Exhibit No.____ (NMP-5)

Direct Testimony of Peter Altenburger

UNITED STATES OF AMERICA

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Niagara Mohawk Power Corporation	)	Docket No. ER14- _____

Direct Testimony
Of
Peter F. Altenburger

I. Introduction and Qualifications

Q. Please state your name and business address.

A. My name is Peter F. Altenburger. My business address is 1125 Broadway, Albany, NY 12204.

Q. By whom are you employed and in what capacity?

A. I am the Director of the Transmission Planning and Asset Management department in New York. My group is responsible for performing the necessary studies to determine the asset health and thermal and voltage performance of the transmission system in National Grid's New York service territory and recommending projects for corrective actions. I am also a member of the lead team responsible for the development of capital projects including related capital budgets and project management activities through the conceptual engineering phase, developing work plans for selected transmission line maintenance projects, overseeing preparation of asset condition reports and regulatory filings to the New York Public Service Commission, and preparing testimony for rate cases.

Q. Please describe your educational background and training.

A. I received a Bachelor of Engineering Degree in Electrical Engineering from Manhattan College, Bronx, NY in 1986 and a Master of Science Degree in Electrical Engineering from Rensselaer Polytechnic Institute, Troy, NY in 1990.

Q. Mr. Altenburger, please describe your professional experience.

A. I joined National Grid (formerly Niagara Mohawk) in 1992. Before being named to my current position in June 2013, I was Manager of Transmission Asset Management for New York and New England for National Grid. Prior to this position, I held various positions within the engineering and operations groups within Niagara Mohawk. Prior to joining Niagara Mohawk, I served as a substation engineer for Pacific Gas and Electric for two years and as an overhead transmission engineer for Long Island Lighting Company for three years.

Q. Mr. Altenburger, have you previously testified before in regulatory proceedings?

A. Yes, I have testified in connection with National Grid rate proceedings before the New Hampshire Public Utilities Commission, in Docket No. DE 08-072, and the Massachusetts Department of Public Utilities in Docket No. DPU 07-30.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to explain the need for National Grid to procure reliability support services ("RSS") from NRG Energy, Inc.'s Dunkirk Generating Station

in light of NRG's notice of intent to mothball the Dunkirk facility, and pending the completion of reinforcements to National Grid's transmission system in western New York. Specifically, I discuss the studies that National Grid performed to assess the impacts on the transmission system that would result from mothballing the Dunkirk facility, studies which identified the need for certain of Dunkirk's units to remain online prior to the implementation of transmission solutions in order to protect the integrity of the transmission grid.

II. Background

Q. Please describe the Dunkirk Generating Station.

A. The Dunkirk facility is a coal-fired generation facility located in Western NY that is owned by NRG Energy, Inc. ("NRG"). The facility consists of four generating units: Dunkirk 1 and 2 each with a nameplate capacity rating of 100 MW and interconnected to National Grid's Western New York transmission system at 115kV (the "Dunkirk 115kV units"); and Dunkirk 3 and 4 each with a nameplate capacity rating of 217.6 MW and interconnected to National Grid's Western New York transmission system at 230 kV (the "Dunkirk 230 kV units").

Q. When was the decision made to mothball the Dunkirk facility?

A. On March 14, 2012, NRG, the owner of the Dunkirk facility, filed notice with the New York Public Service Commission ("NYPSC") of its intent to mothball the Dunkirk facility no later than September 10, 2012.

Q. Had any studies been performed to evaluate the impacts of removing the Dunkirk units from service prior to NRG's issuance of the mothballing notice?

A. At the time of NRG's mothball notice, neither National Grid nor the New York Independent System Operator ("NYISO") had performed a study to specifically evaluate the impacts of mothballing all four Dunkirk generating units while other generation resources remained available. However, National Grid had performed a more general study of transmission reliability issues in Western New York in 2011, known as the 2011 Western Division Needs Assessment and Solution Study ("2011 Western Division Study"). This study, which assumed that the Dunkirk units would remain in service, recommended a number of system upgrades to address concerns in Western New York, including low voltage issues which the study concluded would grow worse over time. National Grid also performed an addendum to this study that examined the impact of certain scenarios involving the retirement of coal-fired generation in Western New York, although it did not analyze a scenario in which all of the Dunkirk units were out of service while all other generation remained online.

Q. Based on this study, was National Grid able to draw any initial conclusions regarding the impact of a mothballing of the Dunkirk units?

A. Yes. Based on the modelling performed in the 2011 Western Division Study and addendum, National Grid planners were able to conclude that mothballing the Dunkirk

units would have a significant impact on transmission reliability in Western New York, particularly with respect to low voltage issues.

