NEUP Project EA, development of the Marcellus Shale may occur over 20 to 40 years and would include clearing for access roads, well pads, gathering systems, and other facilities. Marcellus shale development did not occur in New York, New Jersey, or the Delaware River Basin of Pennsylvania, thereby preventing any impact on vegetation in those areas

As previously disclosed in the NEUP Project EA, the NEUP Project Loops 317 and 319 and proposed modifications at existing Compressor Stations 319 and 321 are located in areas of active Marcellus Shale development. These NEUP Project elements would temporarily impact about 97.8 acres of vegetated land but would not result in any permanent loss of vegetation, although approximately 7.6 acres of forest would be converted to scrub-shrub or herbaceous vegetative cover. In comparison, 38,000 to 90,000 acres of forest could be cleared in Pennsylvania by 2030 due to Marcellus Shale development activities (Governor's Marcellus Shale Advisory Commission, 2011), or approximately 0.2 to 0.5 percent of the approximately 16,700,000 acres of forest in Pennsylvania.

Fragmentation occurs where large areas of contiguous forests are divided into smaller pieces by an activity. The area where the NEUP Project Loop 323 leaves the original 300 Line easement is one area where fragmentation occurred. Edge effects are the impacts that radiate from the edge of clearing in forested areas into the forest. Besides fragmentation and edge-effects, the direct impacts on vegetation would be limited to the construction footprint. Forest impacts would extend a bit further in terms of possible cumulative impacts, but we anticipate most of the forested community impacts would tend to dissipate within 0.5 mile from the right-of-way, unless the forest is interrupted by other development, right-of-way, etc, which would prevent the impact from migrating the entire 0.5 miles.

While the DTI facilities, MPP Project, NSD Project would have had long-term to permanent impacts on forested areas, as defined above, we would not expect the impacts on vegetation to extend far off the right-of-way, especially because these projects took place in mixed vegetation types (e.g., farmlands, forests, and fields) and next to existing rights-of-ways. This minimized any fragmentation impacts because the areas were already fragmented or are a vegetation type where fragmentation would not occur (e.g., open spaces, farmlands, and forests). They are also located a distance from the NEUP Project, separated by non-forested areas, (i.e., they are not part of one contiguous forest ecosystem)

As discussed previously, impact on forested lands represents the greatest overall impact

on vegetation because of the extended period required for regeneration. The regions in which the projects were constructed provide favorable conditions for revegetation. That is, there is adequate precipitation and an ample growing season. Consequently, the regrowth of disturbed herbaceous vegetation is rapid and the regrowth of forested and woody vegetation begins rapidly; especially with the restoration measures that were part of each of the Project Plans.

In certain places, the 300 Line and NEUP Projects did share an overlap in construction work areas and adjacent areas of tree clearing, resulting in cumulative impacts. The existing environment of the projects is a patchwork of different vegetation cover types that developed over 200 to 300 years of anthropogenic utilization. This patchwork contains noncontiguous tracts of forest interspersed with agricultural, residential, and commercial development. In addition, TGP's modifications at the four existing compressor stations for the NEUP Project did not require forest clearing, as the 300 Line Project or a previous project (e.g., construction of the 300 Line system or previous project dating as far back as the 1950's) had previously cleared and developed some of these same sites. The impact on vegetation from the NEUP Project at the existing compressor stations was limited to graveled, maintained lawns, or agricultural areas, which we do not consider a significant impact. Even though these areas had been previously disturbed, the impacts together (when considered that they are within the existing fencelines of previously existing industrial facilities) are not cumulatively significant.

Construction of the projects required the clearing of a narrow corridor of vegetation that was, in most cases, next to the original 300 Line project clearing of the late 1950's and contiguous with TGP's existing cleared corridor for the 300 Line Project. In most areas, with the exception of shrub or forested communities, impacts from the 300 Line Project would have been expected to return to preconstruction conditions prior to the construction of the NEUP Project. The impact from clearing intact forests (i.e., fragmentation) would only occur where the NEUP Project right-of-way did not follow the original 300 Line right-of-way. These areas are separate from the 300 Line Project right-of-way which means this fragmentation was not cumulative with the 300 Line Project (the 300 Line followed existing rights-of-way where it abuts/workspaces overlap with the NEUP Project preventing fragmentation from occurring at all). In all other areas, the edge effects that have become part of the baseline conditions from the construction of the original 300 Line would just occur further into the forest than previously felt (in most cases, under 300 feet). In areas where the 300 Line Project and NEUP Project abut in forested areas, this edge effect could be considered to be a cumulative impact, however, as the areas where this occurs abuts the original 300 Line, it would still just be a shift of currently existing edge effects and would not be considered significant.

The 300 Line and NEUP Projects do not abut each other continuously, nor do they totally occur in forested lands, and the differing timeframes of construction allowed for revegetation to occur between construction of each project in more herbaceous vegetation types. As described above, they do not occur in a contiguous forest system, but instead, mainly in a previously fragmented corridor, which prevented further fragmentation compared to a totally greenfield, right-of-way. In areas where workspaces for the NEUP Project and 300 Line Project overlapped, there could have been a cumulative impact on vegetation. However, because the vegetation for construction of the 300 Line Project was cleared approximately 2 years prior to construction of the NEUP Project and the areas impacted by the 300 Line Project were appropriately revegetated

with early successional or herbaceous species, we do not find this cumulative impact to be significant. If the areas that were previously cleared for 300 Line Project were forested, there would not be a cumulative impact on forested vegetation (trees) since the condition prior to the start of the NEUP Project would not have yet reverted to forested vegetation. We do acknowledge the permanent cumulative impact on forested areas resulting from NEUP Project in consideration with the 300 Line Project for areas that were cleared adjacent to what was cleared for the 300 Line Project.

In the context of the forested areas that exist in the states of New Jersey, Pennsylvania, and New York, (37.7 million acres), the NEUP Project impact amounts to less than 0.007 percent of the total forest available in these states. Based on the 37.7 million acres of forest over the three states, the cumulative impact from the DTI facilities, 300 Line Project, NSD Project, MPP Project, and the NEUP Project on forested areas cleared for construction amounts to 0.003 percent of the total forest available and a cumulative permanent conversion of 0.0007 percent of the total forest available. Exact amounts of forest clearing are unknown for the non-FERC projects that were within the areas where we considered NEUP Project cumulative impacts on vegetation to occur (section 2.10.5 of the NEUP Project EA); however the addition of the clearing of the NEUP Project, with the possible clearing of forested areas from other projects and non-TGP Projects discussed in the EA, is very minor in context of existing resources.

