

AES Indiana
AES Indiana – Petersburg BESS

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Exhibit F – Attachment 9
Project Management Requirements

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 PROJECT MANAGMENT.....	1
1.2 ACCESS TO THE WORK	1
2.0 GENERAL.....	1
2.1 DEFINITIONS	1
2.2 MANAGEMENT ORGANIZATION	1
2.3 PROJECT SCHEDULE.....	1
2.4 PROJECT CONTROLS	3
2.5 WORKFORCE PLANNING.....	4
2.6 QUALITY ASSURANCE.....	4
2.7 PROJECT RECORDS	7

1.0 INTRODUCTION

This Section describes Contractor’s responsibilities in managing Work activities.

1.1 PROJECT MANAGEMENT

- 1.1.1 Contractor shall provide a management organization and implement a management process to control and complete the Work.
- 1.1.2 Owner and/or its appointed representative shall closely monitor the progress of the Work.
- 1.1.3 Owner participation shall not in any way affect Contractor's obligations to complete the Work in accordance with the Contract.

1.2 ACCESS TO THE WORK

- 1.2.1 Contractor shall allow access to its management, design, and manufacturing facilities and those of its subcontractors at all reasonable times and with prior arrangement to permit the participation of Owner, or Owner’s representative, in monitoring the performance of the Work and satisfaction of other obligations.

2.0 GENERAL

2.1 DEFINITIONS

- 2.1.1 The following terms have the meanings defined below:
 - 2.1.1.1 **‘Procedures’** means the defined arrangements and methods that shall be used to ensure that all components of the Work comply with the Technical Specification requirements.
 - 2.1.1.2 **‘Quality Assurance Program’** a program for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure the standards of quality are being met.

2.2 MANAGEMENT ORGANIZATION

- 2.2.1 The authority and responsibility of those Contractor personnel assigned to manage the Project shall be clearly established.
- 2.2.2 An organization chart, or similar graphical technique, showing the relationship between management and engineering, procurement, fabrication, construction, inspection and quality control is required to show the actual organization.
- 2.2.3 Contractor personnel acting as liaison to Owner who provides information or coordinates information transfer between Contractor and Owner shall be proficient in English.

2.3 PROJECT SCHEDULE

- 2.3.1 General Requirement
 - 2.3.1.1 Contractor shall develop and maintain a fully integrated Project Schedule for engineering, procurement, construction, and commissioning. This shall be the master Schedule for the Project and shall become the baseline to which progress updates are measured. Contractor shall fully incorporate additional Project Schedules submitted by the Owner in the integrated Schedule.
- 2.3.2 Summary Schedule

- 2.3.2.1 A Level I summary Schedule shall be prepared and based on the major Project milestones. The summary Schedule shall illustrate the start and finish dates of the key activities that support the milestones. The Level I Schedule shall be based on the detailed Schedule used to plan and monitor the Work. The Level I Schedule shall be included in the monthly progress report.
- 2.3.3 Detailed Schedule
 - 2.3.3.1 Contractor shall submit a master integrated Project Schedule which covers the engineering, manufacturing, construction, commissioning, and testing of the Project. This Schedule shall be based on the Guaranteed Substantial Completion Date and the Guaranteed Final Completion Date and such other milestones as Owner may require. The detailed Schedule shall be in sufficient detail to allow Owner to monitor progress for all parts of the Work, including that of vendors and subcontractors. The Project Master Schedule shall be updated on a monthly basis to reflect actual progress. The updated Schedule shall be submitted to Owner as part of the monthly progress reporting requirement.
 - 2.3.3.2 Contractor shall use Primavera Project Planner 6 scheduling software. Contractor shall have the capability to host the software in a web based environment which allows access by Owner.
 - 2.3.3.3 The master integrated Project Schedule shall be a Level 3 which encompasses all of the Work activities from Full Notice to Proceed to Guaranteed Final Completion. The Level 3 Schedule shall have activities in sufficient detail to support Owner’s monitoring and evaluation of the Work progress. The Schedule shall include:
 - 2.3.3.3.1 All individual subcontractor mobilizations and demobilizations shall be identified.
 - 2.3.3.3.2 Activity descriptions which define the scope of Work for the task.
 - 2.3.3.3.3 Activities which are discrete items of Work when logically assembled define the Project scope of Work.
 - 2.3.3.3.4 Activities which have a defined duration in working days.
 - 2.3.3.3.5 Resources loaded in sufficient detail to produce a plan and progress curves for engineering, procurement and construction and commissioning.
 - 2.3.3.3.6 Activities which have appropriate resource hours by engineer or craft type which shall facilitate the implementation of earned value as the basis for Project progress measurement.
 - 2.3.3.3.7 Capable of calculating the Project critical path. Critical path is defined as the longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains zero total float.
 - 2.3.3.3.8 Personnel who prepare the Schedule shall be qualified and experienced in Critical Path Method (CPM) scheduling.

