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Letter No. 13986-002-21-003
August 17, 2021

Re: Lewes Board of Public Works Battery Energy Storage Request for Proposal

Addressee's Name
Title
Company Name
Company Address
City, State Zip Code

Dear Battery Vendor:

Sargent & Lundy (S&L) is inviting you to submit a bid for the City of Lewes Board of Public Works (BPW) Battery Energy Storage System to be installed at the Old Power Plant Building in Lewes, DE. S&L will be performing the Bid Event on behalf of Lewes BPW. The award will result in an agreement between Lewes BPW and the successful Bidder.

S&L will serve as Owner's Engineer for Lewes BPW, which includes project oversight and engineering Quality Assurance/Quality Control for the project.

Bids are due to S&L by Close of Business on October 1, 2021.

Best Regards,

Jeremy Johnson
Project Manager

Enclosure: Old Power Plant Building Battery Energy Storage Specification

OLD POWER PLANT BUILDING BATTERY ENERGY STORAGE (BESS) SPECIFICATION

REQUEST FOR PROPOSAL
September 3, 2021
REV. 1

500 Delaware Ave. Suite 400 | Wilmington, DE 19801 | www.sargentlundy.com

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REFERENCED EXHIBIT SECTIONS	
Exhibit 1	Existing Substation Drawings
Exhibit 2	Site Photos
Exhibit 3	Fault Data for Schley Ave Substation
Exhibit 4	Proposed BESS One-Line & Layout Drawings

SECTION 1 – TERMS DEFINITIONS

When construing this document, the following words and expressions shall have the meanings hereby assigned to them:

1.1 "AHJ" means Authorities Having Jurisdiction.

1.2 "Auxiliary Losses" as referred to in this specification apply to the battery module losses inherent to the system required to operate subsystems within the modules but are not associated with energy storage ratings of the modules, these would include but not limited to fan module loads, microprocessor losses, alarm sensor losses, etc.

1.3 "BAS" means Building Automation System.

1.4 "BESS" means Battery Energy Storage System, are a type of Energy Storage System that comprise several batteries that store energy.

1.5 "BMS" means Battery Management System is a system that controls the operation of the BESS.

1.6 "BOP" is defined as Balance of Plant, in reference to this specification the BOP refers to the balance of the BESS facility including everything including the additions or revisions necessary on the MV or HV facilities in order to fully connect and operate the BESS on the Utility grid.

1.7 "COD" Commercial Operation Date

1.8 "Coincident Peak" means a day when Peak Demand for Lewes BPW is expected to be high and DEMEC will issue a demand response.

1.9 "DEMEC" means Delaware Municipal Electric Corporation a public corporation constituted as a Joint Action Agency and a wholesale electric utility that represents Lewes BPW.

1.10 "EMS" means Energy Management System is a system that controls the power (and its flow) of the BESS

1.11 "EPP" means Energy Power Provider is the successful contractor whose purpose is to engineer, procure, construct, operate, and manage a BESS at the designated site.

1.12 "FM" means Factory Mutual.

1.13 "HMA" means hazard mitigation analysis.

1.14 "HMI" means Human/Machine Interface, an interface through which a human can interface with a machine performing a specific operation.

1.15 "HV" means High Voltage.

1.16 "ISO" means Independent System Operator, a FERC-designated organization that coordinates,

controls, and monitors the operation of the electrical power system.

1.17 "MV" means Medium Voltage.

1.18 "MW/MWH" means Megawatt and Megawatt Hour, respectively. These are two units of energy measurements applicable to the commissioned BESS.

1.19 "O&M" means Operation and Maintenance, the general terms of operation and maintenance required for the BESS to operate correctly and in a safe manner.

1.20 "OE" Owner's Engineer

1.21 "OEM" means Original Equipment Manufacturer.

1.22 "Old Power Plant Building" refers to the building designated where BESS system to be installed. (See Exhibit 4).

1.23 "Operations Training" means training provided by EPP on basic operation of BESS and Safety Equipment, to be conducted for Lewes BPW Personnel and the local fire department.

1.24 "Owner" or "Lewes BPW" refers to Lewes Board of Public Works. "PCS" means Power Conversion System, a type of device that converts electrical power from one form to another.

1.25 "POI" is defined as the Point of Interconnection, the physical location on the power system at which the EPP owned BESS Equipment connects to the Lewes BPW-owned distribution facilities.

1.26 "Project" is defined as the entire engineer, procurement, construction, integration into Schley Ave Sub, and operation of the BESS for a 10-year period.

1.27 "Project Site" is defined as the, 7930 sq. ft., usable area designated inside and out of the Old Power Plant Building for BESS Equipment to be installed (Refer to Attachment 3).,

1.28 "RFP" means Request for Proposal, a type of document that solicits a proposal. This document is a Request for Proposal to be submitted to a bidding process.

1.29 "SCADA" means Supervisory Control and Data Acquisition, a computer system used for gathering and analyzing data, which subsequently controls connected equipment (if necessary).

1.30 "SPCC" stands for Spill Prevention, Control, and Countermeasure.

1.31 "SWPPP" stands for Stormwater Pollution Prevention Plan.

1.32 "Total system losses" indicates all electrical losses within the BESS system. These include auxiliary system losses, parasitic losses, HVAC, transformer and cable impedance losses and line losses (includes 15KV cable to the substation up to the Owner's meter at the 15kV breaker).

– END OF SECTION 1–

SECTION 2 – PROJECT GENERAL INFORMATION AND REQUIREMENTS

The intent of Section 2 of this Document is to outline the general requirements for the Project to supply and install a Battery Energy Storage System (BESS) facility, including the upgrades to the Project Site to bring the building up to appropriate codes, and necessary required modifications to the HV and MV facilities, in accordance with this document. A Pre-bid Walkdown and RFI period will allow for clarifications to this document to be made. The Electric Power Provider (EPP) will lease the Project site, design and install a BESS System (including upgrades to the Schley Avenue Substation required to incorporate the BESS detailed in Section 9), and operate system to provide power to the Lewes BPW Electric Grid. The full project is to be designed, delivered, installed, commissioned, tested, and operated per the provisions and requirements of this Agreement. The EPP shall be responsible for providing a full turnkey facility including but not limited to the design, engineering, procurement, fabrication, delivery, civil works, erection, installation, testing, commissioning and field verification of the BESS facility, modifications required to the HV and MV equipment inside the Schley Avenue Substation, and the MV interconnection required to interconnect the BESS to the grid. The EPP will maintain ownership and operational control of the facility.

The Owner will maintain ownership and operational control of all equipment inside Schley Ave Substation required to interconnect the BESS to the Owners distribution grid via the 15kV bus, with the exception of the cable that connects the BESS to the substation. An existing NEMA 4-hole pad on the Schley Ave 15kV bus will serve as the demarcation of ownership with the EPP owning the cable that attaches to the 4-hole pad. The prospective EPP will offer a Battery Size in their Proposal, in accordance with section 2.7.5.

Section 2 of this Document defines and describes the major features and performance for construction of the Project. The intent is not to technically describe all details on the engineering and/or construction of the equipment to be supplied, but to provide design details and performance standards in the areas that the Owner deems to be important. The design, engineering, construction, supply and testing of all components, including those not specifically called out in this document, must conform to all applicable industry standards, meet all applicable AHJ, federal, state, and local laws, and meet all requirements of the Owner.

2.0 GENERAL SCOPE OF WORK

2.1 The successful EPP shall be responsible for the design, engineering, procurement, fabrication, delivery, civil works, erection, installation, testing, commissioning and field verification of the Project and associated components.

2.1.1 A set of engineering drawings, specifications, calculations, and design basis shall be supplied at the indicated stages (see section 2.10) that comply with the applicable codes and documents governing the design and installation, (e.g. ACI 301-16, AISC 303-16, etc.) all-inclusive Delaware Codes and standards, local regulatory requirements, NFPA, ANSI, IEEE, ASME, SMACNA and ASCE standards. In addition, the EPP is required to implement any requirements from the insurance carrier, Fire Department or any other AHJ required to review the engineering deliverables. The EPP shall list the applicable standards used in the design basis with specific values and assumptions that makes up the design. All engineering deliverables shall be signed and sealed by a Professional Engineer/Architect/Land Surveyor in the State of

Delaware.

2.1.1.1 The EPP will be responsible for designing to the applicable codes called out in this document. To summarize the building codes referenced:

2.1.1.2 For structural elements, the 2018 versions of the International Building code and International Existing Building Code are to be used.

2.1.1.3 For Fire Protection elements, the 2021 versions of the International Fire Code, and other codes listed in section 14.1.1.4.4 are to be used.

2.1.1.4 Any discrepancies caused by this distinction are to be communicated to the Owner and Owner's Engineer during design.

2.1.2 Procurement and delivery of all equipment under the Scope of Work to the Site as well as the surveying, civil works, erection, installation, assembly, connection, commissioning, field verification, and security of all equipment supplied as required for the Project.

2.1.3 Design Studies and Calculations, including final turnover of all documents to the Owner.

2.1.4 Design and installation of a proper grounding at the site per IEEE 80. There are no existing drawings for the Project Site. Appropriate surveys or scans for underground facilities should be conducted to make sure all electrical equipment is sufficiently grounded. Available Fault data from Schley Avenue Substation is provided in Exhibit 3.

2.1.4.1 Design and upgrade of the existing ground grid at Schley Ave Substation per IEEE 80, as required, will be the responsibility of the EPP.

2.1.5 Equipment installed outdoors will be required to be protected from lightning per IEEE 998.

2.1.6 Upgrades to Physical Site Security required will be the responsibility of the EPP.

2.1.7 Design of control systems for the BESS that will have full control of all equipment included in the BESS.

2.1.7.1 The EPP will be responsible for installing and demonstrating functionality of several high-level BESS alarms, detailed in Section 5, on Schley Ave Substation Annunciator Panel.

2.1.7.2 The Project will interconnect to the Schley Ave Substation 15kV Bus and must not back feed onto the existing 69kv line. EPP will design for and install new meters on incoming 69kV bus and route to EMS to control dispatch and ensure no back-feed through the transformers occurs. EPP cooperation with The Delaware Municipal Electric Corporation (DEMEC) to design the EMS will be required.

2.1.8 Provide input to Owner on operation of the BESS during the development of the operating and procedures for the Project.

2.1.9 The EPP shall provide required modeling and support to the Owner throughout the process until full testing and commissioning is completed.

2.1.10 EPP shall provide all placards and signage including but not limited to life safety placards,

equipment IDs, and arc flash labels at the Project Site. Any applicable signage required to be added to the Schley Ave Substation as part of this project will be procured and installed by EPP.

2.1.11 The EPP shall be responsible for all tariffs and transportation costs associated with the Scope of Work of this Project.

2.2 The owner will:

2.2.1 Facilitate Permitting on the project, with input from EPP.

2.2.2 Provide existing site permits to EPP.

2.2.3 Schedule road closures for construction activities, with input from EPP.

2.2.4 Be Responsible for complete reclamation of any environmental contaminants from the previous uses of the building.

2.3 The BESS facility shall be configured as an array of multiple strings of batteries. Per the site-specific information in Attachment 3, the strings of batteries shall be located in the areas indicated. The EPP can propose other arrangements, but the equipment must fit in the footprint of the building and the yard behind the building.

2.4 All equipment shall be designed as needed to meet the requirements of the Project. The EPP shall provide a total turn-key solution for batteries, racks, inverters, pad mount transformers, battery monitoring systems, system integrator controller/EMS, fire detection and protection systems, HVAC system, protective relaying, fusing and coordination devices, HV and MV interconnection facilities and any other miscellaneous systems and hardware for the complete integration and interconnection of the BESS to the Lewes BPW Grid. The EPP is responsible for the procurement of the necessary equipment for the Project, including the software and controls necessary for the performance and operability of the BESS and integration of the EMS system with the Schley Ave Substation discussed in Section 5. The EPP shall retain licensure of the EMS for control of the BESS system and operate in accordance with a signed agreement, included in their proposal, with Owner for a period of either 10 or 20 years. The BESS shall be constructed and capable of being operated in accordance with this specification, AHJ and insurance requirements, all applicable codes, laws, and permits. Any required equipment and/or function of the BESS and associated components not specifically specified herein shall be included in order to ensure the satisfactory operation of the same. EPP's shall include in their proposal identification of any additional components or systems that are required to meet all applicable grid code compliance requirements.

2.5 The BESS facility shall be designed such that the batteries are rated to support the normal (primary) auxiliary feed for the inverters, BMS loads and HVAC loads of the entire system. The normal (primary) auxiliary feed shall be metered and monitored throughout the life of the project. The emergency (back-up) auxiliary feed shall be designed to support critical loads only. The EPP shall determine the Project's critical loads, but as a minimum shall include fire protection panel loads, lighting loads, and required HVAC loads, in the event of a grid failure the system shall

be designed to adequately support the operability of the system once the grid is restored.

2.6 In their proposal, the EPP should submit plans for both 10- and 20-year contracts. At the end of the 10-year (or 20-year) period, if a renewal is not arranged, the EPP will be responsible for disposal of the BESS and removal of all EPP owned equipment.

2.6.1 To protect Owner in the event the EPP is not able to fulfil its end of the contract, the EPP should include in their proposal:

2.6.1.1 A documented plan for removing and disposing of the BESS Equipment

2.6.1.2 An insurance plan or documentation of an Escrow account to cover the costs of removal and restoration of the site to the original condition.

2.7 The EPP proposed plans should ensure the following arrangements are met:

2.7.1 All equipment, operational, and on-going maintenance costs of EPP owned equipment will be borne solely by the EPP for the duration of the contract.

2.7.2 The EPP will pay a rental/lease fee to the Owner for hosting the battery facility. The fee may be paid monthly or annually.

2.7.3 The EPP will detail a shared revenue arrangement with the Owner for each market for which the EPP intends to participate.

2.7.4 The EPP will also ensure the facility is ready and available at its fully tested capacity to perform peak shaving during events identified and initiated by either the EPP or the Owner. Failure to perform will result in penalty paid to owner, as described in Attachment 4.

2.7.5 The EPP will include the proposed battery size in their response to this RFP. Meter data can be provided to potential bidders upon request to assist in sizing the battery. The battery should meet the following requirements.

2.7.5.1 The battery should have a 4-hour minimum duration.

2.7.5.2 The battery should fit in the project site shown in Attachment 3.

2.7.5.3 If using the Owner provided transformers, the charging and discharging output will be limited to the transformer nameplate rating documented in Attachment 2.

2.7.5.4 Unless the EPP implements additional upgrades to the Schley Ave. Substation, the total load available to the Battery will be Feeders #1 and #2 during normal operation. Loading information will be provided to potential vendors who request from Lewes BPW.

2.7.5.5 The battery should effectively reduce the peak load on certain Coincident Peak Days when Demand Response is requested of Lewes BPW by DEMEC. The demand response should be completely met when called by DEMEC in accordance with the penalty language described in Section 12 and Attachment 4

2.7.5.6 The battery should meet the use cases detailed in Section 3.

2.8 BESS Facility Documentation

The successful EPP's BESS Facility documentation for the system shall contain documents, drawings, instructions and manuals necessary to operate and maintain the BESS. As a minimum the following documentation (divided into groups) shall be provided. 30%, 60%, and 90% submittals will be delivered to the Owner and Owner's engineers for review throughout the course of the project.

2.8.1 System Description:

EPP shall provide overall system related information. As an example, BESS system descriptions, single-line diagrams, function block diagrams, logic diagrams of all software control scheme, and plant circuit diagrams. This shall be inclusive of any Fire Protection, Architectural, Civil, Structural, Control Systems, Communication System, etc. for the full set of deliverables by the EPP.

2.8.2 Operation and Maintenance:

The EPP shall provide a set of operation procedures for their scope for approval to the Owner/Owner's Engineer (OE). In addition, the EPP shall provide all manuals inclusive of information on the OEM operation, and fault tracing. All these documents shall be organized as "Instruction Manuals." The EPP is responsible for Operations Training on all the systems within their scope of work. A full week shall be assumed for Operations training. This is to include training of emergency procedures for the local fire department, for potential scenarios where they might be required to intervene.

2.8.3 Equipment Documentation:

The EPP shall provide information on all equipment included in the BESS system. The information shall include circuit diagrams, dimension prints, technical descriptions, assembly drawings etc.

2.8.4 Physical Construction:

The EPP shall provide information on items such as surveying, architectural, civil and structural works, erection and installation, cabling and inter-connection, and interior wall or battery room design and installation. The information shall include architectural drawings, station layouts, bills of materials, installation manuals and lists of cables, and structural calculations. Submittals shall follow the requirements set forth in applicable codes and documents governing the design and installation, e.g. ACI 301-16, AISC 303-16, etc.

2.8.5 EPP shall ensure all material is appropriately rated for use in the corrosive ocean environment, as applicable.

2.8.6 Factory Testing:

The EPP shall include Inspection and Test Plans, and factory test records.

2.8.7 Commissioning Documentation:

This group shall contain field test records created and logged during the testing and commissioning of the BESS system.

2.8.8 Field Verification Test Report:

This Field Verification Tests shall be documented in a report. This document shall include appropriate references to the performance requirements and to the performed design studies.

2.8.9 All engineering, drawings and documentation shall be in accordance and comply with relevant ANSI/IEEE standards as well as with relevant standards in Section 14. All drawings shall be in provided in AutoCAD native format and PDF.

2.8.10 Owner/Owner's Engineer reviews on the project are mandatory and EPP shall provide packages to the Owner to review, comment, and or reject all equipment and engineering provided by the EPP and the Subcontractors. The requirements are as follows:

2.8.10.1 One complete set of approval drawings depicting the physical and operational characteristics of the equipment and installation must be delivered to the Owner at the 30% and 90% phase. These drawings must clearly indicate arrangement, size, function, pertinent dimensions, interface with other equipment or material type(s) or components(s), operational limitations, and job name.

2.8.10.2 Owner and Owner's Engineer must be allowed a minimum of ten working days to review any drawings submitted for approval. The ten-day period will commence upon receipt of drawings at the Owner's and Owner's Engineer's office and end upon transmittal to the EPP. Failure to provide the Owner with the required time to perform reviews is not grounds for the EPP to request schedule extensions or change orders.

2.8.10.3 One (1) set of Owner/OE reviewed design documents, with or without comments, will be returned to the EPP. Each design document package will be submitted indicating compliance with this Specification, Codes and Standards. The EPP's resolution of these comments is required in writing. A failure to respond to the comments infers that the EPP is in agreement and shall be incorporated. A failure to meet this Specification, Codes and Standards shall not be a design change order to the project.

2.8.10.4 Following return of technically acceptable drawings, EPP, shall make corrections or revisions as required and re-submit all drawings in final form.

2.8.10.5 The Owner shall have final authority to accept or deny any equipment or engineering provided as part of this scope of work.

