APPENDIX C: PON 2157 LARGE FUEL CELL SYSTEM PERFORMANCE MEASUREMENT REQUIREMENTS

The purpose of Performance Measurement is to accurately quantify the electricity generated by the fuel cell system. The Contractor will develop a Performance Measurement Plan in conjunction with NYSERDA's agent, the Performance Measurement Plan must be approved by NYSERDA. The Performance Measurement Plan shall specify an automated data collection and remote transfer mechanism which shall include the installation of revenue grade electric and gas meters.

The Contractor is responsible for the purchase of necessary sensors and meters as described within the approved Performance Measurement Plan. Additionally, the Contractor shall provide the necessary communications for remote data collection including a phone line, internet access or other means acceptable to NYSERDA. Connection of sensors and meters to the remote data collection system will be the responsibility of NYSERDA's Agent.

Following approval of the Project Installation Report, the Contractor can begin the clock for the annual performance period immediately, or can delay the start of the clock by a maximum of 4 months following Installation and Commissioning. Upon the start of the clock, NYSERDA will begin to compile the performance data being uploaded to NYSERDA's CHP Data Integration Website (CHP Website). This will initiate the first year's (consecutive twelve (12) months) performance period.

On a periodic basis, NYSERDA will upload the performance data to their CHP Website. All data acquired by NYSERDA will be made available to the general public. The Contractor may use the CHP Website to support preparation of the Annual Performance Measurement Reports. Overview and summary information regarding the project will also be made publicly available on NYSERDA's CHP Website.

Annual Performance Measurement Reports must be submitted to NYSERDA for three years. The data contained in the Report must demonstrate clearly whether or not the installed project is generating the amount of electricity projected in the SPA.

SUMMARY OF PROJECT RESPONSIBILITIES

The Contractor shall:

- Work with NYSERDA or NYSERDA's Agent to develop the Performance Measurement Plan, which must be submitted to NYSERDA prior to the submittal of any invoices;
- Purchase and install the necessary instrumentation (meters and sensors) and (for projects involving one or more large fuel cell modules) communications to monitor the Fuel Cell System. Communications can be provided as a phone line or broadband connection or other medium selected in agreement with NYSERDA; and
- Provide unrestricted access to the installed system and collected data to NYSERDA and its agents.

The Contractor is responsible for ensuring that all information provided to NYSERDA accurately represents the operation of the Fuel Cell System.

NYSERDA and its agent will:

- Work with the Contractor to develop the Performance Measurement Plan;

- Confirm the necessary data instrumentation is installed correctly and install any additional data collection systems (hardware and software) required to transfer data to NYSERDA's CHP website;
- Verify sensor readings, document sensor locations, and develop a system description (schematics, specifications, and narrative) to document that collected data meet program goals;
- Validate the monitored data and load it into the NYSERDA CHP website; and
- Integrate the site documentation to the NYSERDA CHP website.

PERFORMANCE MEASUREMENT PLAN

The Performance Measurement Plan will include specifications for:

- Procuring and installing the required monitoring instrumentation;
- Verifying monitoring instrumentation during the Installation and Commissioning process;
- Loading and verifying the collected data into NYSERDA's CHP Website; and
- Determining performance based on the measured power output.

The Performance Measurement Plan will be posted on the NYSERDA CHP Website as part of the project documentation.

Procuring and Installing Instrumentation

The Performance Measurement Plan will specify the monitoring instrumentation to be installed, and the installation locations for the instrumentation.

Verifying the Performance Monitoring System

The Performance Measurement Plan will document the procedures to be used by NYSERDA's Agent to confirm that the instrumentation is installed correctly.

Loading and Verifying the collected data into the NYSERDA CHP Website

The Performance Measurement Plan will document how data will be loaded into the NYSERDA CHP website and verified. For the data being collected for Performance Measurement (for projects involving one or more large fuel cell modules), the general procedures and monitoring requirements in NYSERDA's Monitoring and Data Collection Standard for DG/CHP Systems and the ASERTTI DG/CHP Long Term Monitoring Protocol will be followed. These include, but are not limited to, the following:

- The system will log or record data at 15-minute intervals, averaging or integrating readings as required providing accurate and meaningful readings;
- The system shall have on-board storage sufficient to retain a minimum of 14 days of data in the event that communications or site power is lost; and
- The system will automatically transfer data to the NYSERDA CHP Website at least once per day.