- 2.3.3.4 During the engineering phase of the Project, Contractor shall prepare a look-ahead Schedule which shall be available to Owner for review. This look ahead shall cover the period of at least six weeks beyond the data date. This Schedule shall be generated from the Primavera electronic Schedule.
 - 2.3.3.5 During construction, Contractor shall submit a weekly detail Schedule which defines activities for the next three week period. This Schedule may be separate from the Primavera Schedule although the Work activities must be able to be recognized as activities which support those in the electronic Primavera Schedule. The look-ahead Schedule shall display activities three weeks in advance of the weekly data date. This Schedule shall be submitted in advance of the weekly progress meeting where the look-ahead shall be reviewed. To comply with any local regulations regarding construction Work outside of business hours, Contractor shall submit to Owner a Schedule showing plans for overtime or extended work week.
 - 2.3.3.6 On a monthly basis the Primavera Schedule shall be updated with actual progress for the month. The cut-off date for the Schedule shall be in alignment with the monthly progress report. Contractor shall notify Owner and Owner's Engineer when the update is complete and available for review. It is anticipated that Contractor shall continue to Work in order to generate the reports and the earned value for engineering and procurement. Reports which shall be available include a current Schedule report, critical path report and comparison to the Project baseline Schedule. Each report shall display the current start and finish, baseline start and finish dates, variance between the current and baseline Schedule, remaining duration, total float plus the physical percent complete.
- 2.3.4 Commissioning Schedule
- 2.3.4.1 Contractor shall provide a detailed commissioning and startup Schedule four months before the start of commissioning showing a phased sequence of submission to Owner of the commissioning documents and network schedules. Start-up and Commissioning and Testing may require Level 4 scheduling and Contractor shall develop said schedule as required to support the work and ensure Project Milestones are achieved.
 - 2.3.4.2 The first draft of these commissioning documents and network schedules shall be submitted not later than four months before the start of commissioning activities.
 - 2.3.4.3 Copies of the final agreed commissioning documents and detailed commissioning network schedules shall be made available to Owner not later than two months before start of commissioning activities for each generating unit.
 - 2.3.4.4 Commissioning shall not commence until appropriate documentation has been submitted to and approved by Owner.

2.4 PROJECT CONTROLS

2.4.1 Project Controls Representative

- 2.4.1.1 Contractor shall designate a Project controls representative whom shall be able to speak for Contractor on matters of planning and progress and be of sufficient status to have free access to Contractor's management staff, Contractor's and subcontractor's workshops, job Site, etc.