2.9 Proposal Documentation

2.9.1 Participating Contractors will provide the following for review and comment in the Proposal Response:

Cover Letter
Section 1 – Introduction
Section 2 – Company's Relevant Experience
Section 3 – Development Methodology and Standards
Section 4 – Proposed Approach to Scope of Work
Section 5 – Ancillary Services intended for Battery
Section 6 – Proposed Schedule
Section 7 – Proposed Management Plan and Lease Agreement
Section 8 – Major Assumptions
Section 9 – Balance Sheet
Section 10 - Pricing Quotation
Appendix: Supporting Materials
Spec Form 2 – Vendor Response Form

2.9.2 If any stand-alone Battery Investment Tax Credits are included in pricing, the contractor should indicate that in their proposal.

2.10 Schedule

The EPP shall perform the Work in accordance with the following high-level schedule. Following the Effective Date of the Agreement, the EPP will submit a project schedule with their proposals. Any updates to the schedule should be provided to Owner/OE during project meetings.

Bid Schedule:	
Lewes BPW Issue RFP	September 3, 2021
Pre-Bid Walkdown	September 10, 2021
Last Day for Questions	September 24, 2021
Bid due to Lewes BPW from Vendors	October 1, 2021
Bid Awarded	October 15, 2021

Project Schedule:	
Execution of the Agreement/Notice to Proceed	October 18, 2021
Contractor Completion of Engineering	April 15, 2022
30% Design Submittal	November 30, 2021
60% Design Submittal	January 30, 2021
90% Design Submittal	March 31, 2022
Start of Construction	August 1, 2022
Battery/PCS Vendor Factory Acceptance Testing	September 1, 2022
Completion of Construction	November 30, 2022
Commissioning System Testing	January 15, 2023
Commercial Operational Date	January 31, 2023

The EPP is to provide a detailed schedule of all project activities, with milestone dates regarding the project. The provided schedule should include event descriptions of each milestone's impact on the project development, as well as a timeline to track scheduled progress of each milestone. If the above

dates cannot be met by EPP submitted proposals, the submitting EPP shall provide a recommended schedule.

– END OF SECTION 2–

SECTION 3 – BATTERY REQUIREMENTS

3.0 BATTERY SYSTEM PARAMETERS

3.1.1 The System shall include batteries, a power conversion system (PCS) (inverters and medium voltage step-up transformers), and an energy management system (EMS).

3.1.2 The EPP shall provide power system computer aided design (PSS/E™) models of their proposed modules for use in verifying that the Interconnection Point rating is met.

3.1.3 The minimum round-trip efficiency (RTE) shall be over eighty nine percent (89%) at the Point of Interconnect (POI) through the duration of the contract.

3.1.4 Estimated System Losses for System (One-way PSCAD):

Battery/Rack Level Cell Efficiency	>98.0%
Power Conversion Efficiency	>98.0%
Auxiliary Loss (24hr duration)	0.90%
DC & AC Cable Losses (includes 15kV cable to POI)	0.45%
Medium Voltage Transformer Efficiency	98.86%

3.1.5 The system shall be designed to maintain ninety eight percent (98%) availability, excluding scheduled maintenance. See Section 11 and Section 12 for additional required Performance Guarantees.

3.1.6 EPP shall include in their proposal responses any deviations or modifications to the estimated system losses identified above.

3.1.7 Battery MW and MWh will be metered at 15kV breaker installed in Schley Ave Substation. MV Transformer and HVAC losses must be accounted for in defining the ratings for the system.

3.2 BATTERY REQUIREMENTS

3.2.1 The EPP shall supply batteries, associated racks and connections. Specifications for the battery equipment are the responsibility of the EPP. Terminations and interconnects shall have adequate current carrying capacity and shall be designed as specified.

3.2.2 The System's direct current (DC) system rated name plate capacity (MWh) shall be as required to achieve the required alternating current (AC) output (*end of life or augmentation point*). The EPP shall determine if this will be achieved through margin, augmentation or replacement. If required, the EPP shall be responsible for the augmentation or replacement of the System to maintain the AC output throughout the Term of the Agreement. All augmentation shall be located in the same initially specified footprint/parcel area as defined in Attachment 3. All augmentation design shall comply with the Battery Vendor requirements and shall be comprised of new, never used before batteries.

3.2.3 The EPP shall provide an augmentation program with their proposal documentation and an updated preliminary plan prior to Substantial Completion and an update final plan prior to

the COD date and update the plan every year and up to the Term of the Agreement. The plan shall include the number of additional battery strings that need to be added to the system over the remaining Term of the Agreement and how each existing battery string will be revised to account for the displaced racks/modules, the space required, and potential layout required.

3.2.4 The EPP is responsible for the DC cable jumpers within each rack to the Battery Management System (BMS) and the DC cables to the DC summation junction point or bus. The cables shall be low smoke, zero halogen construction. The EPP is also responsible for the DC Disconnect Switch between the battery and the PCS. This DC Disconnect Switch shall be viewable from the PCS and the enclosure rated for the environment it is installed in. The EPP will also be responsible for the AC Cables up to the POI on the 15kV Bus inside the Schley Ave substation.

3.2.5 The battery system components (e.g., racks) are required to fit within the Site (see sketch provided in Attachment 3). The EPP can modify the conceptual Equipment layout to accommodate their Design; however, the Site area is fixed, and no additional area shall be available without the Owner's explicit written approval. Proposed Equipment layouts shall consider as a minimum, System Equipment footprints, auxiliary buildings/enclosure footprints, minimum Equipment clearances, minimum space required for hot air venting, fire protection access, construction access, temporary equipment laydown areas, and maintenance access.

3.2.6 Aisle spacing between racks shall conform to the applicable codes and allow clearance for maintenance and module removal.

3.2.7 The EPP is to provide module lifting carts for the removal and installation of the modules within the racks as required.

3.2.8 The battery wiring shall be sized with adequate capacity and protection for individual cells as well as distinct areas of the DC system in accordance to NFPA 70. The wiring shall have stranded copper or aluminum conductors with flame retardant thermo-plastic insulation rated at 90°C in accordance to NFPA 70.

3.2.9 Battery cells, racks, and wiring shall be insulated for the maximum expected voltages plus a suitable factor of safety of 25% as well as what is recommended by NFPA 855, NESC and NFPA 70.

3.2.10 Batteries, racks and connections shall meet all standards, codes, and requirements set forth under Section 14.

3.2.11 Rack Configurations and design: Given the space limitations of the System, the EPP shall have the flexibility to provide a rack design that meets the Site and System needs, including but not limited to, development of a custom rack to support even module distribution between split rack strings.

3.2.11.1 Rack designs shall be seismically rated and shaker tested (when under load with battery modules).

3.2.11.2 Rack anchoring design and the evaluation of the existing foundation is the responsibility of the EPP with information provided by the Battery OEM.

3.2.11.3 Rack Configurations shall be UL9540A tested and certified. See Section 7 for all other fire protection requirements.

3.3 RAMP RATES

3.3.1 Ramp rates shall be designed to prevent backflow onto the 69kV line at Schley Avenue Substation.

3.3.2 The allowable ramp rates (MW/sec) are specified in Section 11 of this Document.

3.4 SYSTEM RESPONSE TIME

3.4.1 The system shall be able to respond to any dispatch instruction to support islanding of Schley Avenue Substation Feeder #1 in the event of an outage. System response time defined as time from receipt of dispatch instruction by EPP EMS to start of change in system output.

3.5 STARTS AND OTHER RUN TIME LIMITATION REQUIREMENTS

3.5.1 Start limitations: None

3.5.2 Run time limitations: In addition to any limits imposed by the operational characteristics, the System will be limited to one full discharge cycle per day at the Interconnection Point, and one full charge cycle per day.

3.5.2.1 The minimum run time after a discharge start-up is: 1 second

3.5.2.2 The minimum run time after a charge start-up is: 1 second

3.5.2.3 The minimum down time after a shutdown is: 1 second

3.6 SYSTEM APPLICATIONS

3.6.1 At ISO conditions, normal efficiency mode, the full Contract Capacity shall be available to provide any of the below ancillary or energy arbitrage services (and any other proposed use cases):

3.6.1.1 Peak Shaving

3.6.1.2 Islanding of Feeder #1 at Schley Ave Substation

3.7 BATTERY RACK REQUIREMENTS

3.7.1 Labeling of the battery rack or module shall include manufacturer's name, cell type, nameplate rating and date of manufacture, in fully legible characters or quick response (QR) code. Labeling shall adhere to ANSI standards and be suitable for outdoor, coastal applications.

3.7.2 All battery racks shall meet current State and Local building code requirements for the intended installation.

3.7.3 All racks and conductive members of the modules shall be solidly grounded.

3.8 ACCEPTANCE TESTING

3.8.1 Factory Acceptance testing may be required prior to shipment of equipment. Owner's engineers will visit factory and test equipment operability.

3.8.2 Site Acceptance testing will be required and performed on site in the final configuration of installation. Full operation is required at this time as well as all documentation and training.

3.9 BATTERY TESTING

3.10 As part of the performance guarantee, annual pre-scheduled capacity tests are required. Battery will be fully charged prior to the annual capacity test

3.10.1 See Section 13 of this Agreement for additional testing requirements.

– END OF SECTION 3–

SECTION 4 – POWER CONVERSION SYSTEM AND MEDIUM VOLTAGE TRANSFORMER REQUIREMENTS

4.0 TECHNICAL REQUIREMENTS

4.1.1 System Criteria

4.1.1.1 The Power Conversion System (PCS) is a component of the System that converts the Battery output DC voltage to sync with the voltage at the Point of Interconnection. It includes bi-directional inverters, and MV transformers. The MV transformers will be provided by the Owner. The System rating and system parameter assumptions shall meet RFP requirements, as well as be compliant with all applicable grid codes.

4.1.2 Design Requirements

4.1.2.1 Each PCS shall be of a rating to support / complement the battery strings and consist of quick response, bi-directional utility grade inverters and pad mounted or skid mounted transformers. EPP shall provide inverter and transformer installation options, for the MV transformers provided by the Owner, and recommendations (e.g. number of inverter and transformer combinations, direct coupled transformer to inverter, noise mitigation, etc.).

4.1.2.2 EPP shall provide an inverter that meets all requirements set forth in Attachment 1.

4.1.2.3 EPP shall meet the total capacity of inverters and transformers required as set forth in Attachment 1.

4.1.2.4 EPP shall provide an inverter design to perform the intended functions specified herein, and work as intended with the Owner provided MV Transformers, which will assure compliance with the RFP operating requirements.

4.1.2.5 EPP shall optimize the selected inverter for the ambient conditions to account for derating. See Attachment 1.

4.1.2.6 EPP shall provide an inverter that can regulate the power level at the inverter output (e.g. via a power measurement or current transformer (CT)/potential transformer (PT) closed loop feedback control, or equivalent method). The system shall have the ability to regulate power at the POI.

4.1.2.7 EPP shall provide a PCS system that is able to achieve full power rating across the entire AC voltage range (+/- 10% of rated).

4.1.2.8 Performance testing for PCS system shall be measured at the POI on the 15kV voltage level of the System Interconnection Point.

4.1.2.9 EPP shall certify that the proposed inverter and owner-provided medium voltage transformer for each battery string will fit into Owner's allocated available area, as depicted

in Attachment 3, and shall perform as contractually expected for the duration of the contract.

4.1.3 Grounding

4.1.3.1 The PCS grounding design shall be coordinated with the Project Site grounding grid design.

4.1.3.2 The available fault current from the substation will be provided to the successful EPP to ensure adequate grounding is designed.

4.1.3.3 PCS shall be designed so that it will provide personnel protection for step and touch potential in accordance with IEEE standards. The PCS protection shall be adequate for the detection and clearing of ground faults.

4.1.3.4 All exposed non-current carrying metal parts in the PCS shall be solidly grounded at multiple connection points. EPP shall make best efforts to prevent corrosion at the connection of dissimilar metals such as aluminum and steel.

4.1.3.5 EPP shall ensure that the PCS is adequately protected from lightning by including appropriately sized surge suppression devices.

4.1.3.6 EPP shall ensure that the electrostatic shielding of the PCS shall extend and adequately protect the medium voltage transformers.

4.1.3.7 EPP shall supply grounding model for use by Owner upon project completion.

4.2 EQUIPMENT

4.2.1 Utility Grade, Bi-Directional Inverters

4.2.1.1 The inverter shall include devices capable of interrupting line-to-line fault currents and line-to-ground fault currents.

4.2.1.2 The inverters shall include all necessary self-protective features and self-diagnostic features to protect the inverter from damage in the event of component failure or from parameters beyond normal operating range due to internal or external causes. The self-protective features shall not allow the inverters to be operated in a manner which may be unsafe or damaging. Faults due to malfunctions within the inverter or system equipment shall be cleared by the inverter over-current protection device.

4.2.1.3 The inverter AC output should be protected by a suitably rated 3-phase AC Circuit breaker.

4.2.1.4 The EPP will evaluate and design to address adjacent inverter crosstalk and voltage spikes for the 10-year(or 20-year) period.

4.2.1.4.1 Inverters and pad mount transformers shall not add a bias on the DC bus thus affecting the common mode voltage of the batteries.

4.2.1.5 The inverter grounding system shall be designed so that it will provide personnel protection for step and touch potential in accordance with IEEE standards. The system shall also be adequate for the detection and clearing of ground faults. The inverter grounding system shall also be adequate to dissipate any power system electrical transients produced by the BESS. All the exposed non-current carrying metal parts in the inverter package shall be solidly grounded. The inverters shall be adequately protected from lightning such that neither inverters nor components fail.

4.2.1.6 Except for the requirements set forth elsewhere in this scope of work, in the event of a grid-failure, the inverters should be capable of islanding Feeder #1 at Schley Ave Substation. The system shall be designed in accordance with IEEE 1547, and any applicable grid codes. The inverter should be capable of islanding detection by both passive (over- and under-voltage or frequency) measures and at least one active measure, as required. The inverters shall have the capacity to remain synchronized during allowable voltage variations resulting from faults on the transmission network.

4.2.2 Medium Voltage Transformer

4.2.2.1 4 – 2.2MVA 13.2kV-480V Oil-Filled Transformers will be provided by the Owner for use in this project. The nameplate information is included in Attachment 2.

4.2.3 Spare Parts and Special Tools

4.2.3.1 The EPP shall furnish recommended spare parts for the BESS system as well as all special tools needed for the maintenance of the BESS, as required. The scope of spare parts and special tools must be coordinated with the requirements/guarantees for reliability and availability. This equipment must be stored onsite.

4.3 ACCEPTANCE TESTING

4.3.1 Factory Acceptance testing may be required prior to shipment of equipment. Owner's engineers will visit factory and test equipment operability.

4.3.2 Site Acceptance testing will be required and performed on site in the final configuration of installation. Full operation is required at this time as well as all documentation and training.

– END OF SECTION 4–

SECTION 5 – ENERGY MANAGEMENT SYSTEM REQUIREMENTS

5.0 GENERAL REQUIREMENTS

5.1 EPP shall provide all necessary hardware and a software platform that acts as the master controller over both the battery management system and the power conversion system inverter controller, referred to here as an Energy Management System (EMS). The BESS software must operate in a manner designed to monitor, optimize, and protect the battery asset. Optimization shall include but not be limited to controlling state of charge for the BESS and individual lineups in a manner that maximizes efficiency and battery life. Software shall perform a closed loop control to maximize PCS accuracy within two (2) seconds.

5.2 The EPP shall provide an EMS to control the inverters to perform the specified and intended functions of the BESS. The EPP shall perform a factory acceptance test of the EMS to confirm functionality of the control system independently and integrated with the BMS.

5.3 An HMI shall be provided on site located on near a fire protection panel, detailed in Section 7, separated from the BESS by an appropriately sized Fire Barrier.

5.4 The EPP shall provide periodic technology upgrades and provide a plan to expand the capabilities of the BESS software controls.

5.5 The BESS while operating relatively autonomously will be required to communicate with the Owner's control system in several ways.

5.5.1 Conditions resulting in high level, catastrophic alarms that could impact the Schley Ave Substation should be routed to the annunciator panel in the Substation Control House. See Exhibit 1 for station drawings. This should be done by installing SEL-2505/6 remote I/O modules, or approved equivalent, in the Battery Control room and in the Substation Control House. A fiber connection between them deliver the alarm signal using SEL Mirrored Bits, then outputs wired to the station annunciator.

5.5.1.1 All Available Alarms from the BESS shall be included in the proposal.

5.5.2 Site meters shall be designed and procured by the EPP. These meters shall be installed in the Schley Avenue Substation, and signals routed to the EMS to control dispatch of the BESS.

– END OF SECTION 5–

SECTION 6 – HVAC AND THERMAL MANAGEMENT REQUIREMENTS

6.0 BATTERY THERMAL MANAGEMENT & HVAC REQUIREMENTS

6.1 General System Requirements

6.1.1 The EPP will be responsible for any upgrades to ensure the selected BESS Site meets the following requirements.

6.1.2 All HVAC drawings and calculation shall be signed and stamped by a Professional Engineer licensed in the state of Delaware

6.1.3 The EPP shall design and furnish thermal management system for the System that adequately provides a method for evacuation of the heat generated during the charging and discharging Cycles (Battery Operational) of the battery racks, maintains the temperatures and ambient humidity such that it keeps the batteries within the manufacturer's recommendations for operating temperature and humidity, as well as not impacting or nulling the Owner's warranty. The heat generated by the batteries shall consider any heat load increases towards end-of-life operation.

6.1.4 The thermal management system shall consist of recirculation air handling units with economizer capabilities. Direct expansion (DX) cooling coils with heat pumps shall be provided unless it is shown that they are not required by the heat load calculation. Each Heating, Ventilation, and Air Conditioning (HVAC) unit shall also include pre-filters and final filters.

6.1.5 The HVAC system shall be designed to provide constant, uniform air distribution to all battery racks. The Contractor shall deliver thermal models demonstrating equal battery rack temperature distribution, achieved through the system's design of uniform air flow distribution.

6.1.6 All components of the HVAC system shall be designed for the corrosive, salt-air environment of the area.

6.1.7 Depending on the battery manufacturer selected, the supply air shall be ducted to the battery racks using a cold/hot aisle design. The battery racks will pull air from the cold aisles and discharge the hot air out of the back of the rack. Alternatively, batteries may utilize a liquid cooling system.

6.1.8 If self-contained modular battery systems are provided with an integral HVAC system, condensing units shall be located outdoors. General ventilation shall be provided for the building and shall take into account any ancillary equipment outside of the battery modules. Ventilation shall be sized for a 10 deg F temperature rise above ambient.

6.1.9 Cooling for the inverters shall be provided by their own air-cooled systems, supplied by EPP, and therefore should not require cooling from other heating and ventilation systems. Any heat rejected by these systems to the space shall be considered in the overall heat load of the building.

6.1.10 Any HVAC system for occupied sections of the facility shall be designed in accordance with ASHRAE 62.1. Temperatures for occupied spaces shall stay within 70°F to 77°F.

6.1.11 Where servicing critical equipment, the HVAC system shall be provided with N+1 redundancy such that battery system capacity and operation maintain the design requirements if any one piece of equipment may be offline. The HVAC system shall be served

by both primary and backup power service.