Due to their smaller scale and short time frames for construction when compared to the development of the Marcellus Shale, the NEUP Project, other nearby FERC jurisdictional projects, and the Moxie Liberty Generation Plant would not contribute significantly to cumulative impacts on vegetation and wildlife resources in the region.

The development of the NEUP Project and other projects in the area could result in habitat fragmentation, although the cumulative impact of the NEUP Project on fragmentation is considered to be minor for a number of reasons. The proposed pipeline segments would be installed as loops within and adjacent to TGP's existing maintained right-of-way for the majority of their length and the proposed compressor station modifications would occur within or adjacent to the fence lines of existing facilities. In addition, TGP would utilize existing roads to construct and operate the proposed facilities and no other linear elements (e.g., electric transmission lines), would be constructed. Therefore, the NEUP Project would utilize previously disturbed rights-of-way as much as possible, thereby minimizing the areas of previously undisturbed vegetation that would be affected, and reducing additional cumulative impacts on vegetation communities and wildlife habitats. The potential for habitat fragmentation resulting from the NEUP Project would be further reduced because the majority of the disturbed areas would be allowed to return to pre-existing conditions. The geographic extent and duration of disturbances caused by construction of the NEUP Project would be minimal and further minimized by the implementation of TGP's ECP and site-specific crossing plans prepared in consultation with the FERC and other agencies.

This is based on the amount of available forested resources within the states impacted; TGP's implementation of measures for restoration of the pipeline rights-of-way and temporary construction work areas to minimize impacts on vegetation following construction activities; and the minimal timeframe for the right-of-way to become revegetated with herbaceous vegetation (generally within a single growing season). TGP was also required to revegetate

areas of the 300 Line Project and NEUP Project with trees in temporary work areas, effectively speeding up the restoration timeframe and further minimizing long-term impacts.

We acknowledge that all the activities around the NEUP Project might also have cumulative impacts on forested areas in the NEUP Project area, however, the exact amount of permanent conversion of forest is not known. Several factors would have prevented impacts from converging: the project types, timing, and location; the fast revegetation potential of the areas disturbed; and the minimal timeframe for the right-of-way to become revegetated with herbaceous vegetation (generally within a single growing season). In addition, NJDEP's no-net loss (of forest) requirements, the required BMPs, TGP's measures and other regulatory measures implemented to promote revegetation of disturbed areas, and the amount of available forested resources within the states impacted would have lessened any cumulative impact. As a result, we did not find impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

### **Wildlife and Listed Species**

Wildlife impacts are generally short-term, as the right-of-way returns to available habitat following construction and revegetation. However, if the vegetation type to grow back on the right-of-way is no longer suitable for a species or prevented from growing vegetation entirely, the result is destruction of habitat and an impact that would be considered permanent. Impacts on wildlife typically extend a distance perpendicular from the disturbed areas, as wildlife would avoid construction activities and the human presence in the construction areas. The distance of impact depends on each individual species' tolerance of disturbance and habitat needs. Because the impacts of construction noise and human activity are very local, but the increased pressures of wildlife moving into land not previously occupied could occur at a distance from the right-of-way, we expect most impacts on wildlife in the area to be limited to within 5 miles of the right-of-way (for larger mammal and mobile wildlife), and substantially less (areas of the right-of-way or immediately adjacent areas) with less mobile wildlife.

Right-of-way clearing and grading and other construction activities associated with the NEUP Project would result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress, predation, and the establishment of invasive plant species.

When activities are conducted in the same general location and time frame, they could have a cumulative impact on wildlife communities. As discussed in vegetation, the greatest impact on wildlife habitat would occur when forested areas are impacted, especially when those forested areas are part of the range of a species. Impacts on the amount of forested habitat impacted both long term and permanently are addressed above. In herbaceous areas, the impact would be much shorter.

Because of permanent impacts on wildlife that could occur where habitat changes, there could be a cumulative impact between the projects based on the overlap in timeframe of

permanent impacts on forested areas. Species that depend on herbaceous vegetation might be able to return to portions of the right-of-way relatively quickly after construction, preventing a cumulative impact of habitat being unavailable

Due to their smaller scale and short time frames for construction when compared to the development of the Marcellus Shale, the NEUP Project, other nearby FERC jurisdictional projects, and the Moxie Liberty Generation Plant would not contribute significantly to cumulative impacts on wildlife resources in the region.

Right-of-way clearing and grading and other construction activities associated with the NEUP and 300 Line Projects would have had cumulative impacts on wildlife. Most of these impacts are focused during the timeframe of construction; however, permanent impacts on forested lands where the two projects coincide would have a permanent impact on wildlife. In such areas, wildlife was subjected to an initial disturbance and then disturbed again in subsequent years. With the exception of where the NEUP Project is not aligned directly adjacent to the existing 300 Line, fragmentation would not have occurred; however the edge effects of a previously fragmented (approximately 50 years prior) area would extend further into the surrounding forested areas. The potential for habitat fragmentation resulting from the NEUP Project was further reduced because the majority of the NEUP Project was aligned next to a pipeline constructed in 1950 that limited further fragmentation and the majority of the disturbed NEUP Project areas were allowed to return to pre-existing conditions, as was the case with the 300 Line Project.

The development of the NEUP Project and other projects in the area could result in habitat fragmentation, although the cumulative impact of the NEUP Project on fragmentation is considered to be minor for a number of reasons. The proposed pipeline segments would be installed as loops within and adjacent to TGP's existing maintained right-of-way for the majority of their length and the proposed compressor station modifications would occur within or adjacent to the fence lines of existing facilities. In addition, TGP would utilize existing roads to construct and operate the proposed facilities and no other linear elements (e.g., electric transmission lines), would be constructed. Therefore, the NEUP Project would utilize previously disturbed rights-of-way as much as possible, thereby minimizing the areas of previously undisturbed vegetation that would be affected, and reducing additional cumulative impacts on vegetation communities and wildlife habitats. The potential for habitat fragmentation resulting from the NEUP Project would be further reduced because the majority of the disturbed areas would be allowed to return to pre-existing conditions. The geographic extent and duration of disturbances caused by construction of the NEUP Project would be minimal and further minimized by the implementation of TGP's ECP and site-specific crossing plans prepared in consultation with the FERC and other agencies.

We acknowledge that other projects might also have cumulative impacts on wildlife in the NEUP Project area, however, the exact amount of permanent conversion of forest is not known.