- 2.4.1.2 Owner or his designated representative shall be entitled at all times to visit the job Site and all premises, including those of subcontractors, where design, manufacturing and construction of the system/equipment is being carried out in order to monitor and verify progress.
- 2.4.1.3 The monitoring and verifying of progress by Owner shall not release Contractor from any obligations under the Contract.
- 2.4.2 Progress Curves
 - 2.4.2.1 As part of the baseline Schedule development, separate progress curves shall be developed for engineering, procurement, construction, startup and commissioning, and an overall Project progress curve. On a monthly basis Contractor shall update the progress curves with actual earned progress based on the concepts of earned value. In addition, Contractor shall prepare and update progress commodity curves which identify planned and earned progress for:
 - 2.4.2.1.1 Wire and cable
 - 2.4.2.1.2 Raceway
 - 2.4.2.1.3 Terminations
 - 2.4.2.1.4 Concrete
 - 2.4.2.1.5 Structural steel
 - 2.4.2.1.6 Other Contractor proposed metrics

2.5 WORKFORCE PLANNING

- 2.5.1 Contractor shall implement a suitable resource management system to include the following elements:
 - 2.5.1.1 Identify the resources to be deployed during design, manufacture, erection, construction, and commissioning phases, together with planned workday schedule deviations from the planned Schedule
 - 2.5.1.2 Provide, in histogram form for each discipline, the resource disposition for design development, manufacture, erection and commissioning
 - 2.5.1.3 Identify the job Site labor requirements by craft categories to meet the erection Schedule
 - 2.5.1.4 Contractor shall submit monthly resource deployment Schedules segregated into design, manufacture, erection, and commissioning.
- 2.5.2 Contractor shall be wholly and entirely responsible for establishing and maintaining sound labor management practices, good industrial relations, and acceptable levels of labor productivity to achieve safe completion of the Work within the quality assurance program, Schedule, and budget.
- 2.5.3 Contractor shall be responsible for the assessment of subcontractor's proposed labor policies, and shall ensure their compliance and compatibility with their own policy. Contractor shall ensure that there shall be no changes to a subcontractor's policy without the approval of Contractor.

2.6 QUALITY ASSURANCE

- 2.6.1 The following requirements along with those listed in Exhibit F – Scope of Work shall be utilized for Contractors Work management and execution.

- 2.6.2 Contractor shall ensure that all items supplied are designed, manufactured, and tested under a quality assurance program that either complies with the requirements of ISO 9001 or is functionally equivalent to ISO 9001.
- 2.6.3 Contractor shall provide and work to a set of defined Procedures.
- 2.6.4 Contractor's quality assurance program shall be submitted to Owner for review and shall include the preparation of and adherence to Project specific quality plans.
- 2.6.5 Contractor shall ensure that all subcontractors comply with their quality assurance program. Contractor shall be responsible for monitoring of subcontractor quality assurance programs. Contractor shall provide sufficient documentation to satisfy Owner that Contractor is implementing those provisions of the agreed and accepted Procedures that relate to the monitoring by Contractor of subcontractor quality assurance arrangements.
- 2.6.6 Audits of subcontractor quality assurance arrangements shall be recorded in such a manner that the relevant documentation constitutes, amongst other things, objective evidence of the extent of the audits and of the effectiveness with which they have been conducted. All such documentation relating to any one audit shall be made available to Owner, on request, as a single self-contained document.
- 2.6.7 Surveillance and Routine Inspection
 - 2.6.7.1 Owner shall indicate on the quality plans any requirements for surveillance or other routine inspection activities.
 - 2.6.7.2 Contractor shall adhere to the agreed quality plans. Any substantial deficiencies or other conditions adversely affecting quality shall be reported to Owner.
- 2.6.8 Monitoring of the Procedures
 - 2.6.8.1 During the course of the Work, Owner may monitor the implementation of the Procedures. Monitoring shall be by means of surveillance of activities at the Work location and/or by formal audits of the adherence of Contractor to the systems and Procedures that constitute its Procedures. A corrective action Schedule shall be agreed and implemented in respect of any deficiencies revealed by such monitoring.
 - 2.6.8.2 Contractor shall provide any facilities, including access, which may be required by Owner or its representative for monitoring activities.
 - 2.6.8.3 Owner reserves the right to participate in Contractor's monitoring of subcontractors' quality assurance arrangements.
- 2.6.9 Certification to ISO 9001
 - 2.6.9.1 The possession of valid certification to ISO 9001 shall not affect Owner's right to monitor Contractor's Procedures.
 - 2.6.9.2 In the event of Contractor's or its subcontractor's certification being withdrawn, cancelled, or lapsing, Contractor shall advise Owner immediately together with an explanation statement and his intended proposals to rectify any quality deficiencies.
- 2.6.10 Contractor shall be responsible for the inspection and testing of the Work, including:
 - 2.6.10.1.1 Factory inspection and testing of components, systems, and equipment.
 - 2.6.10.1.2 Factory performance testing of systems and equipment.