6.1.12 Any batteries provided that produce hydrogen shall have dedicated and redundant exhaust fans in the space that limit the hydrogen concentration to acceptable levels per NFPA 855.

6.2 System Sizing

6.2.1 The heating and cooling required for each space shall be calculated in accordance with the methodology described in ASHRAE-183 and ASHRAE “Fundamentals Handbook”. All system sizing calculations shall be provided to the Owner for review.

6.2.2 The heating and cooling load calculation shall include, as a minimum, heat load from the battery racks, cable trays, miscellaneous electrical equipment, transformers, ventilation, lighting, and external transmission and solar loads through the building envelope. The cooling load shall be evaluated for all operating scenarios.

6.2.3 System sizing shall determine if variable air flow or cooling staging is required based on different operating scenarios and equipment shall be selected accordingly.

6.2.4 A CFD analysis shall be performed to demonstrate balanced air distribution and that the design temperature can be achieved in all areas of the battery module or building.

6.3 Energy Efficiency

6.3.1 The overall design of the thermal management system and the system equipment and components shall meet the applicable requirements of ASHRAE 90.1 and local energy codes.

6.4 Fire Protection

6.4.1 The design of the thermal management systems shall meet the applicable requirements of NFPA 90A "Installation of Air Conditioning and Ventilating Systems" and Section 7 of this Document.

6.4.2 Upon receipt of a signal from the Fire Alarm Control Panel, the building automation system shall shutdown all HVAC equipment. The HVAC system shall only restart on operator action only. This requirement does not apply to ventilation systems for emergency exhaust.

6.5 System Controls

6.5.1 The HVAC system shall be controlled by a Building Automation System (BAS). The central BAS Control Panel shall be installed in the Admin Building (see Exhibit 4). HVAC system alarms and status shall be wired to the system EMS and SCADA networks.

6.5.2 The HVAC system controls shall meet the applicable requirements of ASHRAE 90.1 and ASHRAE 135 (BACnet).

6.5.3 The BAS shall receive status and alarm signals sufficient to provide information required for regular maintenance and troubleshooting, including, but not limited to, temperature alarms, fan trouble alarms, filter differential pressure alarms, etc.

6.6 Ductwork

6.6.1 Ductwork shall be sized in accordance with the guidance contained in the ASHRAE “Fundamentals Handbook”.

6.6.2 Ductwork air velocities shall be in accordance with the suggested range of air velocity shown the ASHRAE “Fundamentals Handbook” and the ASHRAE “Applications Handbook”.

6.6.3 Ductwork supports shall be designed in accordance with SMACNA duct construction standards.

6.6.4 Ductwork shall be designed using radius elbows without turning vanes whenever possible.

6.6.5 Manual balancing dampers shall be located at each major branch takeoff and at run outs to diffusers and grilles of supply, return, and exhaust.

6.6.6 An access door shall be provided in ducts adjacent to each fire damper, smoke damper, and smoke detector. The opening shall be large enough to permit maintenance and resetting of the device.

6.6.7 Ductwork shall not block the operation of the sprinkler system.

6.7 Insulation

6.7.1 HVAC system insulation requirements shall be in accordance with the requirements of ASHRAE 90.1 and applicable federal, state, and local codes.

6.7.2 Ductwork, casing, piping, and equipment with surface temperatures below the ambient dew point temperature shall be insulated.

6.8 Environmental Design

6.8.1 See Attachment 1 for Environmental Design requirements.

6.9 Testing

6.9.1 After installation, Contractor shall provide Testing and Balancing (TAB) for all HVAC systems using personnel experienced and certified in TAB activities.

6.10 Deliverables

6.10.1 Contractor shall provide documents and drawings for review including, but not limited to: flow diagrams, sequence of operation, vendor data sheets, duct design drawings, calculations, thermal model report, and test reports.

– END OF SECTION 6–

SECTION 7 – FIRE PROTECTION REQUIREMENTS

7.0 Purpose and Scope

7.1 General Requirements

7.1.1 This Specification shall dictate the minimum fire protection system requirements for all Battery Energy Storage Systems (BESS), Energy Storage Systems (ESS), and equipment located:

- In new buildings and structures
- In existing buildings and structures
- In a combination of one or more of the above shared on the same site

7.1.2 This specification establishes the preferred levels of performance and quality of installation but does not establish the only methods by which these requirements are to be achieved. Nothing in this specification shall prevent the use of systems, methods, components, devices, equipment or appliances of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this specification (except as noted or prohibited).

7.1.3 This specification applies to new installations and shall be used to upgrade existing facilities or sites, as appropriate. It is recognized that not all provisions of the document may be met for existing facilities. Deviations at existing facilities or sites, once identified, shall be brought to the attention in writing of the Lewes BPW Fire Protection, Loss Prevention Group(s) and Lewes BPW Corporate Management (hereafter all three (3) referred to as the Owner) for disposition. Supporting documentation of rationale shall be generated, approved, and maintained by the applicable(s) for any deviation from the requirements of this specification.

7.1.4 Passive fire protection measures shall be used instead of active fire suppression measures whenever possible.

7.1.5 This specification identifies the suggestions for the design, manufacturing, delivery, installation and testing of fire detection, alarm and notification systems (including 3 separate and individual full color video and active LED graphic fire alarm annunciators and related sub-systems including automatic wet pipe sprinkler systems throughout the entire building, automatic double interlock pre-action sprinkler systems for all battery racks with rack sprinkler assemblies, Class III automatic wet pipe standpipe systems and hose stations, intelligent addressable smoke detectors, EWFD (early warning fire detection) air sampling detection systems both at the ceiling level and each battery rack level, both hydrogen and carbon monoxide gas detection systems (listed to UL 2075) both at the ceiling level and each battery rack level, manual pull stations, in-duct smoke detectors with remote wall mounted test stations, Thermal Management System ventilation interfaces and controls, control panels with manual switches to operate smoke and heat control systems for responding fire service personnel, battery management system (BMS) interfaces, electric motor driven fire pump(s) and controllers (including all new electrical feeds), new underground and above ground water supplies to the building, fire department emergency pre-plans, fire department training all hereinafter referred to collectively as the fire protection system(s).

7.1.6 Adherence to the requirements of the owner's insurance carrier must be strictly adhered to.

7.1.7 This is a design-build, “turn-key” project. The fire protection systems contractor (hereafter referred to as the Contractor) shall be responsible for the design and installation of fully functional, operational and approved fire protection systems and sub-systems. The Contractor shall be responsible for all material, labor, logistical, and technical resources and coordination necessary for the complete execution of all particulars of this specification.

7.2 Contractors Responsibilities and Services

7.2.1 The term "provide" shall mean design, engineer, submit detailed design and installation drawings and calculations, prepare detailed analyses and reports (including pre-fire plans for both during construction and upon completion of the battery installation), fabricate, manufacture, assemble, furnish, deliver, install, supervise construction including attending daily and/or weekly meetings at the construction site and/or off site, startup and commission, test, and train local fire department personnel and Owner personnel.

7.2.2 The work shall include all necessary and/or usually supplied equipment and appurtenances for the safe, efficient, and convenient operation of the systems within the scope of this specification whether or not such items are specifically referred to in this specification. The work shall include start-up spare parts and special tools required for erection.

7.3 Owners Quality Assurance

7.3.1 All analyses, calculations, reports and subsequent revisions shall be signed and sealed (including the detailed formal exit analysis drawings) by a Fire Protection Engineer (FPE) having a current professional membership grade in the Society of Fire Protection Engineering (SFPE) and licensed in the State of Delaware, and by a State of Delaware licensed architect. In addition, each document shall have the name(s) of the preparer and the reviewer(s).

7.3.2 All fire protection and detection design drawings and calculations shall be prepared by an individual certified Level III or higher, and reviewed by an individual certified Level IV, by the National Institute for Certification in Engineering Technology (NICET). The preparers/reviewers shall be certified in the respective design disciplines (i.e., fire suppression or detection). The documents shall be approved by a Professional Engineer Licensed to practice in the state of Delaware. All documents (both design drawings and calculations – no exceptions) shall include the names, certification numbers, and NICET Level of the preparers and the reviewers will not be reviewed until all information has been provided.

7.3.3 All analyses, calculations, and reports (including all subsequent revisions) shall be submitted to Owner and the Owners Insurance Company for review, comment and approval. All analyses, calculations, and reports shall not be submitted to the local statutory authorities for review, comment and approval without formal written permission by the Owner.

7.3.4 All reports shall be considered as a living document and shall be revised or updated throughout the design process and construction process when a design change has been implemented.

7.3.5 Approval by the Owner and / or Owner’s Engineer of any variances, exceptions, and clarifications shall be contingent to the ultimate approval by the authority having jurisdiction. As a minimum, exemptions for the following requirements will need to be obtained in order to delete or modify:

- Fire department building access knox box
- Off-site central station monitoring

7.3.6 In the event of differences between the requirements of the applicable codes, referenced standards, Owners insurance requirements and this document, the more stringent requirement(s) shall apply (provided by the Contractor) in all cases.

7.3.7 The Contractor shall submit all Contractor submittal documents to the Fire Protection Architectural and Engineering (FPE) Consulting Firm above for review and comment for completeness, accuracy, consistency, code and standard compliance, specification compliance, and compliance to the above mentioned required reports, prior to submission to the Owner. All FPE review comments shall also be submitted to the Owner for review with the Contractor's submittal.

7.3.8 All materials (components, devices and equipment) required to complete the work described in this specification shall be provided by the Contractor and Factory Mutual (FM) Approved.

7.3.9 The use of materials (components, devices and equipment) that are not listed or approved by a recognized US testing organization (UL and FM only) for its intended use shall be prohibited, no exceptions. For example, the following types of sprinklers installed within battery racks and battery rack modules are prohibited: custom-made fire protection materials or materials only available outside of the continental US that are part of the ESS or BESS UL 9540 and/or UL 9540A testing and certification process, and metric fire protection materials that are part of the ESS or BESS UL 9540 and/or UL 9540A testing and certification process.

7.3.10 The use of tubing and tubing fittings to supply fire protection water to battery rack sprinkler assemblies or battery rack module sprinklers shall be prohibited.

7.3.11 The use of fire detection devices or fire alarm control units (panel) manufactured or assembled outside the United States of North America shall be prohibited.

7.4 Fire Protection Master Plan and Associated Project Documents

7.4.1 The following project Fire Protection Master Plan detailed documents as a minimum shall be prepared and submitted to the Owner as part of the initial design process. They include:

7.4.1.1 Combination Building and Fire Codes, and Life Safety Compliance Review documents

7.4.1.2 Combination hazard mitigation analysis (HMA) and fault condition documents

7.4.1.3 A detailed narrative description of the BMS and BESS system architecture including all inputs (for example monitoring points, number of and location of thermo couples, temperature sensors, etc.) and out puts.

7.4.1.4 Deflagration analysis, calculation and mitigation documents

7.4.1.5 Emergency Fire Pre-plans and Response for during construction documents

7.4.1.6 Emergency Fire Pre-plans and Response for after all construction is completed documents

7.4.1.7 A detailed narrative description of routine maintenance required or recommended (both by the manufacture, NFPA 25 and 72) or as would be provided under a maintenance contract, including a maintenance schedule and detailed maintenance instructions for each type of device or equipment installed required documents.

7.4.1.8 All required analysis and calculations required by the AHJ and the applicable codes and standards, etc.

7.4.2 All reports shall be prepared by an independent third party professional Fire Protection Architectural and Consulting Engineering Consulting Firm (or Owner reviewed and approved equal Engineering Firm located within the US) experienced in the preparation of fire protection and life safety master plans, building code reviews and analysis, detailed exit/egress analysis calculations and diagrams, and building code negotiations. The firm shall be contracted by the Contractor for this scope of work. The use of the Contractor's in-house staff to prepare the report instead of an independent third-party Fire Protection Architectural and Engineering Consulting Firm shall be prohibited**.**

7.4.2.1 Acceptable Fire Protection Architectural and Engineering (FPE) Consulting Firms are:

- Code Consultants
- Fire & Risk Alliance, LLC
- FPI - The Fire Protection International Consortium, Inc
- Jensen Hughes and Associates
- Owner reviewed and approved equal

7.4.3 In the event of differences between the requirements of the applicable codes and standards, referenced standards, applicable insurance carrier requirements and this document, the more stringent requirement(s) shall apply (provided by the Contractor).

7.4.4 The documents shall describe in detail (provide) in a separate section the following battery energy storage system information:

7.4.4.1 Total of number of battery racks for the project.

7.4.4.2 Total number of battery racks stacked, including the total height of the stacked equipment.

7.4.4.3 The physical dimension length x width x height (all in inches) and weight (in pounds) for each type of enclosure provided for the project.

7.4.4.4 The physical dimension length x width x height (all in inches) and weight (in pounds) for each type of battery rack (or power packs and mega power pack) provided for the project. In addition, the number of modules for each type of rack provided shall be provided.

7.4.4.5 Rack door swing dimension (in inches) from the face of the rack (or power packs and mega power packs) with the door 90 degrees from the face and the working clear space that is required for safety and to be able to remove a battery module for each type of rack provided for the project.

7.4.4.6 Internal cooling and heating. Include the number of air changes per hour (worst case scenario).

7.4.4.7 The physical dimension length x width x height (all in inches) and weight (in pounds) for each type of transformer provided. Indicate if dry type or contains a liquid cooling media (include quantity of media in gallons, flash point, and if fire retardant cooling media is being used). Also, provide the transformer voltage and current ratings and all working clear and safety dimension (in inches) required around the equipment.

7.4.4.8 The physical dimension length x width x height (all in inches) and weight (in pounds) for any auxiliary required piece of equipment (for example switchgear).

7.4.4.9 Raised floors (if required or provided).

7.4.4.10 The power output both in kilowatts, kilowatt hours and voltage for each type of battery rack (or power packs and mega power packs) provided for the project.

7.4.4.11 Underwriters Laboratories (UL) listings that the equipment has been tested to and passed. Include the control or issue number (issue/serial number or alphanumeric control number).

7.4.4.12 Any special fire suppression, fire detection and/or gas detection that is required to pass (listed or certified) UL9540/9540A.

7.4.5 In addition to the above sections, the report shall be provided with separate sections that identify and address at a minimum the following:

7.4.5.1 All applicable federal (for example Code of Federal Regulations (CFR), OSHA, etc.) state and local building and fire codes, standards, recommendations and amendments. Applicable mechanical codes, electrical codes, energy code, plumbing code, and Owner required insurance standards shall also be identified.

7.4.5.2 Building classification, occupancy and permitted construction type.

7.4.5.3 Building height and area limitations (per floor).

7.4.5.4 The report shall include a definition section in the beginning of the report. As a minimum, definitions shall be provided for:

- Normally occupied
- Normally unoccupied
- Confined space
- Fire Resistive non-combustible

- Fire Protection System
- Combustible
- Non-combustible
- Flammable and non-flammable liquids and gases.
- Construction Type(s)
- Occupancy Classification
- Occupancy Classification H-2, F-1 and S
- Battery rack, battery module, battery cell
- Battery string
- Deflagration Venting

7.4.5.5 Occupancy use groups.

7.4.5.6 Construction and fire resistance rating (including fire proofing) requirements for all exterior and interior walls (bearing and non-bearing), and structural supports including the following (all applicable):

- Structural Framing Members (Supporting floor and roof)
- Exterior Bearing Walls
- Floor Construction
- Roof Construction
- Exit Enclosures
- Exterior Bearing Walls and Vertical Openings between Floors / Stories
- Exit Enclosures Door Openings
- Other Shaft Enclosures
- Smoke Barriers (Including Smoke Compartments)
- Smoke Partitions (Compartments)
- Fire Barriers (except For Exits / Shafts)
- Fire Barrier Openings (Except Exits)
- Exit Access Corridors
- Incidental Use Areas
- Other Non-load Bearing Partitions

7.4.5.7 Means of egress and exiting requirements including the following (all applicable):

- Remoteness of Exits
- Max Travel Distance to an Exit
- Max Travel Distance to Smoke Barrier
- Max Travel Distance from Exit Access Door to Exit
- Max Common Path of Travel
- Minimum Stair Width
- Accessible Means of Egress
- Minimum Exits Per Floor
- Max Dead End Corridor Length
- Area of Refuge

7.4.5.8 Detailed exit analysis and calculations.

7.4.5.9 Prepare and submit detailed formal exit analysis drawings documenting occupant loads, required exit widths, occupant load distribution and travel distances.

7.4.5.10 Accessibility (ADA) requirements (if applicable).

7.4.5.11 Building layout (e.g., hazard separation, fire barriers, drainage and containment).

7.4.5.12 Any alternate means & methods that could reduce construction cost. All variances, exceptions, and clarifications to the codes, standards, and recommended practices shall be clearly identified, referenced to the paragraph number of the code, standard, or recommended practice and the reason why the variance, exception, or clarification is required or proposed.

7.4.5.13 Combustible and flammable gases and liquids, and solid materials – transfer Substations and equipment, process equipment and storage - quantity limitations, fire protection requirements, storage requirements (including reactivity with other materials, separate drains and containment, grounding, lightning protection, etc.).

7.4.5.14 Occupancy and area separation requirements.

7.4.5.15 Fire detection, alarm and notification system requirements and a detailed description what will be provided for the project and how the various fire suppression systems will activate.

7.4.5.16 Sprinkler/Standpipe and fire hose project requirements (duration, flows, pressures and sprinkler densities, etc.). FM Global sprinkler densities and fire hose allowance.

7.4.5.17 Fire protection water supply requirements including fire flow requirements.

7.4.5.18 Location of all existing fire hydrants and all new fire hydrants (if required).

7.4.5.19 Fire Department primary and secondary entrance access to both the site and the enclosures.

7.4.5.20 Emergency power and lighting requirements.

7.4.5.21 Smoke control and ventilation requirements. Including ventilation requirements for each building and enclosure. A detailed description shall be provided describing (automatic mode, manual mode, panel description, etc.) the smoke and heat control system for fire fighter service, power supply (primary and backup) for ventilation equipment and the hazardous classification for vent fans.

7.4.5.22 The report shall include a section discussing as to how the state and local fire and building codes, and NFPA 1 and 101 shall be treated in terms of hierarchy with respect to the model codes. Also, a comparison of NFPA 1 and 101, insurance carrier requirements, and the applicable model building codes as they apply to the design and construction for the project.

7.4.5.23 The report shall include a section discussing the battery management system (BMS) on how it works including any built-in safety features to reduce battery thermal runaway. In addition, this section will also discuss how the individual battery drawers (modules) and cabinets are ventilated.

7.4.5.24 The report shall include as an attachment the safety data sheets (SDS) for each type of battery used for the project.

7.4.5.25 The report shall include as an attachment a copy of the test report and the test data for Cell/Module/Unit level UL 9540A testing of the installation. The report shall include all information required by UL9540A and in addition should identify hydrocarbon gasses, hydrogen, and specifically HF, CO, CO2, Formaldehyde, HCL, HCN, Methane, Propane, SO2, Toluene, H2S, Ethylene, Ethane, oxides of (nickel, aluminum, lithium, copper, cobalt), POF3, and any other hazardous chemicals.