Certain sensitive species are managed by either federal or state agencies (or both) to ensure that actions do not result in actions that could threaten the existence of a species. The applicable agencies consider the impacts of a project and all cumulative actions in their

determinations and mitigation requirements, of which TGP was required to comply. In the case of federally listed species (covered under the Endangered Species Act), cumulative impacts are considered in the agency consultation and effect determinations, and development of appropriate mitigation. A project can only be authorized to be constructed if it complies with Section 7 of the Endangered Species Act, meaning that any cumulative impacts would not rise to a threshold to threaten the continued existence of any federally listed species. Consultation with the FWS resulted in a determination that all of the TGP Projects and DTI facilities would have *no effect* or were *not likely to adversely affect* federally listed species. We would expect all other activities would also have to comply with the endangered species act, thereby also preventing or appropriately minimizing or mitigating for impacts. Based on the consultation requirements and required mitigations, cumulative impacts on listed species were minimal.

Although the NEUP Project, the 300 Line Projects, and the other non-TGP related activities could have cumulatively impacted wildlife in areas where they were constructed in close proximity (such as where the projects' ends meet or species that were impacted have ranges impacted by multiple project); however, we do not find that the impact from the NEUP Project to be cumulatively significant. This is because overall the NEUP Project, the MPP Project, NSD Project, and 300 Line Project impacted less than 0.003 percent of the total forest available in the three affected states during construction. However, the permanent conversion of forested to non-forest areas only amounted to 0.0007 percent of the total forest available, meaning additional habitat was available, and that the impact was not cumulatively significant. In addition, the NEUP Project and the 300 Line Project generally followed an existing corridor that is maintained as a right-of-way (i.e., has been free of forested vegetation for approximately 50 years); and wildlife that inhabits the areas disturbed by both by the NEUP Project would already be acclimated to noise impacts from compressor stations (all compressor stations were pre-existing where they were impacted by both the NEUP and 300 Line Projects) or existing maintained rights-of-way that did not necessarily represent a shift in habitat type. Impacts on wildlife resulting from construction were spread out over a large geographic area and temporally separated by more than a year in places where the NEUP Project and 300 Line Project are in close proximity.

Based on the project types, required BMPs, and other measures that might be implemented to promote revegetation and the expectation that the majority of these areas would revegetate, and the discussion above, we would not expect the impacts on wildlife from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

### **Socioeconomic Impact**

Socioeconomic impacts are generally limited to the timeframe of construction, as the impact from increased construction personnel and traffic in the project area and use of services diminishes once construction is complete. Longer-term impacts may result from increased payments of taxes on the pipeline facilities. Socioeconomic impacts can occur at a greater distance from the project, as workers stay in areas with available housing and utilize services in these locations. This impact distance can vary greatly, but we consider the county level as the

confines of most project impacts, as we would anticipate that most workers would stay and utilize resources within the counties impacted by the NEUP Project. Similarly, tax payments would also be limited to the counties that the facilities are constructed within.

All TGP and non-TGP projects would have had socioeconomic impacts in the counties where they were constructed. These impacts would vary widely based on the amount of construction and operation workers required, the demand on local roads, and other infrastructure. The socioeconomic impacts would also vary based on time of construction of each project. If a project was constructed, and then finished before another project construction began, there would be little to no cumulative impact, as the socioeconomic conditions would have been allowed to revert back to the baseline. Tax payments, would represent one area that projects could result in a cumulative impact over longer time periods.

Most of the socioeconomic impacts from the NEUP Project, such as increased road use (traffic), increased demand on services, and increased populations would have occurred after and/or in different counties than the impacts from the 300 Line, the NSD Project, the DTI Facilities, and the MPP Project limiting the cumulative impacts from the NEUP Project. This is because the greatest propensity for socioeconomic impacts was limited directly to the periods of construction, and because most of the longer-term socioeconomic benefits were positive (e.g., additions to local tax base).

Other projects in the area of the NEUP Project could also have had an impact on socioeconomics. Construction and operation of the NEUP Project would have no significant impact on the socioeconomic character of the region in which it lies. The gradual social and economic changes due to widespread interest in drilling for Marcellus Shale gas reserves have been and would continue to benefit communities and landowners in this region, as demand for products and services increases and municipal agencies, business-owners, and landowners experience financial benefit. According to the Pennsylvania Department of Labor and Industry, from the end of 2009 to the beginning of 2011, there were 72,000 new hires in the Marcellus Shale core and ancillary industries, of which 71 percent were Pennsylvanians. By 2020, the Marcellus Shale industry could create more than \$18 billion in value added revenue; generate more than \$1.8 billion in state and local tax revenues; and support more than 211,000 jobs (Considine et al., 2010). Negative impacts relating to this activity could include increased demand for housing beyond what rural areas are able to support; traffic congestion; damage to roads and local infrastructure; and increased demand on services such as police and medical personnel.

Construction of the NEUP Project and other projects we considered in the area is expected to augment these effects for a brief period of time and at a negligible cumulative scale.

The socioeconomic impacts from the NEUP Project were very short term, lasting only a few months and spread over a distance from northcentral Pennsylvania to northeastern New Jersey. This distance and short timeframe limited the extent and duration of the socioeconomic impacts of the NEUP Project, reverting back to preconstruction conditions soon after the project was placed in service, preventing it from contributing significantly to cumulative impacts.

Therefore, based on the discussion above, the timing and duration of the impacts from the NEUP Project when considered with the other projects discussed in section 2.10.5 of the NEUP Project EA, and the lack of permanent cumulative impacts that would be considered to be significant, we would not expect the socioeconomic impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

## **Land Use, Visual, and Recreation/Special Use Areas**

### *Land Use*

Land use impacts can be long term to permanent where land use is converted from one land use type to another or precludes a use, but are shorter term where land use reverts to preconstruction conditions following construction. Impacts on land use are generally confined to the workspaces and immediate surrounding areas within a few hundred feet of the right-of-way or up to the property boundary.

Other projects constructed in the NEUP Project area could affect land use, result in temporary and long term visual impacts, and possibly impact recreational activities and special interest areas. For similar reasons discussed below, other nearby FERC jurisdictional projects and the Moxie Liberty Generation Plant near Towanda, Pennsylvania, would not be expected to significantly impact these resources. The impact of Marcellus Shale development activities on land use, recreation, special interest areas, and visual resources would vary widely depending on the location of specific facilities and access roads, but would be minimized to the extent possible through the PADEP review and permitting process. One aspect of the horizontal drilling technique used in the Marcellus Shale is that numerous wells can be drilled from a single well pad, thereby reducing the land use requirements for access roads, gathering pipelines, and individual well pads.

Uses within the right-of-way could have some restrictions that were not previously in place prior to the project (e.g., building structures over the pipeline, operating heavy equipment over the line without proper protection, or planting trees). However, land use immediately outside of the permanent easements could generally continue to be used as the landowner wishes. The work at the compressor stations took place within land owned by TGP. Although TGP modified some of the cover types, these areas are considered industrial/commercial properties, and the development of facilities within the existing TGP property lines is considered consistent with the current land use. The land use along a linear corridor varies greatly over distance and therefore, cumulative impacts on land use, as discussed above, are a very local impact.