Automatic error checking and screening procedures will also be established to gauge the data quality, and automated procedures (such as automated emails) will be established to notify appropriate project team members if a sensor failure or other abnormality occurs at a site.

Determining Performance Based on the New Measured Power Output

The Performance Measurement Plan will document how measurements will be made and will provide calculation procedures for determining power output from the Fuel Cell System.

Procedure to Account for Loss of Measured Performance Data

In some cases, a sensor or monitoring system failure or other problem at the site may result in data being lost or failing to pass the data validation process for part of the performance period. If data loss occurs, the ***power output*** for the missing period will be determined by taking the average output measured from similar length periods just prior to and just after the outage. This procedure will be used for up to two outages for up to 36 hours each per 12 month period; if more than two outages occur per 12-month period, then the site shall be required to provide independent cumulative meter readings or other documentation to demonstrate the system power output during outages, otherwise, the generator output will be assumed to equal zero for the outage period.

Annual Performance Measurement Reporting

Submitting the Annual Performance Measurement Report

The Contractor must submit an Annual Performance Measurement Report each year for three years. The data contained in the Report should demonstrate clearly to NYSERDA whether or not an installed project is actually generating the amount of electricity projected in the SPA. Upon approval of the Annual Performance Measurement Report, the Contractor may submit an invoice for the Performance Incentive payment associated with that Report. The Contractor must submit their Annual Performance Measurement Reports within 60 days after the annual performance period ends.

Annual Performance Measurement Report Approval or Rejection

NYSERDA will notify the Contractor in writing, within 30 days after receiving an Annual Performance Measurement Report, whether or not the Report has been approved. As part of the review process, NYSERDA may request clarification or additional information and may choose to conduct an inspection of a project site. NYSERDA will review the contents of the Annual Performance Measurement Report to ensure the following criteria are met:

- The Contractor has adhered to the Performance Measurement Plan;
- All required monitoring data are provided;
- The verified electricity generated is properly calculated from the monitoring data; and
- The installed equipment is operating as per the approved Application Package.

Performance Measurement Inspections

Periodically, NYSERDA or NYSERDA's agent may choose to visit a project site to verify that the information provided in the Annual Performance Measurement Report is accurate with regard to project equipment, site conditions, and monitoring configurations; the project site shall grant reasonable access to NYSERDA and NYSERDA's agents to facilitate this activity. These inspections may occur at any time after project installation, both prior to and after the submittal of an Annual Performance Measurement Report. If the Performance Measurement activities are found to be different from those represented in the Performance Measurement Plan or the Annual Performance Measurement Report, NYSERDA may refuse any further Performance Incentive payments. If NYSERDA deems an inspection necessary, an Annual Performance Measurement Report that is under review will not be approved until the inspection has been completed.

Resolving Disagreements over Performance Measurement

The following approach will be used to resolve any disagreements between NYSERDA and a Contractor concerning the adequacy of an Annual Performance Measurement Report or the adequacy and interpretation of performance data:

1. If an Annual Performance Measurement Report is rejected by NYSERDA, NYSERDA will provide a written explanation of the rejection with suggestions for changes that would make the submittal acceptable.
2. If the Contractor disagrees with the rejection, it must provide a written explanation (with references and any required additional documentation) to NYSERDA.
3. Upon receipt of the Contractor's written explanation, the Contractor and NYSERDA representatives will meet and attempt to resolve the disagreement.
4. The Contractor must submit a new submittal in a manner that complies with any resolution agreed to concerning the original submittal's rejection.

If either party believes the disagreement cannot be resolved by the above approach, the parties will use the dispute resolution mechanism defined in their SPA.