7.4.5.26 The report shall include as an attachment a deflagration analysis.

7.4.5.27 The report shall include a section describing in detail and discussing combustible insulations (for example polyurethane and polyisocyanurate foam insulation), bonding agents, facer coatings, and finish materials contained in insulation or noise reduction assemblies (walls, ceilings, and roof assemblies) may exhibit self-propagating behavior in the event of even a small fire or create toxic gases when exposed to either heat or fire.

7.4.5.28 The report shall include a section describing in detail and discussing any clean agent fire extinguishing systems.

7.4.5.29 The report shall include a section discussing transformer provisions for drainage and any associated drainage and containment for each transformer.

7.4.5.30 The report shall discuss current available site water flow and pressure near the interface points that will be used to bring in fire protection water into the enclosures. The Contractor shall be responsible for obtaining current water flow test information for both input into the report and designing his systems.

7.4.5.31 The report shall include as an attachment the manufactures installation manuals that were reviewed and listed (or approved) as part of the 9540/9540A testing, certification and listing process.

7.4.5.32 The report shall be indexed and include drawings and sketches properly displaying the areas relative to each item listed above.

7.4.5.33 Location and content of signage shall be provided.

7.4.6 The Contractor shall incorporate all requirements of the approved documents into their scope of work at no additional cost to the Owner.

7.4.7 A separate and independent battery energy storage system detailed combination hazard mitigation analysis and fault condition document shall be prepared, reviewed and approved by both the AHJ and Owner and Owner's Engineer. The document shall meet all the preparation requirements as for all formal documents (reports) requirements.

7.4.8 The document shall describe in detail and provide in a separate section and attachments the following:

7.4.8.1 All battery energy storage system information as outlined above.

7.4.8.2 The report shall include a section discussing the battery management system (BMS) on how it works including any built-in safety features to reduce battery thermal runaway. In addition, this section will also discuss how the individual battery drawers (modules) and cabinets are ventilated.

7.4.8.3 The report shall include as an attachment the safety data sheets (SDS) for each type of battery used for the project.

7.4.8.4 The report shall include as an attachment a copy of the test report and the test data for Cell/Module/Unit level UL 9540A testing of the installation. The report shall include all information required by UL9540A and in addition should identify hydrocarbon gasses, hydrogen, and specifically HF, CO, CO2, Formaldehyde, HCL, HCN, Methane, Propane, SO2, Toluene, H2S, Ethylene, Ethane, oxides of (nickel, aluminum, lithium, copper, cobalt), POF3, and any other hazardous chemicals.

7.4.8.5 The document shall include as an attachment a deflagration analysis.

7.4.8.6 The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

- A thermal runaway condition in a single ESS rack, module or unit.
- Failure of any battery (energy) management system.
- Failure of any required ventilation or exhaust system.

- Voltage surges on the primary electric supply.
- Short circuits on the load side of the ESS.
- Failure of the smoke detection, fire detection, fire suppression, or gas detection system.
- Required spill neutralization not being provided or failure of a required secondary containment system.

7.4.8.7 The hazardous mitigation analysis shall show or demonstrate the following:

- Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire resistance rated separations identified by the AHJ, the Owner, etc.
- Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
- Toxic and highly toxic gases released during fires will not reach concentrations in excess of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
- Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).

7.5 Owners Submittal Reviews

7.5.1 Owner or Owner's Engineer's acceptance of Contractor's documents (drawings, calculations, manufacture data sheets, reports, etc.) shall not relieve Contractor of responsibility for the adequacy and accuracy of fabrication, assembly, or design, nor will the Owner be responsible for the quality of the work, material, or performance of any item with respect to Contractor's design. Owner or Owner's designated representatives' acceptance does not relieve Contractor of any responsibility for interference that may result from an incomplete drawing review and/or field survey by the Contractor.

7.5.2 Acceptance or approval of submittals by the Owner shall in no case constitute a change to the contract or relieve the Contractor from his obligation to meet all requirements of the specifications. The Contractor and his subcontractors shall be responsible for performing their own quality assurance.

7.5.3 The Contractor shall deliver the required submittals to the Owner. Submittals will be reviewed for general conformance to the specifications and approved, approved-as-noted, or rejected within 30 calendar days of receipt.

7.5.4 Timely submittals are essential to on-time completion of the project. The Owner will incur no obligation to extend the contract completion date, or to reduce or waive any liquidated damages due, as a result of the Contractor's failure to provide the specified submittals in a timely fashion.

7.5.5 The Owner will review complete submittals or resubmittals only. Incomplete submittals or resubmittals will be returned to the Contractor, within 10 - 15 working days, without being

reviewed. Contractor review of all submittals for completeness, accuracy and consistency, prior to submission, is required.

7.5.6 If submittals, upon review by the Owner, are found not to conform to the requirements of the specification, the Contractor shall resubmit with modifications at no additional cost. Impacts to the project schedule shall be immediately communicated to the Owner and Owner's Engineer.

7.5.7 No construction or installation will be authorized until the required submittals are received, reviewed and accepted by the Owner. Any construction or installation performed without written authorization from the Owner shall be entirely at the Contractor's own risk.

7.5.8 Each system shall be provided with its own design and installation drawings. Using typical design and installation drawings by the Contractor to reduce his design and engineering cost shall be prohibited.

7.6 Cabling and Wiring Jacketing

7.6.1 All emergency circuits, AC power circuits, DC power circuits, control circuits, and fire detection, alarm, notification circuits jacketing insulation shall be rated and certified as low smoke-zero halogen (LS0H or LSZH).

7.7 Fire Detection, Alarm and Notification System

7.7.1 The features of fire detection, alarm and notification system requirements for the Battery Storage System project are as follows: A main intelligent addressable fire detection, alarm and notification system control unit (panel) with a Network Control Annunciator shall be provided at the Fire Command Center & Fire Department Response Point.

7.7.2 The Fire Command Center & Fire Department Response Point shall be located on grade level and either a new or an existing building area or room designated by the Owner, and shall be provided with and include:

7.7.2.1 Main Fire Alarm Control Panel (MFACP) with 640-character LCD display. MFACP monitors (by location and by each individual fire alarm device) all intelligent addressable local fire alarm control panel (LFACP-R) releasing service control units and LFACP's

7.7.2.2 Active graphic fire alarm annunciator panel(s) or systems. Shows which floor, fire area, which fire alarm devices have activated, and which fire suppression system has activated.

- Ventilation system controls
- Battery management system (BMS) interface
- Fire Pre-Plan Documents.

7.7.2.3 Final location and layout of the Fire Command Center & Fire Department Response Point shall be approved by AHJ.

7.7.2.4 The fire alarm system shall be equipped with supervised relays to shut down the ventilation systems in the event the system goes into alarm. A ventilation system control and system(s) bypass panel shall be provided as specified with in in the locations above so

that responding fire service personnel can restore and control enclosure ventilation systems while the system is still in an alarm condition.

7.7.2.5 Wiring of fire alarm panel system control cabinet(s) shall be in accordance with the SPECIFICATION, and the AHJ requirements.

7.8 Fire Detection, Alarm and Notification System Installation and Specialties

7.8.1 The Contractor shall provide local fire alarm system control unit panels (LFACP) and LFACP-Rs as specified within and as required in accordance with his design. All LFACP's shall be networked together (NFPA 72, Class X (formerly Style7)/Class A) including the main and secondary addressable intelligent fire detection, alarm and notification panels using protected fiber optic cable in conduit or Owner reviewed and approved equal.

7.8.2 The main fire alarm control unit panel shall be located in the Admin Building (See Exhibit 4).

7.8.3 Only acceptable fire alarm manufacture (no exceptions) is Honeywell Notifier.

7.8.4 Standby battery capacity, power supplies as required shall be sufficient to maintain the entire system in a non-alarm condition for 90 hours, followed by 15 minutes in full load alarm condition (all fire alarm initiating devices in alarm, and all audible and visible notification appliance signals, annunciators and auxiliary functions activated simultaneously), on battery power only.

7.8.5 Smoke and Gas Detection

7.8.5.1 All fire detection, alarm, and notification components, devices and equipment shall be provided in accordance with Fire Protection Master Plan and the following:

Area or Room, Enclosure, Etc. **Detection Types and Accessories**
Battery Racks – EWFD (early warning fire detection) air sampling systems with hydrogen and carbon monoxide gas detection for each battery rack level listed to UL 2075. All gas detectors and air sampling systems shall be monitored and annunciated individually. (Alarm, warning and trouble contacts) Ceiling Level – EWFD (early warning fire detection) air sampling systems
Fire Command Center – Intelligent addressable smoke detectors.

7.8.6 EWFD (early warning fire detection) air sampling detection systems shall have or consist of:

7.8.6.1 One or more detection(s) units manufactured by VESDA / Xtralis, model VLS per protected hazard enclosure. One detection unit cannot be shared across one or more protected hazard areas and rooms.

7.8.6.2 Air sampling pipes UL Listed to UL 1820, Pneumatic Tubing Certifies for Flame and Smoke Characteristics.

7.8.6.3 Sampling points - The maximum area per sampling point shall be 225 square feet, and the maximum distance between sampling points shall be 15 feet.

7.8.6.4 Hydraulic calculations for each air sampling pipe run /zone

7.8.6.5 Detailed installation drawings. Standard or generic installation drawings will not be reviewed by the Owner and the Contractor shall be required to resubmit.

7.8.6.6 An air sampling pipe remote test station for each air sampling pipe run / zone. Each remote test station shall be mechanically protected and located between 5 to 6 feet off the finished floor.

7.8.6.7 An interface to the buildings main fire alarm control unit (panel) and each LFACP using VESDA-HLI-GW cards.

7.8.6.8 A separate individual air filter shall be provided for each air sampling pipe run /zone.

7.8.6.9 EWFD systems shall be designed so that the system will not falsely activate from wildfires, grass fires, exhaust gases from vehicles or equipment (including trains) located within or near the building or structures.

7.8.6.10 The Contractor shall include in his design of each air sampling detection system gas detection monitoring.

7.8.7 The EWFD (early warning fire detection) air sampling detection system units shall not be located within the protected hazard. The unit shall be located near the main entrance doors going into the protected hazard and adjacent to the LFACP. The unit shall not be attached or affixed to any protected hazard wall, but seismically mounted to a free standing hot dipped galvanized steel mounting frame firmly attached or affixed to the floor.

7.8.8 The maximum area per intelligent addressable smoke detectors shall be 225 square feet, and the maximum distance between smoke detectors shall be 15 feet.

7.8.9 An addressable manual pull station shall be provided next to each exterior exit door. Each pull station shall be provided with a pull station protective cover.

7.8.10 The systems shall be capable of being manually disabled for maintenance, testing and troubleshooting purpose. Disabling of any systems or part there off, shall automatically send an alarm condition (both trouble and supervisory) transmitted to Owner approved central monitoring locations. Each fire protection and suppression system shall be individually monitored.

7.8.11 Wall mounted combination fire alarm horn strobe units, fire alarm horns units and fire alarm strobe units shall be located in all protected areas and rooms. Ceiling mounted units shall be prohibited.

7.8.12 Three (3) different colored lenses high out fire alarm strobe units shall be provided above each LFACP. The purpose of the strobe units is to assist fire fighter personnel in locating the

area or room they need to enter in an emergency. One strobe shall activate upon smoke detection activation. The second strobe shall activate upon a fire suppression system being activated. The third strobe shall activate upon a high level of flammable gas being activated. The color of the lenses is to be submitted to the Owner for review and approval.

7.8.13 All fire system conductors (detection, alarm, notification, cables, etc.) shall be installed in red conduit and labeled.

7.8.14 All system AC power shall be in conduit.

7.8.15 Not-tapping of fire alarm signaling line circuits (SLC).

7.8.16 Conduits shall be electrical metallic tubing (EMT) or Owner reviewed and approved equal for conduit located indoors and rigid hot dipped galvanized conduit located outdoors or in wet locations.

7.8.17 Conduit located outdoors or in wet locations shall be provided with conduit condensation breathers and drains.

7.8.18 Conduits shall not penetrate the top of any electrical box, enclosure and/or or panel located outdoors.

7.8.19 Conduits shall be minimum 3/4" diameter.

7.8.20 Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for fire alarm system conduits shall not exceed 30%.

7.8.21 All fire alarm conduit systems shall be routed and installed to minimize the potential for physical damage, mechanical or by fire, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.

7.9 Fire Protection Systems – Suppression Systems

7.9.1 The use of clean agent fire suppression systems shall be avoided. Fixed aerosol fire extinguishing systems shall be prohibited. Passive fire protection measures shall be used instead of active fire suppression measures whenever possible.

7.9.2 The Contractor shall provide fire suppression systems in accordance with:

7.9.2.1 Fire Protection Master Plan and Associated Project Documents

7.9.2.2 Combination hazard mitigation analysis (HMA) and fault condition documents

7.9.2.3 Deflagration analysis, calculation and mitigation documents

7.9.2.4 AHJ

7.9.2.5 Owner's Insurance Carrier

7.9.3 The Contractor shall be responsible for obtaining current water flow test information for designing his systems. If the water flow test data shows the existing water supply cannot provide the Contractors required flows and pressures for his designs, it is in the Contractors scope of work to provide components, devices and equipment (fire pumps, water tanks, backflow preventors, water meters, water supply piping including new city tie-ins, etc.) to get the water flows and pressures he need for his design.

7.9.4 The use of metric battery rack sprinkler assemblies' components, devices and equipment shall be prohibited.

7.9.5 Sprinkler Systems

7.9.5.1 All sprinkler systems types, components, devices and equipment shall be provided in accordance with Fire Protection Master Plan and the following:

Area or Room, Enclosure, Etc. **Sprinkler System Types, Accessories, and Zoning**
Sprinklers to be provided throughout the entire building and structures Battery Racks with built in sprinkler assembly's – Double interlock pre-action sprinkler systems with supervisory air (no exceptions). Ceiling Level – Automatic wet pipe sprinkler systems throughout the entire existing buildings and structures.
Combination sprinkler system(s) and standpipe and hose stations shall be prohibited
Combination ceiling level sprinkler system(s) and battery rack sprinkler systems shall be prohibited
All sprinkler system control and isolation valves, system releasing valves, system manual mechanical releasing valves, air compressors, etc shall not be installed in an area or room with batteries located within, no exceptions.
Sprinkler and Standpipe and Hose Station Zoning (minimum): Zone 1 - Ceiling System - over battery racks Zone 2 – Standpipe and Hose Station System Zone 3 - Battery Racks - Sprinkler Assembly Pre-Action Sprinkler System Additional Zoning as required per the Contractors design.

7.9.5.2 The use of Nibco products is strictly prohibited.

– END OF SECTION 7–

SECTION 8 – BALANCE OF PLANT (BOP) REQUIREMENTS

8.0 GENERAL

This section details the design, procurement, installation and electrical equipment requirements of the Balance of Plant (BOP) for the System Facility. The design criteria and performance specifications are based on industry standards. Existing drawings for the Old Power Plant building could not be located by the Owner. The EPP will be responsible for creating whatever studies, scans, surveying, etc. is required to complete a design that meets the requirements of this document and all applicable standards. The EPP can sub out any work it needs to accomplish this work. Whoever does the work, an Engineer of Record (EOR) should be named to the Owner.

This Section is intended to serve as a baseline while providing flexibility for the (EOR) to exercise engineering judgment about the appropriate mechanical, fire protection, thermal, electrical, structural and civil designs for the System. The requirements set out in Section 8 shall be met while designing Owner's BOP System Facility. Exceptions based on engineering judgment may be submitted to the Owner and Owner's engineer for design consideration and approval.

Minimum technical requirements to design and construct the BOP System Facility shall include but not be limited to, the following items:

- EPP shall provide all engineering, technical expertise, management, and supervision, to design, specify, and complete all aspects of the BOP System Facility, including but not limited to: land use, access, interconnection up to the Interconnection Point, equipment, devices, materials, construction, testing, and commissioning.
- EPP shall have the overall responsibility for the design provided by their EOR, if another contractor is used. Both the EPP and the EOR shall be licensed in the State of Delaware to perform Work for the System. Both the EPP and the EOR are responsible to meet all requirements of the latest adopted codes and standards for the State of Delaware and the City of Lewes.
- EPP shall provide documentation of the testing and commissioning of each device, as well as: the receiving, handling, disassembly, and reassembly of all equipment in the BOP System Facility.
- EPP shall be responsible for programing and operating all components of a standalone BESS EMS, including all meters and remote I/O modules.
- EPP shall be responsible for energizing the BOP System Facility, and for all components to be successfully integrated into the Owner's electric grid.
- EPP shall be responsible for meeting all requirements of the System scope of work (SOW).

8.1 General Requirements

8.1.1 EPP shall be aware of all local requirements of the Authority Having Jurisdiction (AHJ). All requirements of the AHJ shall be satisfied by the EPP and shall be incorporated into the design and construction of the BOP System Facility.

8.1.2 It is the EPP's responsibility to be conduct geotechnical reports to identify the geological and soil geotechnical conditions at the BOP System Facility location. Estimating errors based on wrong geotechnical assumptions shall be the burden of the EPP, not the Owner.

8.2 DESIGN REQUIREMENTS

8.2.1 Design shall comply with local codes, the site-specific design requirements contained herein, and the plans and reports provided in the scope of work (SOW).

8.2.2 EPP is responsible to develop and submit specifications for all equipment and materials (unless otherwise provided in this Document), which may be needed to design and construct the BOP System Facility.

8.2.3 The EPP shall be responsible for verifying that conductor types and sizes are in accordance with the National Electric Code requirements and the AHJ.

8.2.4 The EPP shall be responsible for coordinating the Battery Management System with the Fire Protection system to comply with the expectations of the AHJ and the NFPA codes.

8.2.5 EPP is responsible for all site preparation, civil, structural, and architectural work as defined in Section 8 subsections 3 to 5 of this Document.

8.2.6 EPP is responsible for receiving at jobsite, executing a materials receipt form, and unloading all equipment. Once equipment has been placed on foundations, EPP shall install all equipment with required accessories as shown on the contract drawings and installation manuals (unless otherwise noted). The EPP shall also apply touch-up paint as necessary to repair any existing rust, scratches, or blemishes to delivered equipment.

8.2.7 EPP is responsible to create an energization and de-energization plan for safe operation of the facility. The EPP shall coordinate with all applicable parties to coordinate the energization plan.

8.2.8 Energization and de-energization plans shall be submitted to the Owner for review and approval at the 60% design package level of the BOP facility. The EPP shall hold a meeting before energization to walk through the energization/de-energization plans at Site.

8.3 CIVIL REQUIREMENTS

8.3.1 General

This Section covers the civil requirements and provides the minimum technical requirements to design and construct the facilities supporting the BOP aspects to the System.

8.3.1.1 The EPP shall perform all work and obtain all necessary permits in accordance with all applicable federal, state, and local rules, ordinances, and standards as required, and shall be responsible for the following:

8.3.1.1.1 Performing site investigations that may include geotechnical subsurface investigations, topographic mapping, underground utility locating, and above ground laser scanning to verify and confirm site conditions for use as design input and for performing specified work.