In most areas, the NEUP Project added a new right-of-way next to an existing TGP right-of-way, as did the 300 Line Project, the MPP Project, and the NSD Project (the DTI facilities utilized an existing right-of-way) limiting cumulative impacts. In areas where projects abut the NEUP Project, there could be further cumulative land use impacts to properties where an additional easement is added next to the existing 300 Line Project easement; however, this would only apply to the 300 Line Project and perhaps other non-TGP Projects. However, we expect the

cumulative impact on land use to be minimal as most uses of the land could continue following construction. In addition, the TGP Projects were designed to minimize impacts on existing and future land uses by being collocated with an existing TGP right-of-way or aboveground facilities to the extent possible. The new permanent right-of-way for the NEUP Project resulted in the permanent alteration of about 78 acres of upland forest land to scrub-shrub or herbaceous cover. This amount, when compared to the total amount of forest available and then considered cumulatively with forested impacts, was negligible (see additive analysis for vegetation in section 2.0). All other land use types were anticipated to be restored after construction, most within a year, thus limiting the extension of impacts for extended periods.

### *Visual Impacts*

Long term to permanent visual impacts would occur where a project results in a change in the visual landscape (i.e., clearing of forested vegetation, or addition of aboveground facilities). Analysis of visual impact differs based on topography, existing land use, and the scope of the project. The scope of visual impact could be narrow if there is not a high point from which to view the impacts (which would be mainly due to tree clearing or aboveground facility construction) or if the visual impact would remain consistent with existing conditions (e.g., existing development or cleared/farmed areas). To account for possible areas where there may be a high point to view the right-of-way, we approximate a 10 mile range for visual impacts, however, this would be with areas directly adjacent to NEUP Project elements.

Temporary visual impacts were evident during construction due to clearing, grading, and construction activities. After construction, restoration in accordance with TGP's Project Plans and permitting agency requirements required revegetation of the construction work areas, thereby limiting permanent visual impacts to those areas where previously existing forest is not allowed to reestablish within the new permanent right-of-way due to pipeline safety and operational requirements. However, because the loops were collocated within or adjacent to existing permanently maintained right-of-way for the majority of their length, the permanent visual impact in previously forested areas consisted of permanently widening the existing corridor from 50 feet to 75 feet. While these cumulative permanent visual impacts may be locally noticed as an expansion where the NEUP Project was constructed, they are not inconsistent with the existing visual character of the area (i.e., a maintained pipeline corridor) which has been that way for over 50 years. Other projects could also have an impact on the visual nature of the area if they result in permanent modification of vegetation, especially if immediately adjacent to the NEUP Project.

TGP's construction of additional compression as part of the NEUP Project took place at some facilities modified as part of the 300 Line Project. This would have resulted in additional visual impact, however, because the incremental additions at these compressor stations resulting from the NEUP Project would not significantly impact the view shed at these facilities. The compressor stations were already existing facilities on TGP's 300 Line that were being used in the transportation of natural gas, thereby the additions as part of the NEUP Project would be consistent with the visual nature.

Most of the other projects (DTI facilities, NSD Project, MPP Project and the non-

adjacent projects discussed in section 2.10.5 of the NEUP Project EA), however, would be located at a distance from the NEUP Project. Where these projects are located adjacent to the NEUP Project, they would also be in proximity to the existing 1950's 300 Line, thereby adding to visual impacts, but not being inconsistent with what we would consider established as the baseline conditions. Because the area is already a patchwork of forested areas and non-forested areas, impacts to vegetation that are removed from the facilities, might add further clearing, they would not add to the visual impact created by the corridor of the NEUP Project

### *Recreation and Special Use Areas*

Recreational activity impacts and impacts on special interest areas are generally limited within the right-of-way and to the timeframe of construction. Adjacent areas which may also not have been useable for a recreational purpose during construction, as the activities may have been precluded by safety concerns or interruption of the actual recreational activity (e.g., hunting, fishing, bird watching, etc.).

The recreational activities impacted by the NEUP Project, may have been the same type as other recreational uses impacted by other projects. If these corresponded to special use area, again, they could have occurred cumulatively with the NEUP Project. As indicated above, we expect recreational impacts to return to pre-construction conditions once the right-of-way is seeded and access is allowed. Use of recreational areas impacted by the NEUP Project, would revert back to preconstruction use soon after construction, preventing cumulative impacts. Even though a use may have been impacted twice by one of the other projects, the NEUP Project would not permanently preclude or diminish most recreational activities.

During construction of the NEUP Project, some recreational activities and some use of special interest areas in the immediate project area were foreclosed, postponed, or diminished. Some of these special interest areas may have been impacted by multiple projects. For both the 300 Line Project and the NEUP Project, TGP coordinated with the land management agency to obtain the necessary permits and approvals to cross these areas, as well as to develop mitigation for each project's impacts, thereby limiting cumulative impacts. While construction of projects through the recreation and special interest areas affected recreational activities, the majority of these impacts related to the NEUP Project were temporary, only extending through the period of construction. For the NEUP Project, TGP has consulted with the National Park Service to minimize impacts on the Appalachian Trail. In addition, TGP has developed site-specific crossing plans for the special interest areas and would obtain the necessary state permits and approvals to cross areas such as state parks, state forests, and the Highlands Region of New Jersey. As a result, significant long-term impacts on recreational activities and special interest areas are not anticipated.

Therefore, in consideration of the projects disclosed in section 2.10.5 of the NEUP Project EA, the NSD Project, the MPP Project, the 300 Line Project, and the DTI facilities based on our analysis above and the fact that some areas impacted by the NEUP Project would not be impacted at all by the other projects and/or in the same timeframe (for instance, the MPP, NSD, and DTI Facilities were over 20 miles away from the NEUP Project and/or constructed during different years); impacts to most land use, recreation, and special use areas would be short term,

limited to the period of construction; the construction of the majority of the NEUP Project next to an existing 50 year old right-of-way would not create a new visual corridor, but would minimize the impact through collocation; and TGP's methods to restore the right-of-way to former use immediately following construction, we would not expect the impacts from the NEUP Project to be cumulatively significant with the impacts of the MPP Project, NSD Project, and DTI facilities, 300 Line Project or the other projects discussed in section 2.10.5 of the NEUP Project EA and do not recommend additional mitigation.