Q. Did National Grid share the results of this initial assessment?

A. Yes. In a March 30, 2012 letter, National Grid informed the staff of the New York Public Service Commission ("NYPSC") of its conclusion that the proposed mothballing of the Dunkirk units would result in significant transmission reliability impacts in Western New York. In that letter, National Grid also outlined a timeframe for completing studies to identify the specific system impacts of the proposed mothballing, the scope of potential reliability services that would be needed from Dunkirk, and the long-term solutions that would be needed to obviate the need for the continued operation of the Dunkirk facility.

III. Studies Evaluating the Impact of Dunkirk Mothballing and Proposed Solutions to Identified Reliability Concerns

Q. Please summarize the additional studies completed by National Grid to assess the impacts of NRG's proposal to mothball the Dunkirk facility.

A. National Grid conducted two studies to evaluate the system impacts of the mothballing of the Dunkirk facility and proposed solutions to address those impacts. The initial study, dated July 27, 2012, examined the immediate impacts of the loss of the Dunkirk generation, and addressed the need for the continued operation of certain of the Dunkirk units in light of several transmission projects that National Grid expected to be completed by the summer of 2013. National Grid also conducted a follow-up study, dated

September 26, 2012, which addressed the long-term transmission upgrades necessary to resolve reliability problems associated with having all the Dunkirk generating units out of service. The July 27 study is included with this filing as Exhibit Nos. NMP-6 (public version) and NMP-7 (CEII version). The September 26 study, which I will discuss later in my testimony, is included as Exhibit Nos. NMP-8 (public version) and NMP-9 (CEII version).

Q. Please describe the assumptions and methodology underlying the July 27 study.

A. The July 27 study was based on summer and winter 2012 base cases that were used in the 2011 needs assessment. National Grid determined that the load magnitude and distribution data from these base cases, with certain modifications discussed in Section 3 of the study, would be fairly representative of the peak loads that would be expected for the summer of 2013.

The study methodology for the July 27 study is set forth in Section 4 of that document. Significantly, the July 27 study was conducted using an "operating" rather than "planning" approach. The primary differences between the two involve the contingencies tested and the limits used. For instance, with respect to voltage thresholds, the July 27 study used a "Load Shed Limit" voltage threshold to determine whether system responses to a contingency were acceptable, meaning that there could be hours where voltages dropped to levels that would require system operators to implement contingency actions which would be short of load shedding, yet would be considered acceptable.

Q. What were the results of the July 27 study?

A. The initial study indicated that the loss of the Dunkirk generating units would result in thermal and voltage problems on National Grid's Western New York transmission system – specifically, the 230kV and 115kV systems. These systems are an integral part of National Grid's bulk electric transmission system, by which National Grid provides transmission service to both its wholesale and retail customers.

Chief among these concerns were low 230kV voltages at Gardenville and Huntley for various N-1 single element, N-1 multiple element, and N-1-1 multiple element outages. The initial study also found that many low voltage conditions that had been identified as existing on the 115kV system following an outage would be worse following the loss of support at Dunkirk. While some of these concerns were present even with the Dunkirk generation in service, both the hours of exposure and load shedding that would be required to correct the system at peak times would increase with Dunkirk out of service.

Loss of the Dunkirk units would also increase the reliance on other 115kV connected generators in the area. It was expected that they would need to run more often to support the system. If, however, one or more of these local plants were not available for some reason, area voltage problems would develop during contingency conditions. The weakened system would also result in an increased exposure, both in severity and numbers of hours per year, to these voltage concerns.

Q. What did the July 27 study conclude with respect to the impact that the continued operation of one or more of the Dunkirk units would have on these problems?

A. Based on a review of the various reliability issues and potential Dunkirk operational combinations, the initial study concluded that during peak periods, at least two of the four generators at Dunkirk would need to be in service in order to ensure the operation of both the 230kV and 115kV systems within acceptable limits. Based on review of the study results, it was concluded that for the summer, absent additional system reinforcement, support of the 230kV voltage was critical and would require use of at least one 230kV connected unit and a second unit at either voltage. In addition, because of the risk of either unplanned long duration outages of generators in the area, or the failure of transformers or other major system components, the study concluded that a third unit should also be available for summer periods. For the winter, the more critical issue was supporting voltages on the 115kV system, which could be best achieved by operating the two 115kV connected units.

Q. You mentioned above that the July 27 study also took into account several short-term transmission upgrades expected to go into service prior to the summer of 2013. Please describe these upgrades.