8.3.1.1.2 Establishing and maintaining survey control points for the duration of the Work.

8.3.1.1.3 All surveying, layout and control work to complete the System.

8.3.1.1.4 Obtaining and implementing applicable land disturbance permits, include utilizing best management practices during construction to minimize sediment laden runoff and fugitive dust. Permit activities may include preparing and administering a Storm Water Pollution Prevention Plan (SWPPP) and filing a Notice of Intent (NOI) and Notice of Termination (NOT) with the agency.

8.3.1.1.5 Removal and disposal of all vegetation, organic matter, top-soil, earth, sand, gravel, rock, boulders, and debris required to complete the construction of the Work per this Specification. Removal shall include characterization of materials, onsite management as necessary, and offsite disposal of materials in a regulated landfill per the Site-specific requirements.

8.3.1.1.6 Demolition, removals, and alterations of existing systems and features, including characterization of materials, onsite management as necessary, and offsite disposal of materials in a regulated landfill per Site specific requirements.

8.3.1.1.7 Restoration of the land after removal of non-permanent improvements (road shoulders, lay-down areas, turnarounds, etc.) to as close to their original state as possible and as acceptable to Owner.

8.3.1.1.8 Providing graded areas which are to be smooth, compacted, and free from irregular surface changes and sloped to drain.

8.3.1.1.9 Providing final grade adjacent to equipment and building foundations below the finished slab elevations and be sloped away from foundations to maintain positive drainage: minimum 1% slope and no greater than 3% slope.

8.3.1.1.10 EPP is responsible for providing an SPCC Plan meeting state and federal requirements for both the construction phase and for the operational phase.

8.3.1.2 Roads

8.3.1.2.1 EPP is responsible for the following:

8.3.1.2.2 Coordination with Owner and the AHJ to determine allowable haul routes over public roads that shall be used for the System.

8.3.1.2.3 Conduct a visual survey to document the existing conditions of the roads to be used by the System prior to commencement of construction. Such survey should include videotaping of pre-construction conditions.

8.3.1.2.4 Providing site access via access roads capable of accommodating delivery. The construction traffic will be expected to observe the site speed limit during construction.

8.3.1.2.5 Designing of all accessways to site and substation(s), as well as the acquisition of required permitting for their construction.

8.3.1.2.6 Maintaining all roads for the duration of the Work. Maintenance shall include grading work and soft spot repair of access roads. Road maintenance shall comply with the requirements of the local AHJ's.

8.3.1.2.7 Conducting a post-hauling road condition study to assess the structural condition of the haul roads identified in the transportation study after the completion of heavy and large truck traffic operations associated with the construction of the Facility (the post-construction hauling condition assessment report).

8.3.1.2.8 Repairing any damage to public roads as a result of its construction activities associated with EPP's Scope of Work. EPP shall leave the roads at construction completion in as good, or better, condition as at the start of construction.

8.3.1.2.9 Providing sufficient parking area for O&M trucks reasonably proportional to the BOP System Facility size.

8.3.2 Earthwork

8.3.2.1 The EPP shall perform all excavation, dewatering, subgrade preparation, earthwork, and offsite disposal of spoils as necessary, which are necessary for constructing the site to design grade elevations and installation of all utilities.

8.3.2.2 Contractor shall ensure that all subgrade preparation, fill material placement, and utility bedding and backfill placement meets the requirements of the geotechnical report for the project.

8.3.2.3 All risk associated with underground construction shall be the responsibility of the EPP.

8.3.3 Earthwork Testing

8.3.3.1 The EPP shall hire and coordinate with a qualified and independent, third party Testing Service who is acceptable to Owner. Service shall assure compliance with soil material requirements for type, compaction, and moisture levels indicated within the geotechnical report and design drawings. The geotechnical report shall include, at minimum, geological properties, soil, bearing, electrical and thermal resistivity, and liquefaction.

8.3.3.2 The Testing Service hired by the EPP shall provide a daily certification reports as necessary to Owner and shall immediately identify non-compliance and the planned resolution. A Final Report shall be completed at the end of construction, and then sealed by the Testing Service Engineer and submitted to the Owner for review and acceptance. The Final Report shall be signed and sealed by a licensed engineer licensed in the State of Delaware. The Testing Service, with Owner and Contractor coordination, shall establish and implement a comprehensive and suitable testing program to ensure compliance with the design drawings, specifications, geotechnical recommendations, and all governing agency requirements.

8.4 STRUCTURAL REQUIREMENTS

8.4.1 General

This Section covers the structural requirements and provides the minimum technical requirements to design and construct the facilities supporting the BOP aspects to the System.

8.4.1.1 All steel structures, foundations, concrete slabs, masonry walls, and trenches as required. Structural design shall be in accordance with the 2018 International Building Code, the 2018 International Existing Building Code, and other applicable codes and standards listed in Section 14.

8.4.1.2 Modifications to the existing grade slab in the Old Power Plant Building to support the weight of the battery racks.

8.4.1.3 New or modified existing foundations, HVAC and cable tray supports, and cable trenches in the exterior courtyard.

8.4.1.4 Fire-rated metal-framed gypsum board system or alternate concrete masonry unit (CMU) wall constructed inside the Old Power Plant Building.

8.4.1.5 Evaluation of existing structure should the EPP's installation add any loading to the structure or modify the structure in any way. Evaluation shall be in accordance with the IBC 2018.

8.4.2 Site Design Data

8.4.2.1 Wind loads and criteria shall be in accordance with the requirements of the 2018 International Building Code, which references ASCE 7-16.

- Risk Category = III (Reference ASCE 7-16, Section 1.5, Table 1.5-1)
- Surface Roughness = C (Reference ASCE 7-16, Section 26.7.2)
- Exposure = C (Reference ASCE 7-16, Section 26.7.3)
- Basic Design Wind Speed V = 129 mph, 3 second gust wind speed at 33 ft. above ground for Exposure Category C (Reference ASCE 7-16, Figure 26.5-1C)

8.4.2.2 All structures shall be designed and constructed to resist the effects of earthquake motions determined in accordance with the requirements of the IBC 2018, which references ASCE 7-16, Chapters 11 - 23. The seismic criteria are as follows:

- Assumed Site Class = D The soil classification is generally determined by the Geotechnical Engineer and should be requested to be included in the geotechnical report if one is to be provided.
- The seismic characteristics of the site are as follows:
  - Mapped MCE_R, 5 percent damped, spectral response acceleration parameter at short periods S_s = 0.100 g (Reference ASCE 7-16, Figure 22-1)

- Mapped MCE_R, 5 percent damped, spectral response acceleration parameter at a period of 1.0 second S_1 = 0.045 g (Reference ASCE 7-16, Figure 22-2)
- Seismic Importance Factor I_E = 1.25 (Reference ASCE 7-16, Section 1.5.1, Table 1.5-2)

8.4.2.3 Foundation Depth:

- The effects of frost heave on foundations will not occur inside the Old Power Plant Building. Minimum depth of foundations shall be 12 inches below grade per the IBC 2018 Section 1809.4.
- Except where otherwise protected from frost, foundations and other permanent supports shall be protected from frost per IBC 2018 Section 1809.5.
- Provide design of the oil retention pit for each transformer sized to hold each of the following volumes combined, 110 % of the transformer oil volume, the volume of rainwater from a 25-year, 24 hour rainfall event and the volume of the fire suppression system water flow over a 10 minute period (if applicable).
- The oil containment should be sized and filled with fire quenching stone so that the oil elevation will not come within 12 inches of the surface of the stone if the entire volume of oil and applicable water was discharged into the pit. A minimum of 18 inches of stone is required. The stone should be thoroughly washed before being brought on-site to prevent silt and other debris from entering the pit and causing maintenance issues with drainage systems.
- Take into account a stone void ratio of 40% for AASHTO No. 3 stones and 35% for AASHTO No. 57 stones, and the required depth of stone (if applicable).
- A vertical corrugate metal pipe can be installed within the containment area to allow for easy inspection of water levels within the pit. The pipe should have holes to allow water to flow into the pipe, but not the stone. The pipe should have a metal lid to seal the top and be installed so the top of the pipe is level with the surface of the stone to minimize tripping hazards.

8.5 ARCHITECTURAL REQUIREMENTS

8.5.1.1 General

8.5.1.2 This Section covers the architectural requirements and provides the minimum technical requirements to design and construct the facilities supporting the BOP aspects to the System.

8.5.1.3 The BESS system will be installed within an existing power generation facility. The EPP shall produce a detailed code analysis detailing the requirements for life safety updates, egress, fire separation requirements and envelope thermal improvements.

8.5.1.4 Building condition and materials shall be verified in the field. In general, the existing facility is a steel framed structure with a masonry façade, and a ballasted membrane roof system. Openings in the façade include industrial windows with exterior shutters, sectional overhead doors, personnel doors, ventilation equipment and numerous abandoned and patched openings. The existing floor is a concrete slab with an extensive covered trench system.

8.5.1.5 The building is adjacent to an existing administration area, and fire separation requirements shall be implemented between use groups.

8.5.1.6 If interior partitioning is required, the contractor may utilize a design with Concrete Masonry Unit (CMU) walls. Detailing of CMU wall design shall be according to a listed UL Assembly Design such as UL U904. CMU shall be coated with a 3-coat industrial epoxy coating system complying with VOC requirements.

8.5.1.7 See structural for concrete slab requirements. New and existing concrete floors shall be coated with a 3-coat industrial grade polyamine epoxy coating suitable for the selected battery chemistry. Provide silica or equivalent media for traction at ramps, steps and transitions. Any transitions shall be designed as ramps per building code requirements.

8.5.1.8 Any insulation required, determined by EPP analysis and reviewed by Owner's Engineer, at new or existing ceilings, walls and partitions shall be ASTM E-84 Class A, mineral wool board fastened to the substrate. Provide a facing that serves as a vapor barrier where required. Provide thickness required to achieve minimum required thermal performance.

8.5.1.9 Install sealant and joint filler at penetrations and at perimeter of new work including wall and door assemblies. Sealant shall be compatible with the associated substrates.

8.5.1.10 Install UL-approved penetration firestop systems as required to maintain the rating of the wall, floor or ceiling assembly. Penetrations include, but are not limited to pipe, conduit, tray, steel and similar penetrations.

8.5.1.11 Doors shall be SDI Level 3, Extra Heavy Duty, Performance Level A (minimum). Provide NFPA 80 approved assemblies where required for fire rating. Doors shall be pre-finished or coated with a compatible 2-coat alkyd coating system.

8.5.1.12 Any exterior doors shall have galvanized face sheets and be insulated per energy code requirements.

8.5.1.13 Door hardware shall be BHMA Grade 1 hardware. Hinges be 5-kuckle ball bearing type with non-removable pins. Provide perimeter seals, closers and panic hardware where required. Provide UL approved hardware at fire rated assemblies.

8.5.1.14 Coordinate door hardware selections with Owner's security requirements.

8.6 AUXILIARY POWER REQUIREMENTS

8.6.1 This Section outlines the necessary auxiliary power equipment and requirements.

8.6.1.1 The existing auxiliary power equipment only has a of 208/120V, 3 phase supply. If any EPP equipment requires a higher operating voltage, the EPP is responsible for bring that supply into the building from the Lewes BPW distribution system.

8.6.1.2 The switchgear load center shall be provided with an integral ATS switch which will be connected to off-site external power source. The ATS will transfer to off-site power upon loss of power. An existing AC feed is available at the project site connected to a pole mounted transformer. The EPP is to evaluate existing infrastructure and upgrade if necessary.

8.6.1.3 The equipment shall comply with all ANSI/NEMA standards for the equipment being provided. The equipment enclosure shall be rated and designed for the area it is installed.

8.6.2 Station Service

8.6.2.1 EPP shall procure and meter separately the electrical service required to serve the ancillary electric needs of the System, including electricity for lighting, security, climate control, ventilation mechanisms, control systems, operation and other auxiliary systems necessary for operation, and maintenance of the System ("Station Use"). The normal (primary) auxiliary feed for the site will be fed off a feeder with an appropriately sized kVA auxiliary load transformer with fused disconnect switches, to tie to dedicated switchgear load centers. The breaker shall be connected and fed from the collection bus.

8.6.2.2 The EPP is to determine the size required for supporting the emergency (back-up) auxiliary system loads and provide the Owner with the loads such that it supports the Owner's solicitation of offsite power feed from the local distribution company.

8.6.2.3 The Station Service shall be designed such that protective devices are properly coordinated and ensure that the arc-flash incident energy is less than eight (8) cal/cm2 at all locations in system for both AC and DC sources.

8.7 BOP SYSTEM EQUIPEMENT

8.7.1 General

8.7.1.1 The successful EPP's SOW will include all equipment and Work required for the System installation up to and including the Interconnection Point. The following shall be required in the successful EPP's SOW, including but not limited to:

8.7.1.1.1 All engineering, fabrication and supply of the components of the System and pertinent assemblies and accessories to meet the functional requirements listed herein. Drawings required by any applicable law(s), rule(s) or regulation(s) of AHJ's shall be signed and sealed by the EOR. Necessary modifications to the existing substation engineering drawings and documents shall be done according to the State of construction laws and

rules for such work in addition to generally accepted industry practices and engineering disclosures and procedures.

8.7.1.2 Harmonic filters as required by the specified harmonic performance levels, as required by IEEE 519.

8.7.1.3 The BESS System shall be designed to ensure that all power quality aspects are in compliance with IEEE 519.

8.7.1.4 BESS physical security to be detailed in EPP proposals.

8.7.1.5 All power transformers required by the BESS system, except those provided by the Owner.

8.7.1.6 All instrument transformers as required.

8.7.1.7 Grounding Transformers as required.

8.7.1.8 All circuit breakers and disconnect switches as required.

8.7.1.9 All switchgear equipment on the primary side of the step-down transformer, including circuit breakers, disconnect switches, instrument transformers, surge arresters, etc., as required.

8.7.1.10 All necessary equipment for the control, protection, signaling and measurement system of the BESS.

8.7.1.11 System for alarm and fault recording as required.

8.7.1.12 Surge protection and overhead lightning protection of the BESS yard as required.

8.7.1.13 BESS yard lighting as required.

8.7.1.14 Revenue grade metering at the POI and revenue grade metering on the feed supplying the HVAC, inverter parasitic loads and battery parasitic loads.

8.7.1.15 PTs and CTs for protection and metering on the distribution bus or feeders, if required.

8.7.1.16 Grounding at the BESS project site shall be done in accordance with IEEE 80. Information about the existing ground grid of the Old Power Plant Building is not available. A grounding study of the Schley Ave Substation will be conducted to ensure adequate grounding is achieved after modifications to the Substation are completed. Available Fault data from Schley Avenue Substation is provided in Exhibit 3.

8.7.1.17 All cables for the equipment in the BESS yard, including but not limited to connections to the substation.

8.7.1.18 All BESS equipment shall be self-contained to minimize the risk of property and personnel damage caused by fire, explosion, or other failures of the BESS, as applicable to NFPA 855.

8.7.1.19 Any other equipment and engineering required for the proper functioning of the BESS.

8.7.2 Interface with Existing Substation

8.7.2.1 All High and Medium voltage equipment interfaces with the Schley Ave Substation shall be in compliance with Section 9.

8.8 Owner Provided Equipment

8.8.1 The following equipment and services will be furnished by the Owner and is subsequently not part of the successful EPP's Scope of Works.

8.8.2 Dedicated Areas at the Project site to house equipment and spare parts.

8.8.2.1 The EPP will be required to remove existing abandoned structures, reroute duct banks, and relocate or reconfigure the existing Site as needed to accommodate the BESS.

8.8.3 EPP to evaluate the existing AC Supply equipment to serve as an auxiliary emergency (back-up) AC feed. If found to be insufficient, the EPP will design and coordinate with the Owner a replacement feed. Maximum load will be as per the successful EPP's requirements.

8.8.4 MV Step up transformers detailed in Attachment 2.

8.8.5 Access/right of entry to the Site at any day of the week during civil works, erection, installation and commissioning. This shall include an access road for transport of heavy equipment.

8.8.6 Available reference data on the Project Site and Schley Ave Substation drawings for the successful EPP's use in the design and interconnection of the BESS system. EPP is responsible for verifying the accuracy of all drawings provided by the Owner.

8.8.7 Temporary storage area for equipment.

8.9 EPP Provided Equipment

8.9.1 Battery Modules and Racks

8.9.2 Circuit Breakers, including 15kV breaker for connection to Substation.

8.9.3 Disconnect Switches, as needed.

8.9.4 Instrument Transformers and Relays

8.9.5 Unless otherwise noted, the EPP is responsible for all materials and equipment pertaining to the BOP to design.

8.9.6 DC Fused Disconnect Switches

8.9.6.1 The EOR design drawings shall indicate the type and quantity of switches required.

8.9.6.2 DC fused disconnect switches shall include a properly grounded mat for operator to stand on while operating the switch.

8.9.6.3 If DC fused disconnect switches need adjustments to function correctly, EPP shall provide any miscellaneous brackets, bearings, couplings, nuts, bolts, lock washers, or other necessary hardware as required.

8.9.7 Auxiliary transformers, as required.

8.9.8 MV MCOV station class surge arresters

8.9.8.1 MV MCOV arresters shall be installed on each feeder circuit bay, where each feeder connects to the BOP System Facility equipment. Arresters are to be coordinated with the collector circuit arresters.

8.9.8.2 When reactive power equipment is included in the design, MV MCOV arresters shall be installed at each riser location within the BOP System Facility.

8.9.8.3 The loop-fed medium voltage transformers shall include MV MCOV arresters installed on the last transformer in a string. A stand to support the MCOV arresters will be the responsibility of the EPP. The size and type of these arresters is to be reviewed by the EOR and coordinated with the owner provided equipment.

8.9.8.4 All arresters shall be sized per the insulation coordination study.

8.9.9 EPP is also responsible for all materials and equipment in association with establishing temporary site construction power and any required temporary metering for usage.

8.10 BALANCE OF PLANT

8.10.1 BOP System Design Considerations

8.10.1.1 The System shall operate automatically without local operator supervision. The Facility shall be capable of being started, stopped and controlled from a site designated by the EPP. While operation can be done remotely via existing fiber, an HMI must be installed onsite near the Fire Protection Panel detailed in section 7. This will be accomplished by the EPP upon direction provided by the Owner. The System shall have the appropriate level of automation to allow 24/7 real-time remote monitoring and operation.

8.10.2 System

8.10.2.1 For technical requirements of the System, reference Section 3 of this Document.

8.10.3 Energy Management System

8.10.3.1 For technical requirements of the System EMS, reference Section 5 of this Document.

8.10.4 PCS Equipment

8.10.4.1 For technical requirements of the System PCS, reference Section 4 of this Document.

8.11 Required Electrical Studies

8.11.1 EPP will be required to perform the following studies, and provide to Owner and Owner's Engineer, to demonstrate the adequacy and design and performance of the BESS system:

8.11.1.1 Main Circuit Design – a report and one-line diagrams will need to be presented to describe the main circuit design of the BESS. In this report the analysis for the rating of the main Medium voltage components shall be presented (For the Insulated Gate Bipolar Transistors (IGBTs) see further below). Power system characteristics shall be clearly stated and a summary of the rating of the BESS components shall be given.

