



Alabama Port Authority
Specification Booklet

Project Name **McDuffie 43E Low Voltage Switchgear**

Location Mobile, AL

Project # 11847 **TASK#** 2

September 2026

SPECIFICATIONS AND CONTRACT DOCUMENTS



**ALABAMA
PORT AUTHORITY**

Doug Otto, Director & CEO

Kay Ivey, Governor of Alabama

ISSUED BY

Engineering Services Department



Alabama Port Authority
Specification Booklet

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BID

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LOW VOLTAGE SWITCHGEAR SPECIFICATION (15 PAGE ATTACHMENT)	



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INVITATION TO BID

Sealed bid proposals will be received via courier to the Alabama Port Authority, 1400 Alabama State Docks Blvd., Room 216, Administration Building, Mobile, AL 36602 no later than **1:30 P.M., on Thursday, October 8, 2026**. Sealed bid proposals can also be hand delivered from **1:45 P.M. to 2:00 P.M., on Thursday, October 8, 2026** to the Alabama Port Authority International Trade Center Lobby, 250 North Water Street, Mobile, AL. Faxed or electronic submitted bids will not be accepted.

McDuffie 43E Low Voltage Switchgear
Mobile, Alabama

This Requisition solicits proposals to furnish 480/277 volt switchgear for building 43 East at McDuffie Coal Terminal in Mobile, Alabama for the Alabama Port Authority (APA) as shown in the attached Low Voltage Switchgear Specification. Work will be in accordance with the requirements stated herein, attached insurance requirements, all referenced documents, and applicable State of Alabama Laws. The Contractor will be required to supply a delivery schedule with their bid and associated liquidated damages will be applied based on the provided schedule. ASPA reserves the right to choose the best value based on a combination of price and schedule. Proposals shall be valid for 90 calendar days.

Specifications, proposal forms, bid bond forms, performance bond forms, and plans are available on the Alabama Port Authority website at www.alports.com. For additional project and contractual information, please contact the APA Project Manager, Pete Olivero at (251) 622-2688 (email to pete.olivero@alports.com). For technical information, please contact Taylor Williams at Taylor.Williams@AllianceEngr.com c.c. pete.olivero@alports.com

Each Bidder shall satisfy oneself as to the character, quality, and quantities of work to be performed, and as to the requirements of the proposed contract. The submission of a proposal shall be proof that the bidding Contractor has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed Contract.

APA will utilize its sales tax exemption status on this project. The Contractor will be responsible for the purchase of all materials and will be required to apply for sales and use tax certificate of exemption upon contract award.

Due to the time needed to determine the best value based on price and schedule, bids will **NOT** be publicly opened. We intend to let the selected bidder know that we intend on proceeding with award within 10 days of receipt of the bids. The right is reserved, as the interest of the Alabama Port Authority may require, to reject any and all bids and to waive informalities in bids received. In the event no bid represents a viable combination of price and schedule, the Alabama Port Authority reserves the right to solicit submission of a best and final offer from the pool of existing bidders.



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IMPORTANT NOTICE TO CONTRACTORS REGARDING EMPLOYMENT PRACTICES: Effective October 1, 2011, the Beason-Hammon Alabama Taxpayer and Citizen Protection Act ("the Act") requires that any business entity contracting with or providing any grant or incentives to the state, including the Alabama Port Authority, certify compliance with the Act. All Contractors must certify such compliance by executing the enclosed "Certificate of Compliance" and returning it to the Alabama Port Authority with your proposal. In addition, the company shall submit with their proposal evidence that the company is enrolled in the E-Verify system. The following E-Verify website link is provided for convenience: http://www.dhs.gov/files/programs/gc_1185221678150.shtm.

IMPORTANT NOTICE TO CONTRACTORS REGARDING ACCESS TO ASPA RESTRICTED FACILITIES:

All individuals performing any work in McDuffie Terminal must have a valid Transportation Worker Identification Credential (TWIC) card, ASPA badge and an ASPA vehicle decal with no exceptions. Information regarding ASPA's access policy is provided on the ASPA website at the link below.