## **Cultural Resources**

Under Section 106 of the NHPA, cumulative effect applies only to those resources that are listed in or eligible for the NRHP. However, under NEPA, cultural resources could include cultural, prehistoric, or historic resources not eligible for listing in the NRHP. Under Section 106, the analysis of impacts on cultural resources is initiated by defining the area of potential effects (APE). The APE may differ for the analyses of direct effects and indirect effects; the APE for direct effects typically is the project area, and includes all work areas associated with a project, while the APE for indirect effects could encompass a larger area to account for effects such as dust, vibration, and visual impacts on historic properties. Impacts on cultural resource as a result of project activities can range from short-term to permanent in duration. For our analysis under NEPA of the cumulative impacts of the project on cultural resources, we define region of influence as the direct and indirect APEs.

For impacts on cultural resources to be cumulative, there would have to be cultural resources within the APE for the NEUP Project that would also be affected by other projects. Because the APE for the NEUP Project did not overlap the APEs for the MPP Project, NSD Project, and DTI facilities, there could be no cumulative impact from these projects in conjunction with the NEUP Project.

In Pennsylvania, the APEs for the NEUP Project and 300 Line Project overlap. One cultural resource site occurred within the APE for both the NEUP and 300 Line Projects. However, both projects avoided effects to the site, and therefore there were no cumulative impacts to that site.

In New Jersey, the APEs for the NEUP Project and the 300 Line Project also overlap; however, there were no cultural resources in the area that was affected by both projects. Although both the 300 Line and NEUP Projects had adverse effects on cultural resources in New Jersey, no historic properties were affected by both projects, and therefore there were no cumulative effects to historic properties in New Jersey. Further, in fulfillment of the Section 106 process, all historic properties that were affected by either project were mitigated. This preserved either the resource or the information gathered from any data recovery and did not result in a significant impact.

TGP's Project and Spectra's New Jersey – New York Expansion Project (CP11-56-000) both proposed upgrades at the Mahwah Meter Station, in Bergen County New Jersey, and both projects proposed to use Bear Swamp Road and Cleveland Bridge for access to the meter station. The existing meter station was situated within an archeological site. Both TGP and

Spectra committed to avoidance of all areas that were not previously disturbed by the construction and operation of the existing meter station. TGP erected fencing and signage to ensure the protection of the site. We concluded that there would be no effect to the archeology site as a result of either project, and therefore, there were no cumulative impacts to the site.

Use of Bear Swamp Road and the Cleveland Bridge for both projects also had the potential to have a cumulative effect on cultural resources. The road and bridge were already in use for permanent access to the existing meter station. In general, use of this access road and bridge are consistent with the current vehicular use, but would present a cumulative impact by temporarily increasing effects from traffic. Upgrades to the road by either project could also result in cumulative impacts. Additionally, TGP's cultural resources survey identified a number of archeological sites in the vicinity of the road, and found that the Cleveland Bridge is eligible for listing on the NRHP.

In order to minimize impacts to Bear Swamp Road and the Cleveland Bridge, TGP committed to the use of only light trucks. Additionally, they committed to keeping upgrades to the road to a minimum, specifically agreeing that they would not widen or straighten the road. TGP installed protective fencing and signage in the vicinity of the cultural resources along Bear Swamp Road to ensure those resources were protected. Through use of these avoidance and protection strategies, we concurred that TGP would have no effect on the archeology sites in the vicinity of Bear Swamp Road, and thus they would not contribute to any cumulative impacts to those sites. TGP's use of the Cleveland Bridge would contribute to cumulative impacts to the bridge; however we concluded that the cumulative impacts to this public roadway structure would not be significant.

As a result, we find that the NEUP Project, in consideration with the NSD Project, the DTI facilities, the MPP Project, the 300 Line Project, and the non-TGP related activities discussed in section 2.10.5 of the NEUP Project EA did not contribute significantly to cumulative impacts on cultural resources.

## **Air Quality**

### *Construction Emissions*

Emissions associated with construction and installation of natural gas pipelines and aboveground facilities generally include: 1) exhaust emissions from construction equipment, 2) fugitive dust emissions associated with construction vehicle movement on unpaved surfaces, and 3) fugitive dust associated with trenching, backfilling, and other earth-moving activities. Construction emissions for pipeline transmission projects are temporary, intermittent, and highly localized along the right-of-way and/or at aboveground facility sites. Once construction activities in an area are completed, fugitive dust and construction equipment emissions subside and the project's construction-related impact on air quality terminates. Construction-related air quality impacts are limited to the immediate area surrounding the construction right-of-way or aboveground facility site. The applicable timeframe for cumulative construction-related air quality impacts is within the calendar year(s) to be consistent with the analysis conducted for indirect emissions under the General Conformity regulations codified in Title 40 of the Code of

Federal Regulations, Part 93, Subpart B.

Table 15 summarizes the construction emissions for the projects within the affected counties. The table below also identifies the calendar years of construction for the 300 Line, NSD, DTI, NEUP, and MPP Projects.

To minimize construction emissions, TGP and DTI complied with all federal and state air quality regulations regarding construction emissions and implemented BMPs discussed in TGP's and DTI's respective Project Plans, including the use of dust suppression (e.g., watering); using newer, cleaner operating equipment; and encouraging the use of low-emission fuels.

As described in section 2.10.5 of the NEUP Project environmental assessment, the ongoing drilling activities of Marcellus Shale natural gas reserves, and other projects in the area involved the use of heavy equipment that generated emissions of air contaminants and fugitive dust during construction of these projects. For the FERC jurisdictional projects, the air quality impacts during construction were short-term and intermittent along the pipeline rights-of-way and aboveground facility sites. The PADEP has jurisdiction of the Marcellus Shale development facilities. Federal and PADEP air quality regulations apply to minimize the associated construction emissions. Compliance with the applicable regulations would have also avoided or minimized significant cumulative construction-related air quality impacts of Marcellus Shale development activities in the NEUP Project area. Likewise, construction of the Moxie Liberty Generation Plant resulted in temporary construction emissions. However, we expect that Moxie Energy would have been required to implement BMPs to minimize construction-related impacts on air quality and, thus, the NEUP Project did not contribute to significant construction-related cumulative impacts on air quality.

Most of the loops associated with the 300 Line Project began or ended in close proximity to the beginning or end of loops in the NEUP Project area. However, the construction time frames (temporal scope) of the projects were different; the NEUP Project was constructed in 2013 and the 300 Line Project was constructed in 2011.