A. The upgrades, referred to as the interim solutions, included the addition of 230kV breakers at Huntley and Packard, installation of a mobile capacitor at Dunkirk, moving

three distribution stations served from Gardenville—Dunkirk lines #141 and #142 to other circuits, and accelerating the installation of capacitor banks at Gardenville and Homer Hill substations.

Q. What did the July 27 study indicate would be the impact of completing these upgrades by the summer of 2013?

A. The study determined that completing these projects would result in all 230kV voltages being above acceptable operating limits even with no Dunkirk units in service. However, the study concluded that due to continued N-1 and N-1-1 conditions, thermal overload issues, and the risk associated with outages of other local generators or transformers, there would still be a need to operate one of the Dunkirk 115kV units, year round, after the installation of the short-term upgrades. These findings are set forth in Section 7 of the July 27 study.

Q. What conclusions did National Grid draw based on these studies in terms of procuring reliability services from Dunkirk?

A. Because the implementation of the short-term transmission upgrades would address the problems on the 230kV system, which were much worse during the summer, National Grid concluded that the first contract with Dunkirk, which would cover the pre-summer 2013 period (September 2012 through May 2013), should procure reliability services from the 115kV units. National Grid determined that the contract should be for both Dunkirk 115kV units, based on the July 27 study's finding that pending the completion of

the short-term transmission upgrades, two units would be required to address voltage problems, and that the winter results would be better with two 115kV units, as opposed to one 115kV unit and one 230kV unit. Moreover, having both 115kV generators in service would allow National Grid to adequately protect the reliability of the transmission system if the short-term transmission upgrades were not fully completed by June 1, 2013.

Q. Did National Grid complete the installation of the short-term transmission upgrades by June 1, 2013?

A. Yes.

Q. Please describe the follow-up study conducted by National Grid.

A. National Grid conducted a follow-up study, dated September 26, 2012, that addressed the long-term transmission upgrades necessary to resolve reliability problems associated with removing all of the Dunkirk units from service. The follow-up study examined the impact that the removal of the Dunkirk units would have assuming the completion of the short-term upgrades recommended in the July 27 study as well as the longer-term projects identified in the 2011 Western Division Study. The September 26 study also analyzed whether non-wires alternatives, such as demand side management and distributed generation, might be used to address the needs caused by mothballing the Dunkirk facility.

Q. On what assumptions was the September 26 study based?

A. The September 26 study was conducted using the summer and winter 2016 and 2021 cases that were used in the 2011 Western Division Study, based on the conclusion that data on load magnitude and distribution across the system used in the 2011 study would be representative of the peak loads that would be expected for the summer of 2013.

The September 26 study assumed that transmission reinforcements recommended in the 2011 Western NY Solution Study to address issues pre-existing the planned mothballing of the Dunkirk units would be in service. These reinforcements are described in Section 3 of the September 26 study.

Q. What conclusions did the September 26 study reach?

A. Based on the system analysis and a review of the potential cost of area upgrades, the September 26 study recommended several longer-term transmission upgrades in order to address the N-1 problems and greatly mitigate N-1-1 exposure that would exist absent the continued operation of the Dunkirk facility service. These upgrades, which are discussed in detail in Sections 6 through 8 of the September 26 study, include: (1) the addition of two 33.3 MVAr capacitor banks on the two Dunkirk 115kV bus sections; (2) the addition of a second 75 MVAr capacitor bank at the Huntley 115kV switchyard; (3) reconductoring of the two 115kV lines between Five Mile Rd and Homer Hill; (4) reconductoring of one mile of the Niagara-Gardenville #180 line; and (5) reconductoring of fourteen miles of the Packard-Erie #181 line.

The September 26 study also concluded that the "non-wires" alternatives such as demand-side management or distributed generation were not preferable to the identified upgrades, because they were either comparable to the costs of upgrading transmission facilities or did not present viable solutions to the identified reliability problems. These conclusions are set forth in Section 9 of the September 26 study.

Q. What conclusions did National Grid draw from the September 26 study with respect to the continued procurement of reliability services from the Dunkirk facility or some other provider?

A. National Grid estimated that the solutions identified in the September 26 report could be sufficiently implemented by June 2015 such that National Grid should continue to procure reliability services to address the impacts of the planned mothballing of the Dunkirk facility until that date. Therefore, in response to the NYPSC's requirement that National Grid procure any additional reliability services related to the Dunkirk mothballing through a competitive solicitation process, National Grid requested proposals for reliability services from June 2013 through the end of May 2015. Ultimately, as described in the testimony of Mr. Holodak, National Grid determined that contracting for the continued operation of one of the Dunkirk 115kV units was the most viable option both in terms of costs and ability to address the identified reliability needs.

IV. Conclusion

Q. Does this conclude your testimony?

A. Yes.