<https://www.alports.com/port-access>

Time is an essential element in the Contract. Therefore, for each day the equipment delivery is delayed beyond the delivery date specified in the schedule provided by the bidder with their bid, \$250.00 shall be paid by the Contractor to ASPA as liquidated damages for the loss sustained by the State because of failure of the Contractor to complete the work within the specified time.

Subsequent to the final acceptance of this project by the APA project manager, the following requirements must be satisfied by the Contractor before final payment can be made.

The Contractor must execute copies of CONTRACTOR'S AFFIDAVIT OF PAYMENT OF CLAIMS AND DEBTS on the form furnished by the Engineer.

- a) The Contractor must furnish a letter on his letterhead acknowledging that acceptance of final payment by the Contractor constitutes a waiver of all claims, present or future, in connection with this project.
- b) The Contractor must furnish a written guarantee on his letterhead covering all defects in material and workmanship for a period of not less than two (2) years commencing on the date of final acceptance.
- c) If any purchased items have been incorporated in the work, the Contractor must furnish a letter on his letterhead assigning those warranties to the OWNER. Copies of said warranties shall be bound in one binder and submitted along with the letter assignment.



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INSTRUCTIONS TO BIDDERS

1.0 ADDENDA AND INTERPRETATIONS

All questions about the meaning or intent of the Contract Documents shall be submitted to the Engineer in writing. Replies will be issued by Addenda emailed to all parties recorded as having received the bidding documents. All addenda so issued shall become part of the Contract Documents. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. Deadline for submitting questions is Thursday, October 1, 2026 at 4pm CST.

2.0 SUBMISSION OF PROPOSALS

Before submitting their proposal, the Contractor shall comply with the following:

- (a) The Proposals, including the acknowledgement of addenda, shall be filled in ink on the form provided herein and all blank spaces in the form shall be fully filled. The signature shall be in long hand and the complete form shall be without interlineations, alteration or erasure.
- (b) Attach a certified check or Bid Bond in the amount of 5% of the Proposal, but not more than \$10,000 made payable to the Alabama Port Authority.
- (c) Certificate of Compliance with the Beason-Hammon Alabama Taxpayer and Citizen Protection Act (see page I-9)
- (d) Delivery schedule

One copy of Item (a) through (d) should be placed in a sealed envelope with the bidder's name, the project name and number, and the time and date of bid opening shown on the outside.

All submissions, including hand-delivered packages, US Postal Service express mail, or private delivery service must be delivered to the following individual at the following address in accordance with the Invitation to Bid. Bids will not be publicly opened.

Alabama Port Authority
Pete Olivero, P.E., Sr. Facilities Engineer
1400 Alabama State Docks Boulevard,
Administration Building, Suite 216
Mobile, AL 36602
(251) 622-2688

Neither fax nor email submissions will be accepted. Respondents are responsible for effective delivery by the above deadline, and late submissions will be rejected without opening and returned to the sender. APA accepts no responsibility for misdirected or lost proposals.



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Proposal of:

Address:

Date:

To: STATE OF ALABAMA, Alabama Port Authority, Mobile, Alabama

Gentlemen:

The undersigned, as Bidder, hereby declares that he has examined the plans and specifications for the work and contractual documents relative thereto, and has read all Specifications furnished; and that he has satisfied himself relative to all aspects of the work to be performed and especially to those factors affecting cost, progress, or performance.

The Bidder proposes and agrees, if this bid is accepted, to contract with the Owner in the form of contract specified, to furnish all necessary materials, equipment, tools, apparatus, means of transportation, labor and incidentals to perform in a satisfactory manner, the work described in the Contract Specifications and Drawings for the Alabama Port Authority, for the prices listed below to complete:

McDuffie 43E Low Voltage Switchgear
Mobile, Alabama

In full and complete accordance with the shown, noted, described and reasonable intended requirements of the plans, specifications and contract documents to the full and entire satisfaction of the Owner with a definite understanding that no money will be allowed for extra work except as set forth in the attached contract documents.