On the other hand, a portion of the NSD and DTI Projects occurred in the same calendar year as the NEUP Project. However, there was no actual overlap of active construction of the NEUP, DTI, and NSD Projects. Construction of the NSD and DTI Projects were nearing an end in 2012, and nearly two months later construction of the NEUP Project commenced. In general, the intensity of construction emissions is minimal at the end or beginning of construction when compared to the peak in activity in the middle. As a result, the intensity of concurrent construction for both projects was minimal, resulting in limited cumulative air quality impacts. The NSD and NEUP Projects were also over 20 miles away from each other; well outside the range where off-right-of-way impacts could converge. Table 15 also shows that the DTI Project affected different counties and different states than the NEUP Project.

TABLE 15

## Estimated Project Construction Emissions by County

Location (County, State)	Project	Pollutants (tons)						
		NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	HAPs
<b>2010-2011</b>								
Venango, Pennsylvania	300 Line	7.34	0.77	4.79	0.006	4.51	0.92	0.18
McKean, Pennsylvania		7.34	0.77	4.79	0.006	4.52	0.92	0.18
Potter, Pennsylvania		42.4	4.97	59.28	0.061	38.71	6.67	1.10
Tioga, Pennsylvania <sup>a</sup>		59.33	6.97	88.66	0.091	55.95	9.57	1.52
Bradford, Pennsylvania <sup>a</sup>		58.63	6.86	87.43	0.09	54.91	9.43	1.51
Susquehanna, Pennsylvania		48.85	5.73	71.72	0.073	43.06	7.57	1.26
Wayne, Pennsylvania		36.51	4.35	56.43	0.058	34.37	5.87	0.95
Pike, Pennsylvania		47.18	5.54	71.12	0.073	42.56	7.4	1.22
Sussex, New Jersey		34.99	3.76	44.93	0.047	25.8	5.02	0.83
Passaic, New Jersey		22.13	2.40	30.59	0.032	16.93	3.23	0.53
<b>Total</b>		<b>364.7</b>	<b>42.12</b>	<b>519.74</b>	<b>0.54</b>	<b>321.32</b>	<b>56.60</b>	<b>9.28</b>
<b>2012</b>								
Tioga and Bradford Counties, Pennsylvania <sup>a, b, c</sup>	NSD	20.46	3.68	52.94	0.05	33.91	4.62	0.80
Niagara, New York		1.54	0.11	0.59	0.0	0.41	0.16	0.03
<b>Total</b>		<b>22.00</b>	<b>3.79</b>	<b>53.53</b>	<b>0.05</b>	<b>34.32</b>	<b>4.78</b>	<b>0.83</b>
Potter, Pennsylvania	DTI	3.26	0.29	1.22	--	2.66	0.20	--
Wyoming, New York		5.43	0.55	1.79	--	11.47	0.3	--
Livingston, New York		54.54	5.44	16.98	--	4.68	4.22	--
<b>Total</b>		<b>63.23</b>	<b>6.28</b>	<b>19.99</b>	<b>--<sup>a</sup></b>	<b>18.81</b>	<b>4.7</b>	<b>--<sup>a</sup></b>
<b>2013</b>								
Bradford, Pennsylvania <sup>b</sup>	NEUP	12.42	1.79	23.4	0.02	26.84	4.03	0.41
Susquehanna, Pennsylvania		4.06	0.31	1.77	0	2.11	0.59	0.08
Wayne, Pennsylvania		3.86	0.68	9.98	0.01	18.15	2.62	0.15
Pike, Pennsylvania		15.06	2.26	30.25	0.028	24.32	3.6	0.52
Sussex, New Jersey		16.14	2.45	33.02	0.032	26.18	3.9	0.55
Passaic, New Jersey		7.48	1.33	19.35	0.02	19.13	2.67	0.25
Bergen, New Jersey		7.31	0.69	6.75	0.009	5.48	1.12	0.20
Orange, New Jersey		--	--	--	--	0.71	0.11	--
<b>Total</b>			<b>66.33</b>	<b>9.51</b>	<b>124.52</b>	<b>0.12</b>	<b>122.92</b>	<b>18.64</b>
Potter, Pennsylvania	MPP <sup>d</sup>	22.89	3.66	79.51	0.34	29.51	4.54	1.11
Mercer, Pennsylvania		2.61	0.59	16.12	0.07	2.91	0.46	0.18
Venango, Pennsylvania		1.30	0.30	7.62	0.03	1.63	0.25	0.09
McKean, Pennsylvania		1.30	0.30	7.62	0.03	1.63	0.25	0.09
<b>Total</b>		<b>28.10</b>	<b>4.85</b>	<b>110.87</b>	<b>0.47</b>	<b>35.67</b>	<b>5.50</b>	<b>1.48</b>
<sup>a</sup> Construction of the NSD project commenced in 2011; however, any construction emissions from the NSD Project are not shown for the year 2011 because construction occurred for one month or less. <sup>b</sup> Construction of the NEUP Project commenced in 2012; however, any construction emissions from the NEUP Project are not shown for the year 2012 because construction occurred for one month or less. <sup>c</sup> Construction emissions include meter station construction in Erie, Livingston, and Niagara Counties, New York; and Bradford County, Pennsylvania. <sup>d</sup> Construction of the MPP Project commenced in 2012; however, any construction emissions from the MPP Project are not shown for the year 2012 because construction occurred for one month or less. CO = carbon monoxide SO <sub>2</sub> = sulfur dioxide PM <sub>10</sub> = particulate matter less than 10 microns in diameter PM <sub>2.5</sub> = particulate matter less than 2.5 microns in diameter HAPs = hazardous air pollutants								

Construction of the MPP Project occurred during the same months and years as the NEUP Project. The MPP Project was about 80 miles away from the NEUP Project, and outside of the range where off-right-of-way impacts could converge.

Because pipeline construction moves through an area quickly, air emissions associated with the 300 Line, NSD, DTI, NEUP, and MPP Projects were intermittent and short term. The majority of these impacts were minimized further because the construction activities occurred over a large geographical area and, in many cases, construction schedules did not directly overlap. Although these projects resulted in short-term construction air emissions, they did not significantly affect long-term air quality in the region.

When considered with the three TGP Projects, DTI facilities, and other non-TGP projects discussed in section 2.10.5 of the NEUP Project EA, we do not find a significant construction-related cumulative impact on air quality from the NEUP Project and do not recommend any additional mitigation.

### Operation Emissions

Operation of the TGP and DTI Projects' new and modified compressor stations resulted in air emission increases over the existing emissions levels within the projects areas. The compressor stations emissions associated with each project are outlined in table 13 above.

TGP and DTI were required to obtain air quality permits for operation of each compressor station and/or modification for the 300 Line, NEUP, NSD, and DTI Projects from the PADEP, the New Jersey Department of Environmental Protection, and the New York State Department of Environmental Conservation. There were no stationary emission sources associated with the MPP Project and so it could not have contributed to a permanent cumulative impact on air quality. The state permitting requirements would enforce the federal and state regulations designed to protect ambient air quality (thereby protecting public health and welfare) and prevent significant cumulative impacts.