8.11.1.2 Insulation Coordination – an insulation coordination study shall be performed by the EPP to ensure proper selection and coordination of the arrestors selected for the BESS bus and branches. The results of this analysis shall be presented to Owner in a report.

8.11.1.3 Control Strategy Documentation – In this report the control strategies implemented in the control system shall be described in detail. The verification of the main strategies shall be done by running the real control system together with a simulator implementing a network equivalent together with the BESS high voltage components. The verification can be done during the factory validation test of the control system.

8.11.1.4 Protective Relay Coordination - In this report the calculation of relay protection setting levels shall be presented together with the principles for protection coordination. A summarized list of the protection settings shall be given.

8.11.1.5 Arc Flash Analysis – In this report the System arc flash incidence levels, appropriate approach distances, and required PPE levels should be identified.

8.11.1.6 Reactive Power Study – Power factor range analysis at a rated output, to be performed to confirm compliance with grid code requirements

8.11.1.7 Harmonic Analysis

8.11.1.8 Short Circuit and Load Flow Analysis Reports. Model must be provided to Owner upon project completion.

8.11.1.9 Grounding Analysis. Model must be provided to Owner upon project completion,

8.11.1.10 Loss Evaluation - In this report the total BESS losses shall be calculated and compared with guaranteed values. Explanations to discrepancies, if any, shall be given. The final Loss Evaluation report shall be based on component loss data obtained from factory tests. Loss Evaluation shall include all system aux loads, transformer loads, impedance loads, line loss loads, from the system to the POI.

8.11.1.11 The titles and scope of the design studies shall be clearly stated in the bid.

8.11.1.12 Cable Sizing and Ampacity

8.11.1.13 Lighting Study

8.11.1.14 TRV Studies

8.11.1.15 TPL-007 Geomagnetic Studies

8.11.1.16 Battery Sizing Study (IEEE 485)

8.11.1.17 UPS Sizing Study

8.12 Construction Inspections

8.12.1 The Owner shall be provided an opportunity to review, comment, and approve or reject all on-site construction services provided by the EPP and the Subcontractors. The requirements are as follows:

8.12.1.1 The Owner shall have unrestricted access to the site during all phases of construction.

8.12.1.2 The EPP shall schedule formal walk through inspections at the end of each phase of construction. No equipment or installation (rebar cages, foundations, grounding, conduit, etc.) shall be covered prior to inspection by the Owner. The OE will inspect the installation for compliance with the engineering drawings, this specification, and good construction practices. If approved, the Owner/OE will sign an EPP provided approval form. If not approved, the EPP or its Subcontractors will remedy the discrepancy as required by the Customer, the engineering drawings, and/or this specification.

8.13 SYSTEM PLANT FUNCTIONALITY REQUIREMENTS

8.13.1 Voltage and Frequency

8.13.1.1 Nominal System frequency is 60 Hz. Minimum and maximum scheduled frequencies shall be determined by the EPP based on applicable grid codes and standards.

8.13.2 Power and Energy Capabilities

8.13.2.1 The total harmonic distortion at POI shall be compliant with latest revision of IEEE 519.

8.13.2.2 AC characteristics of the System: All characteristics relating to capabilities are to be expressed in power and energy as metered at the Interconnection Point. Energy capacity shall be described as energy delivered to the Interconnection Point.

8.13.2.3 DC characteristics of the System: All characteristics relating to the DC system performance are to be expressed in power and energy.

8.13.2.4 Owner recognizes that a variety of System technologies exist. The useful working life of some technologies is strongly dependent upon the usage profiles such as depth of discharge. For this reason, EPPs shall list the capacity of their proposed System only in terms of what that System will be capable of sustaining over its useful life. See Attachment 1.

8.13.3 Autonomous Functions

8.13.3.1 A simplified description of the required autonomous functions is presented in Form 2. EPPs shall verify that autonomous functionality required to meet the desired usage cases is included. EPPs shall include in their proposal response a detailed description of how their proposed system will function to implement these features.

8.13.4 External Override Functions

8.13.4.1 In the event of substation maintenance, one of the usage cases of the System is manual dispatch by Owner operators. When operated in such a manner, this may temporarily reduce some of the autonomous function scale. A simplified description of the necessary controls is presented below. The communication mechanism for this control shall come from communication from the Owner. EPPs shall include in their proposal response a detailed description of how their proposed system will function to implement these features.

8.13.5 Remote Monitoring and Control

8.13.5.1 EPP shall provide all necessary hardware and a software platform that acts as the master controller over both the BMS and the PCS. The System software must operate in a manner designed to monitor, optimize and protect the battery asset. Optimization shall include, but not be limited to, controlling state of charge for the System and individual lineups in a manner that maximizes Owner's demand peak shaving, efficiency, and battery life. Software shall perform a closed loop control to maximize PCS accuracy within two (2) seconds.

8.13.5.2 The EPP shall provide a System controller to control the PCS to perform the specified and intended functions of the System. The System controller shall also interface with the BMS, the substation protection and control, and provide dry contact outputs configurable for the BESS alarms. The EPP shall perform a factory acceptance test of the System controller to confirm functionality of the control system independently and integrated with the BMS.

8.13.5.3 EPP shall provide periodic technology upgrades and provide a plan to expand the capabilities of the System software controls.

8.14 Remote Telemetry Requirements

8.14.1.1 Facility real-time status, condition and variable performance data shall be provided to Owner at Owner's request.

8.14.1.2 For Cyber Security Requirements see Section 10.

8.14.1.3 EPP shall install Fiber Distribution Panels (FDP) and fiber optic cables as needed for communications requirements. EPP shall be responsible for termination of fiber between any and all remote I/O modules and meters, as required.

8.14.2 System Safety Requirements

8.14.2.1 Owner requires that the successful EPP demonstrates that appropriate safety systems are in place to minimize the risk of property damage from fires, explosions or other

failures of the System. This shall include at a minimum automated fire suppression systems and automated controls to limit the risk of fires. Proposed systems must comply with relevant IEEE standards. Specific standards to be followed are UL1973, 9540, 1741 and ASME.

8.14.2.2 Initial training for the local municipal response services not to exceed 24 hours will be required by the successful EPP. The training shall include review of the required PPE and Arc Flash incidence zones.

8.14.2.3 Additional design requirements for the fire suppression system are contained in Section 7 of this Document.

8.14.3 Electrical Losses and Parasitic Loads

8.14.3.1 Owner recognizes that inherent inefficiencies will result in the BESS consuming more energy than delivered. Additionally, is it anticipated that operational requirements such as cooling and powering ancillary equipment will result in further losses. The maximum parasitic loads (including HVAC and Auxiliary loads) shall not exceed 10% of the overall system rating.

8.14.4 Calculation of Electrical Losses

8.14.4.1 The EPP shall provide a summarized loss evaluation of the total proposed BESS system. The summarized losses shall include guaranteed not to exceed losses for the BESS when operated according to an EPP proposed schedule. The total system losses shall be calculated, assuming an outside temperature of 85 deg. F and an expected nominal operating voltage.

8.14.4.2 Total system losses, E1 (kWH), during 24 hours of standby operation.

8.14.4.3 Total system losses, E2 (kWH), incurred by 15 min of full power discharge and subsequent recharge.

8.14.4.4 Total system losses, E3 (kWH), incurred by 2 hours of 50% power discharge and subsequent recharge.

8.14.4.5 As-built BESS losses shall be based on factory measurements and calculations.

8.14.4.6 The BESS system bid prices shall, as part of the bid evaluation process, be adjusted to take into account the present value of the total BESS system losses.

8.14.5 Audible Noise

8.14.5.1 Unless otherwise stated in Attachment 1, the level of audible noise inside and outside the BESS building shall comply with the Delaware State Noise Control Regulation as specified in Part 7, of Delaware Code Chapter 71, Section 7105, 1982. The EPP shall ensure any and all applicable noise control ordinances are accounted for when specifying audible noise levels.

8.14.5.2 The successful EPP shall make audible noise measurements (pre and post installation) to verify the compliance with the requirements above. At these measurements

the background audible noise shall be deducted when calculating the audible noise level for the BESS as specified in the first paragraph. Measurements shall be made at several locations in order to eliminate local interference effects.

-END OF SECTION 8–

SECTION 9 –HIGH AND MEDIUM VOLTAGE EQUIPMENT AND PROTECTION

9.0 Equipment and Protection

9.1 Interface with Existing 15kV bus at Schley Ave Substation: Medium Voltage

9.1.1 The successful EPP's SOW will include all equipment and work required to design and construct the interface between the BESS and Schley Ave Substation for 15kV interconnection and system alarms to support peak shaving and Feeder #1 Islanding use cases (and any other proposed use cases), including but not limited to:

9.1.1.1 The EPP shall design and install a cable from the BESS to be landed on the designated NEMA 4-hole pad at the future 52-7 Breaker Position on the 15KV Bus at Schley Avenue Substation. This will serve as the line of demarcation of ownership with the Owner owning the substation bus onward and the EPP owning everything from the BESS side up to and including the terminating cable. The cable is to be installed in a duct bank run under Schley Avenue from the Old Power Plant Building to the Schley Avenue Substation.

9.1.1.2 The Feeder #1 Islanding scheme will be accomplished manually. In the event of an outage on the incoming 69kV line, the Owner will configure the Schley Ave Substation equipment to support islanding by ensuring 69kV Breaker T1, the 15kV Bus-Tie disconnect switch, 15kV breakers 52-2 and 52-5 are open, and 15kV Breakers 52-1 and 52-7 are closed. The Dispatch signal will be communicated to the EPP, by the Owner, that the battery may be discharged. Upon Restoration of the incoming 69kV line the process will be performed in reverse to achieve the normal operating conditions. Black start capabilities for the inverter will be required. EPP to detail capabilities in their proposal.

9.1.1.3 The EPP will route control cables for alarms and meters, from the Schley Ave Substation to the project site, to ensure interference is limited to acceptable levels in accordance with industry standards.

9.1.1.4 The design and install of a new 15kV circuit breaker in spare 52-7 position.

9.1.1.4.1 The new breaker will have the appropriate rating and match the make of the other 15kV feeder breakers. The existing breaker information is included in the table below:

Parameter	15kV Breakers	69kV Breakers
Type	Siemens SDV4A	Siemens SPS2-72.5-20-2
Maximum Voltage	15.5kV	72.5kV
Interrupting Capacity	20kA @ 13.2kV	20kA @ 72.5kV
Ampacity	1200A	1200A
Interrupting Time	5 Cycles	3 Cycles

9.1.1.5 Design and construction of all protection schemes for the new relay.

9.1.1.6 Design and installation of the equipment in the existing Schley Avenue Substation Control House.

9.1.1.7 Programming of new relays, and adjustment of old relay programming to fit the new scheme, as required.

9.1.1.8 All associated test switches, control cable, power cables, lockout relays, and terminal blocks.

9.1.1.9 All conduit and grounding material associated with these upgrades.

9.1.1.10 Evaluation of the existing AC and DC Station Service for adequacy to support the new load.

9.1.1.11 Installation of new 69kV VT, and associated protection equipment to detect when 69kV System has been restored.

9.1.1.12 Evaluation of an existing ground grid, if any, at the Old Power Plant Building, using GPR and surveys of the site, to ensure adequate grounding with all new equipment installed and operational in accordance with IEEE 80.

9.1.1.12.1 Evaluation of the existing ground grid of Schley Ave Substation using existing grounding drawings provided in Exhibit 1.

9.1.1.13 Evaluation of the existing substation lighting to support proposed modifications.

9.1.1.14 Evaluation of existing substation lightning protection to support proposed modifications.

9.1.1.15 All equipment including but not limited to cables, links, potential transformers and disconnect switches required to connect the BESS to the existing Substation shall be reviewed for adequacy and replaced if required to support the new BESS installation.

-END OF SECTION 9–

SECTION 10 – CYBER SECURITY REQUIREMENTS

10.0 The EPP shall provide a cybersecurity plan for the project, this plan needs to encompass securing of devices, communications, networks, systems, management, monitoring, backups, patching and updates for the lifecycle of the products delivered including third party products provided by the EPP.

10.1 The EPP will be responsible for the Cyber Security protecting all connections to the BESS System. The EPP will document how they intend to protect all networks and systems in their proposal. Any licensing considerations or device considerations to be addressed by EPP. The EPP is responsible for any cabling needs for connectivity enablement.

10.2 All communication and SCADA shall be compliant with all North American Electric Reliability Corporation (NERC) compliance standards at time of initial operation (i.e. Critical Infrastructure Protection or CIP). EPP is responsible for maintaining NERC compliance throughout the duration of the contract.

– END OF SECTION 10–

SECTION 11 – PERFORMANCE GUARANTEES

11.0 TERM

11.1.1 EPP shall guarantee the performance of the System for the term of the contract.

11.1 GUARANTEED CAPACITY

11.1.1.1 Since the primary intended use for the battery is to meet load shed obligations the battery should be available to meet Coincident Peak days as defined by DEMEC. Failure to meet a demand response call can possibly result in increases in the Owner's Transmission costs and Capacity Cost, therefore if a demand response is missed due to System Guaranteed Capacity not being available, a penalty shall be paid by the EPP to the Owner in accordance with the penalty language in Attachment 4.

11.2 GUARANTEED ROUND-TRIP EFFICIENCY (RTE)

11.2.1 Round-Trip Efficiency is the measured rate of efficiency comparing a unit of energy injected into the System and the amount of that unit of energy discharged by the System. RTE will be established by testing protocols defined in this Document, Section 13 of this Document and measured annually at the end of each Performance Period.

11.2.1.1 Guaranteed Round-Trip Efficiency (RTE): 89.0% exclusive of auxiliary loads

11.2.1.2 Guaranteed Round-Trip Efficiency (RTE): 84.0% inclusive of auxiliary loads

11.3 GUARANTEED RAMP RATE

11.3.1 The EPP shall guarantee the inverters must ramp up to inject active (real power) current with a minimum ramping rate to support islanding of feeder 1 without backflow onto the 69kV lines ("Guaranteed Ramp Rate").

11.3.2 The Ramp Rate will be measured per the procedure outlined in this Document, Section 13. If the System is unable to demonstrate the Guaranteed Ramp Rate, EPP shall notify the Owner/OE. The Owner may direct the EPP to place the System into an Unplanned Outage immediately and resolve any issues so that the System can achieve the Guaranteed Ramp Rate.

11.4 CHARGE AND DISCHARGE RATE

11.4.1 EPP shall guarantee a minimum charge rate of full rated MW/sec of the system ratings.

11.4.2 EPP shall guarantee a minimum discharge rate of full rated MW/sec of the system ratings.

– END OF SECTION 11–

SECTION 12 – SERVICE AGREEMENT / O&M REQUIREMENTS

12.0 GENERAL

12.1.1 Minimum Warranty Requirements and Service Agreement

12.1.1.1 The Project and all component parts, including the energy storage modules, power conversion system, communications and control equipment, cooling and climate control equipment, protection equipment, and switchgear shall be the property of the EPP, to be maintained as necessary to meet the requirements of Section 11 of this document.

12.1.1.2 The equipment shall be new and of good quality and workmanship; free from defects in materials, workmanship, and design; and conform materially to all applicable specifications and contractual requirements in this Document.

12.1.1.3 The Project and all component parts shall perform as specified in this Document.

12.1.1.4 The Project shall be installed, maintained, and operated to ensure continued performance and all costs associated with the replacement and repair of the Project or its component parts, if deemed to be non-performing, shall be borne by the EPP.

12.1.1.5 EPP shall obtain sufficient warranties and/or service agreements to ensure continued performance of the Project for the duration of the contract.

12.1.1.6 Any warranties or service agreements entered by EPP with a manufacturer or service provider must indemnify EPP with respect to damages and losses incurred in connection with the negligence and willful misconduct of such manufacturer or service provider.

12.1.1.7 Any service warranty or service agreement obtained by EPP to service the Project shall cover all system maintenance, including system support, problem diagnosis, on-site repair and preventive maintenance.

12.1.1.8 EPP shall provide the Owner with supporting warranty documents from the original equipment manufacturer for energy storage modules, power converter systems, and necessary climate control or key auxiliary equipment that:

12.1.1.8.1 Covers the entire lease agreement

12.1.1.8.2 Articulates standards and methods for establishing that the equipment is not performing to specification and should be repaired or replaced,

12.1.1.8.3 Establishes a maximum allowable time for faulty equipment to be repaired or replaced, particularly for long-lead items, and

12.1.1.8.4 Includes identification of annual fire safety training for the local municipal response services that is required. Allocation of training not to exceed **24** hours annually**.**

12.2 GUARANTEED AVAILABILITY

12.2.1 As discussed in Section 11.1.1.1. the EPP shall ensure the guaranteed capacity is available to meet the demand response call on a Coincident Peak Day as defined by DEMEC. Failure to meet the demand response call will result in a penalty paid by the EPP to the Owner in accordance with the penalty language in Attachment 4.

– END OF SECTION 12–

SECTION 13 - COMMISSIONING AND TESTING REQUIREMENTS

13.0 COMMISSIONING OF THE COMPLETE SYSTEM AND INSTALLATIONS

13.1.1 Operational testing of all BESS systems, individual components as well as the whole BESS. This is inclusive of any temporary equipment to facilitate Testing and Commissioning such as generator, load banks, test equipment, etc. required to fully test and commission the scope within this specification.

13.1.2 Testing shall include but not be limited to: ensuring the BESS can discharge, follow the demand, and stop discharging to prevent back feed onto the 69kV lines using simulated inputs to the EMS.

13.1.3 System training for the Owner's Employee shall be included at the time of system or site turnover. Operator training shall be at a minimum of 40 hours.

13.1.4 The successful EPP will also be responsible for adherence to OSHA and Owner's safety standards and requirements.

13.2 TESTING

13.2.1 General

13.2.1.1 Testing shall be performed in accordance with the applicable standards, such as NETA, and any additional requirements in this specification. If the requirements of this specification conflict with any of the above standards or practices, the EPP shall identify the conflict to the Owner and adhere to the more stringent governing standard. Where standards are not suitable or applicable, other common industry procedures and mutually acceptable methods shall be used.

13.2.1.2 The results obtained from type tests must demonstrate that the equipment conform to the requirements of this specification.

13.2.1.3 The results obtained from tests must be compiled and organized in writing. All test results must contain the appropriate signature of the EPP.

13.2.1.4 The Owner reserves the right for itself and/or its representatives to be present and witness all tests. The Owner may require that test be re-performed in the presence of its representatives if the EPP neglects to provide prior notification as presented below. If the Owner or its representatives do not attend a test to which proper prior notification has been given, the Owner has waived the right to witness the test.

13.2.1.5 The EPP shall furnish all labor, materials, instrumentation and testing facilities for all tests in this specification.