- 2.6.10.1.3 Job site inspection and testing during erection and commissioning of the Work.
- 2.6.10.1.4 Performance and demonstration tests .
- 2.6.10.1.5 All inspection and testing required by applicable laws.
- 2.6.10.2 The test codes and testing Procedures shall be agreed between Contractor and Owner in advance of tests commencing.
- 2.6.10.3 Contractor shall notify Owner of inspections and tests as required in the Contract.
- 2.6.10.4 All measuring equipment and special apparatus required for carrying out inspections and tests shall, unless otherwise agreed by Owner, be provided by Contractor without extra cost to Owner. All such equipment shall be calibrated, with valid calibration certificates available for inspection.
- 2.6.10.5 Contractor shall check the electrical and mechanical connections to all systems/equipment supplied and other requirements of the quality assurance program, before energizing, and shall be responsible for the correctness of such connections. Qualified staff shall be employed for this aspect of the Work.
- 2.6.10.6 Contractor shall, not later than three months prior to commencement of any tests and for the duration of the tests, be responsible for ensuring that any systems, equipment, and cables to be involved in the test or be electrically charged, intentionally or inadvertently, are suitably protected against damage to the Work and/or other adjacent systems/equipment. Contractor shall also ensure that all systems, equipment, and cables are de-energized, made safe, and grounded after each test.
- 2.6.10.7 Contractor shall, not later than three months prior to the commencement of any tests, provide to Owner a Schedule of all inspections and tests. This shall include factory tests, construction tests, and job Site commissioning tests and shall be reflected in the quality plans for the Project.
- 2.6.10.8 Contractor shall give particulars of the tests that will be carried out during erection and commissioning of the Work to comply with the Technical Specifications, together with any additional tests that are proposed. The details shall include how equipment is to be tested.
- 2.6.10.9 All non-destructive testing (NDT) Procedures for key systems, equipment, or structures and for systems and equipment subject to statutory inspections shall be submitted to Owner for agreement prior to testing, together with details of the certification scheme used for NDT operatives. NDT at job Site using radiography shall be subject to safety rules agreed by Owner.
- 2.6.10.10 Where applicable, hydraulic and non-destructive tests of the various components, and also mechanical tests on the materials thereof, shall be carried out at the manufacturer's factory in accordance with the appropriate standard. Steel maker's certificates of chemical and heat treatment shall be provided in all cases.
- 2.6.10.11 Systems and equipment performance tests, where required and where practical, shall be carried out at the manufacturer's factory and a method of test shall be agreed between Contractor and Owner. Tests shall be conducted to the appropriate standard, shall cover the normal operating range of the systems or equipment, and curves shall be drawn showing the relevant performance characteristics over this range.