As described in section 2.10.5 of the NEUP Project EA, the operational emissions sources associated with the projects in table 2.10-1 also resulted in permanent emissions. Operation of these projects would also contribute cumulatively to existing air emissions. Each of the projects would need to comply with federal, state, and local air regulations, which may require controls to limit the emission of certain criteria pollutants or HAPs.

The permanent air emissions sources associated with the NSD Project and the DTI facilities was the modification at Station 230C in Niagara, New York, and one new 10,800-horsepower compressor station in Wyoming County, New York (Silver Springs Compressor Station), respectively. Station 230C is located in the Niagara Frontier Intrastate AQCR and the Silver Springs Compressor Station is located in the Genesee-Finger Lakes Intrastate AQCR. Both Station 230C and the Silver Springs Compressor Station are operating within the same timeframe as the compressor stations associated with the NEUP Project. These compressor stations are located in another state and in different AQCRs as the one affected by the NEUP Project.

Permanent emissions sources as part of the 300 Line Project affected the Northwest Pennsylvania-Youngstown Interstate AQCR and the Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR. Permanent emissions sources as part of the NEUP Project affected the Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR. Compressor Stations 315, 321, and 325 as part of the 300 Line Project and the modifications at Compressor Stations 321 as part of the NEUP Project as these compressor station modifications resulted in additional emissions and are within the same AQCR. For all three compressor stations, they are geographically separated by at least 25 miles from each other; further, because prevailing winds blow in one direction at a time, air quality between facilities would not be affected by two facilities at the same time. In addition, TGP was required to obtain air quality permits for operation of each compressor station and/or modification for the 300 Line and NEUP Projects from the PADEP and the New Jersey Department of Environmental Protection.

TGP installed modifications at Compressor Station 321 as part of the 300 Line Project and the NEUP Project. Table 16 shows the emissions at Compressor Station 321 as a result of the 300 Line Project and the NEUP Project.

The modification at Compressor Station 321 as part of the 300 Line Project reduced the station's total emissions such that it was no longer considered a major source with regards to Title V and PSD regulations, hence improving air quality in the AQCR. Compressor Station 321 maintained its minor source status with regards to criteria pollutants with the addition of the new compressor unit added as part of the NEUP Project. However, the Title V Greenhouse Gas Tailoring Rule applied to the NEUP Project modification because the potential-to-emit emission levels would be above 100,000 tons per year of carbon dioxide equivalents. TGP obtained its Plan Approval for Compressor Station 321 as part of the 300 Line Project on April 28, 2010, and as part of the NEUP Project on May 9, 2012.

TABLE 16

Cumulative Potential-to-Emit Emissions at Compressor Station 321								
Project	Emissions (tons per year)							
	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM <sup>a</sup>	HCHO	Total HAP	GHG <sup>b</sup>
300 Line Project	55.18	74.31	19.95	3.68	1.89	0.88	0.99	85,703
NEUP Project	20.26	23.81	11.53	1.19	2.31	0.50	0.56	42,468
<b>Additive Total Emissions</b>	<b>75.44</b>	<b>98.12</b>	<b>31.48</b>	<b>4.87</b>	<b>4.20</b>	<b>1.38</b>	<b>1.55</b>	<b>128,171</b>

<sup>a</sup> Assumes PM = particulate matter less than 10 microns in diameter (PM<sub>10</sub>) = particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>)  
<sup>b</sup> GHG emissions are expressed as carbon dioxide equivalents.  
CO = carbon monoxide  
SO<sub>2</sub> = sulfur dioxide  
HCHO = Formaldehyde  
HAPs = hazardous air pollutants

An air dispersion modeling analysis provides an evaluation of the potential cumulative impacts on the ambient air quality from operation of both the 300 Line Project and the NEUP Project modifications at Compressor Station 321. TGP conducted an air dispersion modeling analysis using AERSCREEN, an EPA recommended screening model based on AERMOD. The model produces estimates of “worst-case” 1-hour concentrations for a single source, without the need for hourly meteorological data, and also includes conversion factors to estimate “worst-

case” 3-hour, 8-hour, 24-hour, and annual concentrations. The AERSCREEN analysis includes nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), and particulate matter with an aerodynamic radius of 2.5 microns (PM<sub>2.5</sub>). The potential hourly emission rates (pounds per hour) for NO<sub>2</sub>, PM<sub>2.5</sub>, CO, and SO<sub>2</sub> were applied in the AERSCREEN screening model. Background concentrations were obtained from the EPA AirData site, AQS Site ID 42-069-2006 in Lackawanna County, and included in the analysis. Table 17 shows the predicted maximum ground level concentrations for criteria pollutants NO<sub>2</sub>, CO, SO<sub>2</sub>, and PM<sub>2.5</sub> compared to the NAAQS, including background concentrations provided by the EPA AirData site. The results of the modeling demonstrate that the cumulative air quality impacts are below the NAAQS, and thereby are not significant.

Pollutant	Averaging Period	GLC <sub>max</sub> (µg/m <sup>3</sup> )	Ambient Background Concentration (µg/m <sup>3</sup> )	GLC <sub>max</sub> Plus Background (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-hour <sup>a</sup>	56.28	75.8	132.11	188
	Annual <sup>a</sup>	5.28	19.96	25.23	100
SO <sub>2</sub>	1-Hour	3.16	90.8	93.98	196.4
	3-Hour	3.16	5.9	9.03	1,300
CO	1-Hour	82.45	337.1	419.55	40,000
	8-Hour	74.20	377.3	451.55	10,000
PM <sub>2.5</sub>	24-Hour	3.67	22.3	25.93	35
	Annual	0.61	9.5	10.12	12

<sup>a</sup> A NO<sub>2</sub>/NO<sub>x</sub> ratio of 0.8 was applied to the 1-hour and a ratio of 0.75 was applied to the annual modeled averaging times.  
GLC<sub>max</sub> = modeled maximum ground level concentration  
µg/m<sup>3</sup> = micrograms per cubic meter

In conclusion, when considered with the three TGP Projects, DTI facilities, and other non-TGP projects discussed in section 2.10.5 of the NEUP Project EA, we do not find a significant cumulative operational impact on air quality from the NEUP Project because:

- the Marcellus Shale development activities and permanent emissions from the other projects in table 2.10-1 resulted in increased long-term emissions of criteria pollutants, HAPs, and GHGs within the region but would have been minimized to the extent possible through the PADEP review and permitting process;
- and each of the projects would have needed to comply with federal, state, and local air regulations, requiring controls to limit the emissions of certain criteria pollutants or HAPs.