13.2.1.6 If any piece of equipment provided as a part of the BESS does not pass a test or is damaged, the EPP must replace or repair the failed or damaged equipment and modify the equipment design, if necessary. The EPP shall redo the tests previously done on any equipment which is replaced, repaired or modified. All expenses for the material, re-installation and re-testing will be the responsibility of the EPP.

13.2.1.7 The EPP, at all times, must obtain permission from the Owner to perform field verification tests when the BESS is connected to the power system. These tests may have to be performed during night or low load periods. If distribution system conditions prevent the successful EPP from performing field tests, this fact shall not delay other contractual activities and obligations, neither of the Owner, nor of the EPP.

13.2.2 Factory Validation Tests of BESS Control System

13.2.2.1 A factory simulation test shall be conducted for the control system. The EPP shall thoroughly test as many control functions as possible on a representative simulator at factory. These tests shall provide an initial verification of performance before the control equipment is shipped to site.

13.2.3 BESS Commissioning Tests

13.2.3.1 EPP shall support the performance of on-site performance testing for the project. Startup, Operational and Test procedures shall be developed jointly with the battery/PCS vendors, Owner and shall be provided to Owner with the 60% design submittal. Such testing shall commence as soon as the system can be operated safely and reliably. All necessary documentation shall be provided by the EPP.

13.2.3.2 The BESS commissioning tests are those tests to be performed at the site on the fully assembled BESS, without having the BESS connected to the power system. The test shall include but not be limited to the following items:

13.2.3.2.1 Insulation check of auxiliary cables.

13.2.3.2.2 Verification of operation of station auxiliary power distribution.

13.2.3.2.3 DC distribution system, battery, and battery charger.

13.2.3.2.4 Testing of relay protections and protective control functions (by secondary injection).

13.2.3.2.5 Testing of control and monitor system and IGBTs (if required).

13.2.3.2.6 Verification and tuning of cooling system (if required).

13.2.3.2.7 Check of operation and indications of circuit breakers disconnect and earthing switches.

13.2.3.2.8 Capacitance check of capacitor banks (if required).

13.2.3.2.9 Verify proper operation of all pump fans and motors.

13.2.3.2.10 Verify proper operation of heating, ventilation, and lighting systems.

13.2.3.2.11 Check of current and voltage transformers.

13.2.3.2.12 Overall check of trip operations from protections to breaker.

13.2.3.2.13 Check of circuits through the local control interface and the remote EMS interface.

13.2.3.2.14 Verify Autonomous Functions operation simulated inputs and the battery stops discharge prior to backfeed on to 69kV line.

13.2.4 Field Verification Tests

13.2.4.1 Upon satisfactory completion of the commissioning tests, energizing of the BESS and Field Verification Tests shall be performed. These tests are performed at the site on the fully assembled BESS with the BESS operating and connected to the power system. The tests shall include but not be limited to the following items:

13.2.4.1.1 Measure and verify the Power and Energy Capabilities operation at nominal power system properties.

13.2.4.1.2 Measure and verify Autonomous Functions operation. The EPP to provide the requirements and setup needed to perform the test to Owner for approval after award.

13.2.4.1.3 Measure and verify the External Override Functions operation.

13.2.4.1.4 Verify the Remote Monitoring and Control operations. EPP to provide the requirements and setup needed to perform the tests to Owner for approval after award.

13.2.4.1.5 Verify Data Storage and Auditing operation. EPP to provide the requirements and setup needed to perform the tests to Owner for approval.

13.2.4.1.6 Verify Connection and Disconnection Control operation.

13.2.4.1.7 Measure and verify current total harmonic distortion at POI to validate requirements herein.

13.2.4.1.8 Measurements of audible noise.

13.2.4.1.9 Check of supplementary control functions

13.2.4.1.10 Capacity Testing

13.2.4.1.11 Duty Cycle Efficiency Testing

13.2.4.1.12 Verification of Peak Shifting scheme, Islanding coordination scheme, and any other proposed uses. EPP to provide the requirements and setup needed to perform the tests to Owner for approval after award.

13.2.5 Notification of Testing

13.2.5.1 The EPP shall give the Owner advance notice of type, routine and factory acceptance tests two weeks before the actual testing date.

13.2.5.2 Inspection and Test Plans shall be submitted for the Customer's information 30 days prior to commencement of the test.

13.2.5.3 The EPP shall furnish a detailed Inspection and Test Plan for the commissioning and field verification, 2 months before the beginning of the testing.

13.3 PERFORMANCE TESTING REQUIREMENTS

13.3.1 EPP shall perform Storage Rating Test for the System in accordance with this Document as a condition to achieving Commercial Operation and for ongoing Performance Testing, as specified in this Document.

13.3.1.1 Initial Commercial Operation Test: Prior to the target Commercial Operation Date, EPP shall schedule and complete an Initial Commercial Operation Test, which test shall be conducted using the procedures set forth in this Document. EPP shall undertake such activities in sufficient time to achieve Commercial Operation of the System by the Guaranteed Commercial Operation Date The Initial Commercial Operation Test shall verify the Contract Capacity for purposes of calculating the Total Compensation Amount and shall be deemed an Owner Initiated Test.

13.3.1.2 Performance Testing: During the Contract Term, additional Storage Rating Tests shall be conducted from time to time in accordance with this Document.

13.3.2 During the testing, the EPP's personnel shall operate the System. Owner and Owner's representatives shall have the right to observe the testing.

13.3.3 The Energy delivered for the tests will be at the Interconnection Point.

13.4 TESTING PROTOCOLS

13.4.1 Coordination

13.4.1.1 All testing shall be coordinated with the Owner to ensure grid conditions are available for testing conditions.

13.4.2 Storage Rating Test Sequencing

13.4.2.1 Storage Capacity Rating Test and Round-Trip Efficiency (RTE) Test

13.4.2.1.1 Pre-charging storage prior to System Capacity rating test: to commence the System Capacity rating test the System will be charged by the Owner to the maximum State of Charge (SOC) permitted by the control system.

13.4.2.1.2 Initiating System Capacity rating test: the Interconnecting Utility shall initiate a dispatch instruction for the System to be continuously discharged at its Maximum Discharge (MW) at the Interconnection Point until the System has reached the minimum SOC permitted by the control system, the discharge power is limited to nameplate power of 5% or less, or the Maximum Storage Level. Measure and record the amount of Energy discharged in MWh AC. All measurements will occur at the Interconnection Point in AC power.

13.4.2.1.3 Calculating System Capacity rating: the total amount of discharged Energy delivered to the Interconnection Point (expressed in MWH AC) shall be measured during 15 continuous minutes of discharge (the "Discharge Period"). The total MWh AC

discharged during the Discharge Period (the "Discharge Energy") divided by 15 minutes shall determine the System Capacity rating, which shall be expressed in MW AC.

13.4.2.1.4 Recharging after System Capacity rating test: within two hours of the System reaching minimum SOC, the Interconnecting Utility shall initiate a dispatch instruction for the System to be continuously charged at its Maximum Charge (MW). During recharging, charge power de-rating will occur when the batteries transition to constant voltage (CV) charging mode. The batteries may be considered fully charged when the charge power is limited by the control system to Maximum Charge of 95% or less or when the System has reached the maximum SOC permitted by the control system. Measure and record the amount of energy that is used for charging in MWh AC (the "Charge Energy"). All measurements will occur at the Interconnection Point in AC Power. For the avoidance of doubt, the Charge Energy does not include the auxiliary loads consumed by the System for cooling, lighting, etc. The auxiliary load during the recharging shall be measured by the auxiliary load meter and subtracted from the measurement at the Interconnection Point.

13.4.2.1.5 Calculating RTE: RTE of the system shall be calculated as the Discharge Energy divided by the Charge Energy as seen from the POI.

13.4.2.2 The Storage Ramp Rate Test

13.4.2.2.1 SOC of the System 50% before the Storage Ramp Rate test can commence.

13.4.2.2.2 The Storage Ramp Rate test shall commence when a dispatch instruction is received at the control system to increase System output from zero (0) MW to the Maximum Discharge (MW) rating.

13.4.2.2.3 EPP shall increase System output from zero (0) MW to Maximum Discharge (MW). EPP shall measure the elapsed time from when the dispatch signal is received at the control system to when the System output as measured at the System Interconnection Point reaches a level within two percent (2.0%) of the Maximum Discharge (MW). The System will be considered to have reached the Maximum Discharge when the measured output is within two percent (2.0%) of the Maximum Discharge. The Maximum Discharge shall be divided by the elapsed time required to reach a level within two percent (2.0%) of the Maximum Discharge. The resulting number shall be recorded as the test ramp up rate. Ramp up rate test shall be repeated and recorded four (4) times within an hour. The average of the three highest ramp up rates will be recorded as the ramp up (MW/second) for the System.

13.4.2.2.4 Within one hour of completing the ramp up rate test, as specified above, a dispatch instruction to ramp down from full Maximum Discharge to zero (0) MW will be issued.

13.4.2.2.5 The EPP shall decrease System output from Maximum Discharge to (0) MW. EPP shall measure the elapsed time from when the dispatch signal is received at the control system to when the System output as measured at the System Interconnection Point reaches a level within two percent (2.0%) of 0.1 MW. The absolute value of the change in System output (MW) from when the dispatch signal was received to when the System output reaches a level within two percent (2.0%) of 0.1 MW shall be divided by the elapsed

time. The resulting number shall be recorded as the ramp down rate (MW/minute). Ramp down rate test shall be repeated and recorded four (4) times within an hour. The average of the three lowest results will be recorded as the ramp down rate for the System.

AC System:

System Test	Description	Pass/fail requirement	Measurement Point
Charge Power Test	1. Charge or discharge the system as required so that the SOC is between 40-60% SOC. 2. Command the system to charge at the system rated charge power 3. Maintain system charge at rated power for 5 minutes	Charge power is maintained at 100% of rated MW +/- 1% for 5 minutes.	ESS Power Quality Meter
Discharge Power Test	1. Charge or discharge the system as required so that the SOC is between 40-60% SOC. 2. Command the system to discharge at the system rated discharge power 3. Maintain system discharge at rated power for 5 minutes	Discharge power is maintained at 100% of rated MW +/- 1% for 5 minutes.	ESS Power Quality Meter
Battery O&M Energy Capacity Test	1. Perform the battery OEM capacity test procedure to determine the dischargeable energy at the point of common coupling for a discharge between 100% and 0% state of charge at rated power. This test procedure may include pre-test cell balancing, multiple charge/discharge cycles at rated power, and include constant voltage charging.	Minimum 100% of rated MWh discharge energy at 100% of rated MW	ESS Power Quality Meter
Round Trip Efficiency (RTE) test	1. Perform the battery OEM roundtrip efficiency test procedure. This test may include pre-test cell balancing, multiple charge/discharge cycles at rated power, and include constant voltage charging.	N/A. Characterize roundtrip efficiency	ESS Power Quality Meter and ESS Auxiliary Power Meter

13.4.3 Operating Conditions

13.4.3.1 At all times during testing, the System shall not be operated with abnormal operating conditions such as unstable load conditions, or operation outside of regulatory restrictions. The measured output of the System shall be adjusted to account for environmental considerations, such as ambient temperature, humidity, and barometric pressure according to guidelines provided by EPP, provided that such environmental considerations shall not be considered limiting factors to conducting a Storage Rating Test unless those factors constitute a force majeure event. If abnormal operating conditions occur on the day of or during a test, Owner may postpone such test in its reasonable discretion in accordance within the requirements in this Document.

13.4.4 Communications

13.4.4.1 The end-to-end communications shall be tested by sending the signals remotely and confirming the system responds accordingly.

13.4.5 Additional Testing Details

13.4.5.1 Only energy discharged and delivered at the Interconnection Point during Storage Rating Tests shall be included in all calculations of the Storage Rating Test.

13.5 TEST RESULTS

13.5.1 No later than three (3) business days following any Storage Rating Test, EPP shall submit a testing report detailing results and findings of the test. The report shall include meter readings and digital plant log sheets verifying the operating conditions and output of the System.

13.5.2 The following data shall be captured and digitally reported at (2) two second resolution:

13.5.2.1 Time

13.5.2.2 Storage system MW output in AC at the Interconnection Point

13.5.2.3 Storage system ramp rate (Ramp up rate and Ramp down rate) as measured in MW/min at the Interconnection Point

13.5.2.4 Storage System SOC

13.5.2.5 Power factor at the Interconnection Point

13.5.2.6 Frequency as measured in hertz at Interconnection Point

13.5.2.7 AC current and voltage at the Interconnection Point

13.5.3 Record of the personnel present during all or any part of the test, whether serving in an operating, testing, monitoring or other such participatory role.

13.5.4 Record of any unusual or abnormal conditions or events that occurred during the test and any actions taken in response.

13.6 INCOMPLETE OR POSTPONED TESTS

13.6.1 If any test is postponed or otherwise not fully completed in accordance herewith, EPP

shall repeat such test on the same date as the incomplete test, or if repeating the test on the same day is not reasonably possible, the test shall be completed within no longer than ten (10) days after the date of the incomplete test.

13.7 SUPPLEMENTARY STORAGE RATING TEST PROTOCOL

13.7.1 No later than seventy five (75) days prior to commencing System construction, EPP shall deliver to Owner for its review and approval (such approval not to be unreasonably delayed or withheld) a supplement to this Document with additional and supplementary details, procedures and requirements applicable to Storage Rating Tests based on the then current Design of the System ("supplementary Storage Rating Test protocol"). Thereafter, from time to time during construction, EPP may deliver to Owner for its review and approval (such approval not to be unreasonably delayed or withheld) any EPP's recommended updates to the then current supplementary Storage Rating Test protocol. The initial supplementary Storage Rating Test protocol (and each update thereto) will be submitted to the Owner/OE for approval. Once approved the initial supplementary Storage Rating Test protocol (and each update thereto) shall be deemed an amendment to this Document.

13.8 SYSTEM OPERATING RESTRICTIONS

13.8.1 Results of all testing performed as set forth in this Document shall be used to determine the system operating restrictions.

13.9 BESS OPERATING LIMITATIONS

13.9.1 EPP shall use the results from Section 13.8 to identify whether there are any operating limitations to the system that they are supplying.

13.10 OPTIONAL OPERATING SCENARIOS

13.10.1 EPP may provide warranty terms that adjusts the Guaranteed Capacity and Guaranteed Round Trip Efficiency for the following optional operating scenarios. Each of these scenarios can cause accelerated degradation of the System. Any potential bidder to provide dollar amount estimates for each of these conditions.

13.10.2 The total System throughput in any Performance Period exceeds three hundred and sixty-five (365) Full Cycle Equivalents.

13.10.3 The total System throughput exceeds one Full Cycle Equivalent per day.

13.10.4 EPP to provide estimates for the lifetime round trip efficiencies and HVAC / Auxiliary loads of the system.

13.10.5 EPP to identify impacts to the system when demands on the system exceed nominal operations. Examples: Increase charge and discharge frequencies while staying within SOC ranges.

– END OF SECTION 13-

SECTION 14 – CODES, STANDARDS AND REFERENCE DOCUMENTS

14.0 CODES AND STANDARDS

14.1.1 General

14.1.1.1 The EPP shall design and manufacture all equipment in accordance with ANSI standards. All documents, drawings, instruction manuals and test certificates shall use English units.

14.1.1.2 All Works connected with the supply of the BESS system shall be in accordance with the requirements of the appropriate ANSI/IEEE standards. Where no ANSI/IEEE standard exists the BESS system shall comply with recognized standards (including IEC) and design practices. If the requirements of this specification conflict with any of the above standards or practices, this specification shall apply. Based on the location of the project as stated in Attachment 1, the EPP is required to determine any applicable codes pertaining to the municipal, state, or federal AHJ.

14.1.1.3 Where the term "should" is utilized in the applicable codes, standards and reference documents, these requirements shall be incorporated into the design. If deviations are warranted, Owner approval must be obtained, and justification provided.

14.1.1.4 The latest revisions of the following standards, in particular, shall apply:

14.1.1.4.1 General

ACI 301-16	Specifications for Structural Concrete
ACI 318-14	Building Code Requirements for Structural Concrete
AISC 303-16	Code of Standard Practice for Steel Buildings and Bridges
AISC 325-17	Steel Construction Manual, 15th Ed.
AISC 341-16	Seismic Provisions for Structural Steel Buildings
AISC 360-16	Specification for Structural Steel Buildings
ANSI C2	National Electrical Safety Code
ASCE 7-16	Minimum Design Loads for Buildings and Other Structures
ASCE 41-17	Seismic Evaluation and Retrofit of Existing Buildings
ASHRAE 169	Climatic Data for Building Design Standards
IBC-2018	International Building Code

IEBC-2018	International Existing Building Code
IEEE 979	Guide for Substation Fire Protection
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm and Signaling Code
TMS 402-16	Building Code for Masonry Structures
TMS 602-16	Specification for Masonry Structures

14.1.1.4.2 BESS

UL 9540	Standard for Energy Storage Systems and Equipment
UL9540A	Test Method, 4th Edition.
UL 1642	Standard for Lithium Batteries (Cells)
UL 1741	Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
IEEE 1547-2018	IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
NFPA 855	Standard for the Installation of Stationary Energy Storage Systems
IEEE 2030.2.1	Guide for Design, Operation, and Maintenance of Battery Energy Storage Systems, both Stationary and Mobile, and Applications Integrated with Electric Power Systems

14.1.1.4.3 HVAC and Thermal Management

NFPA 90	Standard for the Installation of Air Conditioning
ASHRAE 183	Peak Cooling and Heating Load Calculations in Buildings Except Low-rise Residential Buildings

ASHRAE 90.1	Energy Standard for Buildings Except Low-Rise Residential Buildings

14.1.1.4.4 Fire Protection (2021 Edition of all codes)

IFC	International Fire Code
NFPA 1	Fire Code
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electric Code
NFPA 72	National Fire Alarm and Signaling Code
NFPA 855	Standard for the Installation of Energy Storage Systems
	Note: Comply with local fire department requirements as of the date of the offer, including the local fire department's Letter of Approval.