It is agreed that the description under each item, being briefly stated, implies, although it does not mention, all incidentals and that the prices stated are intended to cover all such work materials and incidentals as constitute Bidder's obligation as described in the specifications and any details not specifically mentioned, but evidently included in the contract shall be compensated for the item which most logically includes it.

Bidder agrees that he will commence the work within the time allotted by the Contract Documents with adequate force, plant, and equipment and that the work will be completed within the time schedule which the Bidder provides. Bidder accepts the provisions of the Contract Documents as to liquidated damages in the event of failure to complete the work on time.

The Bidder further agrees that, in case of failure on his part to execute the Contract and required bonds within ten (10) calendar days from the date written notice of intent to award if mailed or otherwise delivered to the Bidder, the certified check or bid bond accompanying this bid and the monies payable thereon shall be paid into the funds of the Owner not as penalty, but as a liquidation of a reasonable portion of the damages incurred by the Owner due to the Bidder's failure to execute the Contract.



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Each of the following items within the Schedule of Prices shall be completed in accordance with this Specification Booklet. **Items not specifically noted in the schedule of prices shall be considered ancillary to the project and be absorbed in the bid items.**

SCHEDULE OF PRICES

ITEM	DESCRIPTION	QTY	UNIT PRICE	LEAD TIME (weeks)	VALUE
1	Bonds and Insurance	L.S.	Lump Sum	n/a	\$
2	277/480v Switchgear	L.S.	Lump Sum		\$
3	Factory Testing and Delivery	L.S.	Lump Sum	n/a	\$
TOTAL					\$



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I, the undersigned bidder, hereby acknowledge receipt of the following addenda:

ADDENDUM NO. _____

ADDENDUM NO. _____

ADDENDUM NO. _____

ADDENDUM NO. _____

Contractor's Signature: _____

Company _____

Name (print)

Title

Date



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BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, undersigned, _____
_____ as Principal, and _____

as Surety, are hereby held and bound unto The Alabama Port Authority as **OWNER** in the Penal sum of _____ for the payment of which will and truly be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, the _____ day of _____, 2026.

The Condition of the above obligation is such that whereas the Principal has submitted to the Alabama Port Authority a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the **McDuffie 43E Low Voltage Switchgear**, Project 11847, Task # 2.

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the form of Contract attached hereto (Properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its **BOND** shall in no way be impaired or affected by any extension of time within which the **OWNER** may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal	
By	
Surety	
By	



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State of _____

County of _____

CERTIFICATE OF COMPLIANCE WITH THE BEASON-HAMMON ALABAMA TAXPAYER AND CITIZEN PROTECTION ACT (ACT 2011-535, as amended by Act 2012-491)

DATE: _____

RE Contract/Grant/Incentive (describe by number or subject):

_____ by and between
_____ (Contractor/Grantee) and
_____ (State Agency, Department or Public

Entity) The undersigned hereby certifies to the State of Alabama as follows:

1. The undersigned holds the position of _____ with the Contractor/Grantee named above, and is authorized to provide representations set out in this Certificate as the official and binding act of that entity, and has knowledge of the provisions of THE BEASON-HAMMON ALABAMA TAXPAYER AND CITIZEN PROTECTION ACT (ACT 2011-535 of the Alabama Legislature, as amended by Act 2012-491) which is described herein as "the Act".
2. Using the following definitions from Section 3 of the Act, select and initial either (a) or (b), below, to describe the Contractor/Grantee's business structure.

BUSINESS ENTITY. Any person or group of persons employing one or more persons performing or engaging in any activity, enterprise, profession, or occupation for gain, benefit, advantage, or livelihood, whether for profit or not for profit. "Business entity" shall include, but not be limited to the following:

- a. Self-employed individuals, business entities filing articles of incorporation, partnerships, limited partnerships, limited liability companies, foreign corporations, foreign limited partnerships, foreign limited liability companies authorized to transact business in this state, business trusts, and any business entity that registers with the Secretary of State.
- b. Any business entity that possesses a business license, permit, certificate, approval, registration, charter, or similar form of authorization issued by the state, any business entity that is exempt by law from obtaining such a business license and any business entity that is operating unlawfully without a business license.