2.6.11 Inspection and Test Certificates

- 2.6.11.1 The following documents shall be provided to Owner:
 - 2.6.11.1.1 Copies of inspection and test certificates for systems, equipment, or materials subject to quality assurance in accordance with the Contract and quality assurance plan
 - 2.6.11.1.2 Copies of inspection and test certificates for all other systems, equipment, materials, and lifting equipment
- 2.6.11.2 Each test certificate and graph shall indicate clearly the material, equipment, or system to which it refers and be identifiable with such material, system, or equipment at all times until completion of the Work.
- 2.6.11.3 During commissioning of systems/equipment or materials subject to quality assurance and quality plan, copies of inspection and test certificates shall be made available when requested by Owner.
- 2.6.11.4 For all permanent lifting equipment and all other systems and equipment subject to statutory inspection used during commissioning and then handed over upon taking over of the Work, one original copy of inspection and test certificates shall be supplied to Owner at the time of commissioning.
- 2.6.11.5 Contractor shall ensure that valid certification on all systems and equipment, subject to statutory inspection, is maintained up to and including the date of issue of the Certificate of Substantial Completion by Owner.
- 2.6.11.6 Copies of all certificates shall have been provided by Contractor to Owner as part of the requirements to achieve Substantial Completion.
- 2.6.11.7 Following an activity, inspection and test certificates shall be prepared in a timely manner.

2.6.12 Inspection and Testing Facilities

- 2.6.12.1 For the purposes of monitoring the implementation of the Procedures, Contractor shall provide suitable facilities for all inspections and tests required for the Work, by the quality plan, and for statutory purposes. Suitable office accommodation for the duration of inspections shall be made, at Contractor's expense, for Owner's quality assurance representatives at the manufacturers' facilities.
- 2.6.12.2 Individual factory performance tests for equipment shall be specified by Contractor and agreed with Owner during the design phase of the Work, and shall include a test plan document together with references to all applicable standards.

2.7 PROJECT RECORDS

- 2.7.1 Contractor shall maintain the necessary and specified Project records which shall be available to Owner for inspection at all reasonable times. Contractor shall provide a copy to Owner as part of Final Completion. The records shall include, but shall not be limited to, the following:
 - 2.7.1.1 Reports
 - 2.7.1.2 Manuals
 - 2.7.1.3 Calculations
 - 2.7.1.4 Technical data and latest review/mark-up or all drawings
 - 2.7.1.5 Procurement specifications

- 2.7.1.6 Subcontractor, supplier, and manufacturer information and correspondence
- 2.7.1.7 Schedules
- 2.7.1.8 Financial data
- 2.7.1.9 Construction records
- 2.7.1.10 Start-up records
- 2.7.1.11 3D engineering models (AutoCAD or similar)
- 2.7.2 Contractor shall maintain on the job Site up-to-date records of all relevant documentation and shall ensure that these are available to meet obligations to all regulatory or statutory bodies, to all governmental authorities having jurisdiction, and to any commissioning committees, working parties, or test teams that are established to meet the needs of the Work. These records shall be maintained and retained until completion of all Work on the job Site and shall be subject to audit by Owner. Prior to turnover, records shall be made available for Owner review. The relevant documents include, but are not limited to:
 - 2.7.2.1 Job Site labor records
 - 2.7.2.2 Job Site working drawings and construction records
 - 2.7.2.3 Job Site management and safety documents
 - 2.7.2.4 Job Site register for lifting equipment, cranes, slings, hooks, lifting beams and tackle used for construction of the Works, either mobile or fixed
 - 2.7.2.5 Job Site register for lifting equipment, cranes, slings, hooks, lifting beams and tackle supplied as part of the permanent Works
 - 2.7.2.6 Job Site register for all portable powered apparatus and tools, both temporary and permanent
 - 2.7.2.7 Job Site register for all scaffolding
 - 2.7.2.8 Progress records
 - 2.7.2.9 Weld inspection test results
 - 2.7.2.10 Unit commissioning documents
 - 2.7.2.11 Operation and maintenance instructions
 - 2.7.2.12 Quality assurance documents
 - 2.7.2.13 Photographic evidence as agreed with Owner
 - 2.7.2.14 Environmental compliance records
 - 2.7.2.15 Risk assessments
 - 2.7.2.16 Test certificates from manufacturing Works and job Site
 - 2.7.2.17 Safety reports
 - 2.7.2.18 Health and safety file
 - 2.7.2.19 Safety data sheets
- 2.7.3 Contractor shall enter safety records into Owner’s tracking system. Owner will work with designated Contractor representative for training and access to this system.