14.1.1.4.5 Transformers and Reactors

IEEE C57	Standards Collection: Distribution, Power, and Regulating Transformers.
	Note: The items below are all included where applicable by the reference above.
	[NEMA TR-1 Transformers, Regulators, and Reactors]

14.1.1.4.6 Arresters

IEEE C62	Standards Collection: Guides for Surge Protection
IEEE C62.11	IEEE Standard for Metal-Oxide Surge Arresters for AC Power Circuits
NEMA LA 1	Surge Arresters

14.1.1.4.7 Circuit Breakers

IEEE C37	Standards Collection: Circuit Breakers,

		Switchgear, Relays, Substations, and Fuses
		Note: The items below are all included where applicable by the reference above.
14.1.1.4.8	Disconnect Switches	
	IEEE C37.37	IEEE Standard Loading Guide for AC High Voltage Switches (in excess of 1000 Volts)
	NEMA SG 6	Fuses
	IEEE C37.46	Specifications for Power Fuses and Fuse Disconnection Switches
	IEEE C37.47	Specifications for Distribution Fuse Disconnecting Switches, Fuse Support and Current Limiting Fuses
	NEMA FU 1	Low Voltage Cartridge Fuses
14.1.1.4.9	Protection	
	IEEE C37.91	IEEE Guide for Protective Relay Applications to Power Transformers
	IEEE C37.99	Guide for Protection of Shunt Power Capacitors
	IEEE C37.90	IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus
	IEEE C37.90.1	IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
	IEEE 242	Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
	IEEE 141	Recommended Practice for Electric Power Distribution for Industrial Plants
	IEC 255-5	Electric Relays. Part 5: Insulation Tests for Electric Relays
	IEC 255-22	Electric Relays. Part 22: Electrical Disturbance Tests for Measuring Relays and Protection Equipment
14.1.1.4.10	Control Equipment	
	ANSI/IPC D30OG	Printed Board Dimensions and Tolerances

ANSI/IPC A610B	Acceptability of Printed Boards

14.1.1.4.11 Motors

NEMA MG-1	Motors and Generators

14.1.1.4.12 Instrument Transformers

IEEE C57.13	IEEE Standard Requirements for Instrument Transformers
IEEE C57.13.2	IEEE Standard Conformance Test Procedures for Instrument Transformers

14.1.1.4.13 Harmonics

IEEE 519	IEEE Guide for Harmonic Control and Reactive Compensation of Static Power Converters

14.1.1.4.14 Grounding

IEEE 80	Guide for Safety in AC Substation Grounding

14.1.1.4.15 Seismic

IEEE 693	IEEE Recommended Practice for Seismic Design of Substations

14.2 REFERENCE DOCUMENTS

14.2.1 Reference Attachment 3 for a plan of the areas designated for battery installation and inverter locations.

14.2.2 Reference Exhibits 1 to 4 for additional site-specific information.

– END OF SECTION 14–

Attachment 1 – Project Specific Requirements

Facility Name	Old Power Plant Building
Location	216 Schley Ave, Lewes, DE 19558
Latitude/Longitude	38.77102, -75.13757
Rating (MW/MWh)	4-hour battery (MW rating to be included in proposal)
Cycles of operation per day	EPP to determine as long as Coincident Peak obligations are met
PCS	To be included in proposal
Point of Interconnect (POI)	Schley Avenue Substation

Note – Refer to Battery & Inverter Location Plan in Attachment 3.

Environmental Conditions[2]	
Category	**Requirements**
Minimum Ambient Design Conditions (for Outdoor equipment) [3]	18.1°F
Maximum Ambient Design Conditions (for Outdoor Equipment) [3]	91°F; % RH, full rated power available at up to this temperature with power derate above this temperature
Basic design wind speed, 3 sec. gust	129 mph[1]
Contamination Level	(per IEEE C57-19-100. Section 9.1.1 Table 1)

[1] refer to section 8.4.2.1.

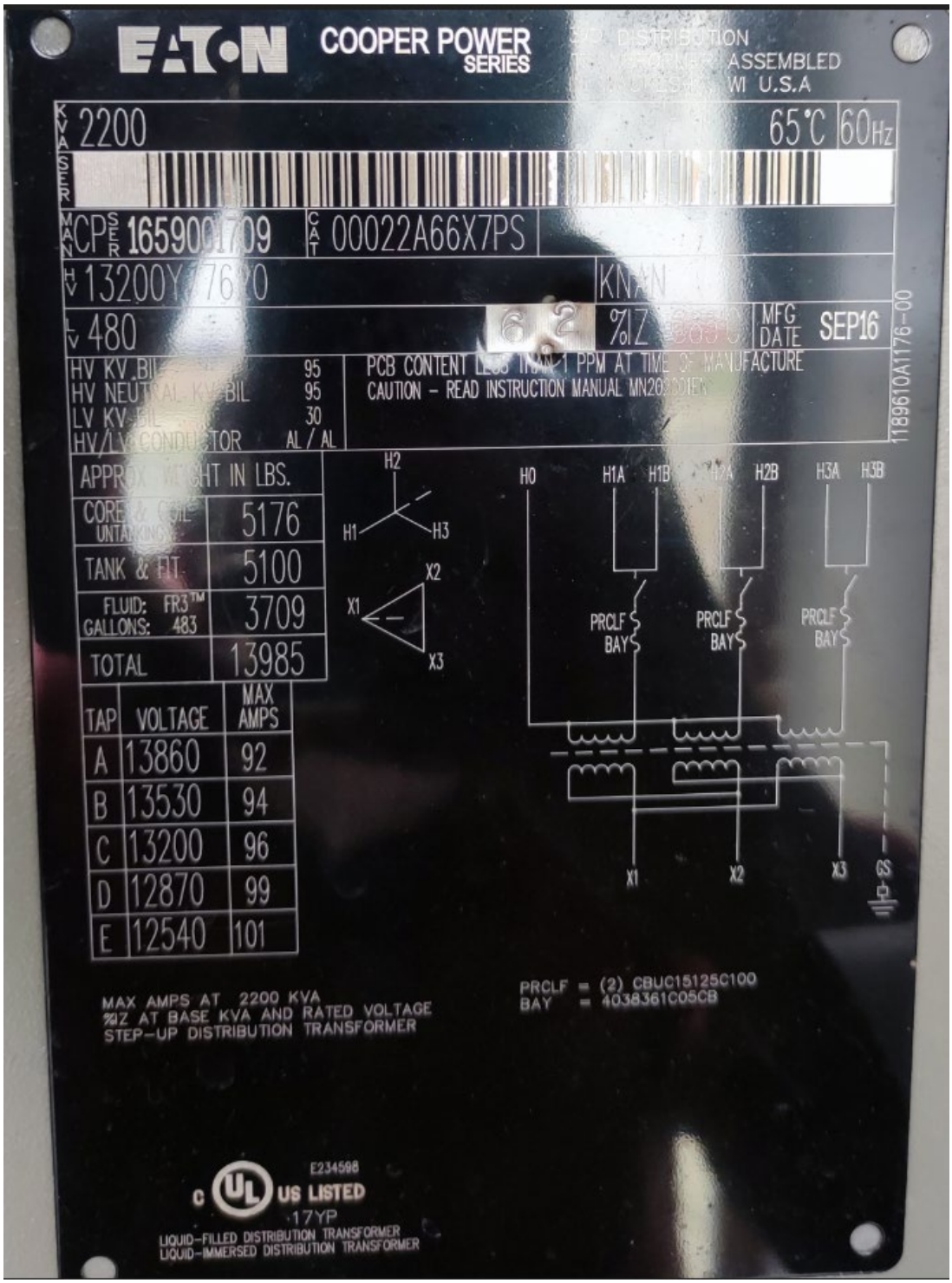
[2] Contractor shall ensure that selected equipment (including but not limited to the batteries, inverters, and transformers) are adequately rated and capable of correct and uninterrupted performance within the environment installed in.

[3] Contractor shall ensure that any equipment (including but not limited to the batteries, inverters, and transformers) installed indoors operate in an environment climate conditioned in accordance with the ASRAE Fundamentals Handbook.

System Use Case[1]	
Category	Requirements
Cycles per year	365 cycles per year
Cycles per day	1 cycle per day
Average State of Charge	40% - 80%
State of Charge monitoring frequency	Once per hour
Expected days with fully charged (100%) battery per year	365 days
Allowable charge (MW)	Complete
Allowable Discharge (MW)	Complete
Allowable charging rates (MW/min)	
Allowable discharging rates (MW/min)	

[1] EPP is expected to ensure battery design shall meet nameplate capacity until end of contractual obligations.

Attachment 2 – Existing Medium Transformer information



Transformer Impedance 8.2% @ 82 MVA (Nameplated Impedance Field Verified)
See Exhibit 4 for additional information.

Attachment 3 – Proposed One-Line & Battery and Inverter Locations

See Drawings in Exhibit 4.

Attachment 4 – Demand Response Non-Performance Description

Demand Response Non-Performance Penalty

The EPP will have the expectation to operate the resource per DEMEC's direction at the identified Contract Capacity in an effort to capture the top 5 PJM RTO Summer Coincident Peaks (5 CP's) for PJM capacity service (June – September) for the following PJM Delivery Year Peak Load Contribution (PLC) impact, and the annual Delmarva Power and Light (DPL) zonal peak for zonal transmission network service (November-October) for the following calendar year PJM Network Transmission Service PLC. DEMEC may direct the EPP to operate for demand response purposes up to 25 dispatches per calendar year. For each DEMEC directed dispatch, the EPP must be able to accommodate 4 consecutive hours of operating/discharge.

If during a DEMEC directed dispatch resulting in the capture of one of the 5 CP's or the annual zonal peak, the EPP is unable to operate the resource at the Contract Capacity, the EPP will be assessed a Non-Performance Penalty for the MW quantity that is short of the Contract Capacity. This shortfall will be referred to as the Lost Opportunity Quantity. The Lost Opportunity Quantity will be calculated to reflect the impact on the DEMEC Peak Load Contribution (PLC) value for capacity and transmission network service as calculated in the most current Delmarva PHI Supplier Operating Manual.

Note: Capacity and transmission charges and PLC impacts will be calculated on current polices for effected program year.

Capacity Peak Load Contribution (PLC)Performance

Capacity Peak Load Contribution (PLC) Lost Opportunity Quantity Calculation

Performance during each 5 CP hour will be calculated for the Capacity Peak Load Contribution (PLC) Lost Opportunity Quantity Calculation. Sample calculation provided in Appendix A - Table 1.

As defined in the Delmarva PHI Supplier Operating Manual, the Capacity PLC for the Lost Opportunity Quantity will be calculated for each of the 5 CP hours as the Lost Opportunity Quantity multiplied by the 69KV voltage code loss factor, multiplied by the Unaccounted for Energy Factor, multiplied by the Reconciliation Factor. Sample calculation provided in Appendix A - Table 2.

Capacity PLC Non-Performance Penalty Calculation

The Non-Performance Penalty for capacity service will be calculated using the average of the 5 CP Lost Opportunity Quantity Capacity, multiplied by the cleared PJM DPL-South LDA Base Residual Auction (BRA) capacity price for the applicable delivery year as posted by PJM in $/MW-day, multiplied by the percentage of the captured 5 CP's, multiplied by 365 days. Sample calculation provided in Appendix A - Table 3.

Transmission Network Service Peak Load Contribution (PLC) Performance

Transmission Network Service PLC Calculation Lost Opportunity Quantity Calculation

Performance during the annual zonal DPL zone peak hour will be calculated for the Transmission Network Service PLC Calculation Lost Opportunity Quantity Calculation. Sample calculation provided in Appendix A - Table 4.

As defined in the Delmarva PHI Supplier Operating Manual, the Network Service PLC for the Lost Opportunity Quantity will be calculated for the annual zonal DPL zone peak as the Lost Opportunity Quantity multiplied by the 69KV voltage code loss factor, multiplied by the Unaccounted for Energy Factor, multiplied by the Reconciliation Factor. Sample calculation provided in Appendix A - Table 5.

Transmission Network Service Non-Performance Calculation

The Non-Performance Penalty for transmission network service will be calculated using the Lost Opportunity Quantity for the annual zonal peak, multiplied by the percentage Annual DPL Zone Peak Captured multiplied by the DPL zone Network Integration Transmission Service (NITS) price for the applicable calendar year as posted by PJM. Sample calculation provided in Appendix A – Table 6.

Appendix A – Sample Lost Opportunity Quantity PLC and Non-Performance Calculation

Capacity PLC Lost Opportunity Quantity Non-Performance Calculation

Table 1 - Example is for the summer 2019 period (June 2019 – September 2019) for the PLC impact to the PJM Delivery Year 2020/2021

Peak	Date	HE	Contract Capacity (MW)	Performance Capacity (MW)	Lost Opportunity Quantity (MW)	DEMEC Captured Hour
1	7/19/2019	18	10	8	2	Yes
2	7/17/2019	17	10	7	3	Yes
3	7/10/2019	18	10	6	4	Yes
4	8/19/2019	17	10	10	0	Yes
5	7/29/2019	17	10	10	0	Yes

If DEMEC fails to correctly capture an event hour with its notice, then regardless of performance that hour will be considered a fulfilled.

Table 2 - Capacity Peak Load Contribution (PLC) Lost Opportunity Quantity Calculation

Lost Opportunity Quantity (LOQ) (MW)	69KV voltage code loss factor (LF)	LF Multiplied	Unaccounted for Energy Factor (UEF)	UEF Multiplied	Reconciliation Factor (RF)	RF Multiplied
2	1.03193	2.06386	0.9723452	2.006784364	1.00112052	2.009033006
3	1.03193	3.09579	0.9900576	3.065010418	1.00112052	3.068444823
4	1.03193	4.12772	0.98245684	4.055306748	1.00112052	4.059850799
0	1.03193	0	0.97081078	0	1.00112052	0

0	1.03193	0	0.98342811	0	1.00112052	0
					LOQ Average	1.827465726

Table 3: Capacity PLC Non-Performance Penalty Calculation

LOQ Average	BRA	CP Captured Percentage*	Calendar Days	Non-Performance Penalty
1.827465726	$187.87	100%	365	$125,313.98

*Each DEMEC CP captured is equal to 20%. For example, 5 captured CP is equal to 5 x 20% = 100%.

Transmission Network Service PLC Lost Opportunity Quantity Non-Performance Calculation

Table 4: Example is for the November 2019 – October 2020 period for the PLC impact to the PJM Network Transmission PLC for the 2021 Calendar Year

Peak	Date	HE	Contract Capacity (MW)	Performance Capacity (MW)	Lost Opportunity Quantity (LOQ) (MW)	DEMEC Captured Hour
1	7/20/2020	18	10	5	5	Yes

If DEMEC fails to correctly capture an event hour with its notice, then regardless of performance that hour will be considered a fulfilled.

Table 5: Transmission Network Service PLC Calculation Lost Opportunity Quantity Calculation

LOQ (MW)	69KV voltage code loss factor (LF)	LF Multiplied	Unaccounted for Energy Factor (UEF)	UEF Multiplied	Reconciliation Factor (RF)	RF Multiplied
5	1.03193	5.15965	0.98786682	5.097047038	1.027541509	5.237427405
					LOQ PLC Final	5.237427405

Table 6: Transmission Network Service Non-Performance Calculation

LOQ PLC Final	Annual Zonal Peak Captured Percentage*	NITS Rate	Non-Performance Penalty
5.237427405	100%	$33,000.00	$172,835.10

*DEMEC capture of the Annual Zonal Peak will result in the percentage equaling 100%.

Form 1 – System Operating Restrictions

File Update Date:	**[07/1/2021]**
Technology:	**Lithium-Ion**
Storage Unit Name:	**"Old Power Plant Building"**
A. Contract Capacity	
Contract Capacity (MW):	EPP to include in proposal
B. Total Unit Dispatchable Range Information	
Maximum Storage Level (MWh) [1]:	EPP to include in proposal (as measured by the system controls) (should fit inside Project site, be properly sized to meet load)
Minimum Storage Level (MWh) [2]:	EPP to include in proposal (as measured by the system controls)
Maximum Discharge (MW):	EPP to include in proposal (should fit inside Project site, be properly sized to meet load)
Maximum Charge (MW):	EPP to include in proposal (should fit inside Project site, be properly sized to meet load)
Guaranteed Round Trip Efficiency (%)	89%, exclusive of auxiliary loads

Notes:

[1] Maximum Storage Level (MWh) is based on the Maximum usable State of Charge available in the System.

[2] Minimum Storage Level (MWh) is based on the Minimum usable State of Charge available in the System.

Form 2 – Vendor Response Form

For responses to this section of the specification at time of bid, contractor only needs to provide explanation for exceptions taken to any of the below.

HVAC SYSTEM DESIGN	
ITEM	**VENDOR RESPONSE**
Describe the methodology for HVAC Sizing and redundancy	

POWER AND ENERGY CAPABILITIES		
ITEM	**MINIMUM REQUIREMENT**	**VENDOR RESPONSE**
Power/Energy *Discharge power available when BESS is at neutral SOC which can be sustained for:*		
Four Hours 1.0 times per day (Supplemental Power function)	8MW / 2 MWh at 10 years	
Margin, Augmentation, or Replacement Plan (Per Section 3.2.2)	Augmentation no earlier than year 5	

AUTONOMOUS FUNCTIONS *These functions shall be simultaneously armed and active. In case of conflict, they are listed in order of priority.*		
ITEM	**REQUIREMENTS**	**VENDOR RESPONSE**
Fault Response		
Monitor at POI	YES	

In the event of a grid-failure the BESS should successfully island Feeder #1 at Schley Avenue Substation.	YES	
State of Charge Management		
Monitor system state of charge and provide a mechanism to regulate SOC, principally to recover SOC after discharge events (both manual and automatic)	YES	

EXTERNAL OVERRIDE CONTROLS		
Provide functionality to trigger manual discharge, using the following parameters:	**MINIMUM REQUIREMENTS**	**VENDOR RESPONSE**
If present conditions do not permit requested discharge (ex SOC is too low), system must report the maximally conforming parameters.	YES	

REMOTE MONITORING AND CONTROL		
ITEM	**MINIMUM REQUIREMENTS**	**VENDOR RESPONSE**
BESS-Owner communication mechanism for data transfer, define maximum sampling during faults/triggered actions.	EPP to provide	
Connection to external communications systems?	YES	
BESS internal communications	EPP designed	
Heartbeat timer to ensure communication path is online and processor is functioning	EPP designed	

Available alarms that can be provided to		
Provide list of available alarms that can be connected to Schley Avenue Annunciator Panel		
Required adjustable set points *Operation mode including arming and disarming each autonomous function, and all operational set points for each function.*		
Fault response		
Fault Response Power (kVAR)	YES	
Minimum SOC for normal operation		
Maximum response time for implementing changes to setpoints	2 seconds	

PERFORMANCE VALIDATION		
BESS SCADA must compute performance metrics which describe the quality of system performance for each function over the last 72 hours minimum to be provided to the Owner at regular intervals. EPP will specify length of data storage.	YES	
Describe how system will be maintained to continuously perform at initial nameplate.		

CONNECTION AND DISCONNECTION FROM OWNER POWER SYSTEM		
ITEM	**MINIMUM REQUIREMENT**	**VENDOR RESPONSE**
While voltage and frequency remain within the specified voltage and frequency windows, the BESS shall remain connected to the Owner grid and operational at all times unless instructed otherwise by communication from Owner.	YES	
Provide function for commanded disconnection from the Owner grid both remotely and via local HMI. This is to be used for routine disconnection when sufficient warning is available to permit a graceful disconnection by the BESS.	YES	

If instructed to open *the BESS must immediately cease operation.*	YES	
Startup and connection time from a full off condition	EPP to provide	
Maximum time for BESS POI disconnection after receiving emergency stop signal	EPP to provide	
<u>Power Quality:</u>		
Current Total Harmonic Distortion at POI	IEEE 519	
<u>Low and High Frequency Ride-Through:</u>		
Transmission	IEEE 1547	
Distribution	NERC PRC-024	
General	FERC Order 827	