## Noise

### Construction Noise

Noise affects the local environment during the construction period along the pipeline routes and at aboveground facilities and contractor/pipe yards. The construction activities were performed with standard heavy equipment, such as track-excavators, backhoes, bulldozers, dump trucks, cement trucks, and boring equipment; however, not all of the equipment was used in each phase of construction.

Construction noise moves in a linear fashion along the pipeline right-of-way and varies during each phase of construction. In addition, noise impacts during the construction phase are localized and attenuate quickly as the distance from the noise source increases. The related impacts are limited to the noise receptors in the vicinity of the right-of-way and the aboveground facility sites such that noise from simultaneous construction activities would be heard by the same receptor.

Construction of the TGP Projects and the DTI Project occurred primarily during the daytime with certain activities such as hydrostatic testing and HDD pullbacks occurring over 24-hour periods. In some cases actual drilling operations associated with the HDD crossings may have occurred over 24-hour periods, due to construction schedule or subsurface conditions. Regardless of whether the HDD activities were conducted in the day or nighttime hours, TGP and DTI were required to meet our noise criteria of a day-night noise level ( $L_{dn}$ ) of 55 dBA at the nearest NSAs to the HDD entry and exit sites.

The Marcellus Shale drilling activities and other projects shown in the table 2.10-1 of the NEUP Project EA also produced noise during construction.

Most of the loops associated with the 300 Line Project began or ended in close proximity to the beginning or end of loops in the NEUP Project area. In addition, the 300 Line Project and NEUP Project each had facilities that were installed at Compressor Stations 319, 321, 323, and 325. The construction time frames of the projects are different; the NEUP Project was constructed in 2013 and the 300 Line Project was constructed in 2011.

On the other hand, a portion of the NSD Project and the NEUP Project construction occurred in the same calendar year. Table 15 in the air quality section also shows that these activities both occurred in Bradford County. With regards to the timing of the projects, however, there was also no actual overlap of active construction of the NSD Project and the NEUP Project. Further, the NSD Project was located over 20 miles west of the NEUP Project at its closest point.

Similar to the NSD Project, the DTI Project construction occurred in the same calendar year as the NEUP Project although there was no actual overlap of active construction of these projects. Table 15 also shows that the DTI Project affected different counties and different states than the NEUP Project.

The MPP Project construction also occurred in the same calendar year as the NEUP

Project. Table 15 shows that the MPP Project affected different counties and different states than the NEUP Project.

When considered with the three TGP Projects, DTI facilities, and other non-TGP projects discussed in section 2.10.5 of the NEUP Project EA, we find no significant cumulative construction-related noise impacts from the NEUP Project because:

- construction activities occurred over a large geographical area and, in many cases, construction schedules did not directly overlap;
- noise impacts during the construction phases were localized and would have attenuated quickly as the distance from the noise source increased; and
- pipeline construction proceeds as a moving assembly line along a pipeline right-of-way, the duration of construction activities, and therefore noise impacts on nearby noise receptors, at any one location would have been limited and short term.

### Operational Noise

Operational noise impacts from the projects resulted from the additional or new compression added as part of the projects. Noise generated from compressor station facilities is the greatest at the compressor station and can impact noise receptors to varying degrees (based on factors such as topography, vegetation, and noise mitigation equipment), with the noise impacts decreasing as distance from the facility increases. The permanent noise associated with the new or modified compressor stations is summarized in table 14.

As described in section 2.10.5 of the NEUP Project EA, the operational sources associated with the projects in table 2.10-1 also resulted in permanent noise sources. Operation of these projects would also contribute cumulatively to the existing noise environment.

There were no operational noise sources associated with the MPP Project; therefore, we find no cumulative operational noise impacts associated with the MPP Project and the NEUP Project.

The compressor stations that resulted in noise increases as part of the 300 Line, NEUP, NSD, and DTI Projects affected the ambient noise at the nearest NSAs to the respective compressor stations. The compressor stations associated with the TGP and DTI Projects are separated by at least 25 miles, with one exception Compressor Station 321 as detailed below.

The NSAs nearest to Compressor Station 321 did experience an increase in ambient noise as a result of the 300 Line and NEUP Projects as noise generating sources were installed as part of both projects. The Commission authorization for the NEUP Project; however, required that the post-construction noise survey demonstrate that all of the equipment at Compressor Station 321 meet the Commission's noise criteria of a day-night noise level of 55 dBA at the nearest NSAs. This post-construction noise survey therefore ensured that the cumulative operational noise from the 300 Line Project and the NEUP Project modifications at Compressor Station 321 did not exceed our noise criteria, and thereby did not result in significant cumulative operational

noise impacts.

When considered with the three TGP Projects, DTI facilities, and other non-TGP projects discussed in section 2.10.5 of the NEUP Project EA, we find no significant cumulative operational noise impacts from the NEUP Project because the permanent noise sources occurred over a large geographical area.

### **Reliability and Safety**

The addition of one pipeline to an adjacent pipeline, an extension of a pipeline system, or an expansion of an existing compressor station does not constitute a measurable increase of impacts on public safety. The same applies to the cumulative safety impacts associated with two or more projects, whether in the same or different temporal or geographic scope of each other. When considered with the three TGP Projects, DTI facilities, and other non-TGP projects discussed in section 2.10.5 of the NEUP Project EA, we find no cumulative safety impacts from the NEUP Project as all of the projects would need to comply with federal and state safety requirements to construct and operate.

### **Climate Change**

The GHG emissions from construction and operation of the projects are provided earlier in the additive impacts analysis in section 2 (see tables 11 and 13). Currently, there is no standard methodology to determine how the projects' cumulative, incremental contribution to GHGs would translate into physical effects on the global environment. The cumulative GHG emissions from the construction and operation of the four TGP Projects, DTI facilities, and those projects discussed in Section 2.10.5 of the NEUP Project EA could increase the atmospheric concentration of GHGs, when considered with past, present and future emissions from all other sources. Because we cannot determine all of these activities' incremental physical impacts on climate change, we cannot determine whether the projects would result in significant cumulative impacts.

## **4.0 Conclusion**

Based on the analysis contained in section 2, we conclude that when considered additively, impacts from the NEUP Project, MPP Project, 300 Line Project, DTI facilities, and NSD Project are not significant. Based on the analysis contained in section 3, we also conclude that when the MPP Project, 300 Line Project, DTI facilities, NSD Project and those projects discussed in section 2.10.5 of the NEUP Project EA are considered cumulatively with the NEUP Project, there are no significant cumulative impacts. As a result, we conclude that there are no significant impacts and recommend to the Commission that additional environmental mitigation is not required.