EMPLOYER. Any person, firm, corporation, partnership, joint stock association, agent, manager, representative, foreman, or other person having control or custody of any employment, place of employment, or of any employee, including any person or entity employing any person for hire within the State of Alabama, including a public employer. This term shall not include the occupant of a household contracting with another person to perform casual domestic labor within the household.

____ (a) The Contractor/Grantee is a business entity or employer as those terms are defined in Section 3 of the Act.

____ (b) The Contractor/Grantee is not a business entity or employer as those terms are defined in Section 3 of the Act.

3. As of the date of this Certificate, Contractor/Grantee does not knowingly employ an unauthorized alien within the State of Alabama and hereafter it will not knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama;



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4. Contractor/Grantee is enrolled in E-Verify unless it is not eligible to enroll because of the rules of that program or other factors beyond its control.

Certified this _____ day of _____ 20 _____

Name of Contractor/Grantee/Recipient

By: _____

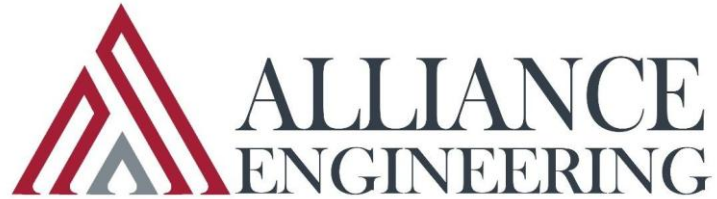
Its _____

The above Certification was signed in my presence by the person whose name appears above,

on this _____ day of _____ 20 _____.

WITNESS:

Printed Name of Witness



250525-EL-SPEC-003

Prepared For: Chris Phillips

Revision: A

Date: 08/24/2026

McDuffie Coal Terminal

1901 Ezra Trice Blvd

Mobile, AL 36603

Project: 480 V Switchgear Upgrade

Low Voltage Switchgear Specification

Rev	Reason	Date	By	Chk'd	App'd
A	Issued for Bid	8/24/2026	AND	TW	

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1. General

Alliance Engineering has prepared this low-voltage switchgear specification on behalf of McDuffie Coal Terminal to solicit competitive quotations from qualified equipment manufacturers. This document, together with the associated reference drawings and schedules, defines the minimum technical, performance, and construction requirements for the 480/277-volt switchgear to be furnished for the McDuffie facility located in Mobile, Alabama.

This specification has been developed by Alliance Engineering based on project-specific requirements, applicable codes and standards, and accepted industry practices for industrial power distribution systems. The design intent, system configuration, and equipment requirements are fully defined within this package and shall be used by vendors as the sole basis for equipment selection, configuration, and pricing.

The specification package includes, but is not limited to, the following Alliance Engineering–developed reference documents:

- Single-line diagram(s)
- Low-voltage switchgear equipment specification sheet(s)
- Equipment ratings, protective device requirements, and functional descriptions
- Grounding and bonding requirements
- Applicable testing, documentation, and submittal requirements

All equipment furnished under this specification shall be fully compliant with the requirements contained herein and shall be complete in all respects for proper installation, operation, and long-term service.

2. Scope of Supply

The low-voltage switchgear supplied by the vendor shall include all equipment, components, accessories, and services required to provide a complete, fully functional system as specified. This includes, but is not limited to, switchgear sections, main and feeder circuit breakers, metering, control power equipment, grounding provisions, and all required interconnections.

Vendor proposals shall address all items necessary to meet the performance and functional requirements shown on the single-line diagram and described in the equipment specification sheets, including coordination with the SEL protective relay.

3. Applicable Codes and Standards

The switchgear and associated equipment shall be designed, manufactured, tested, and labeled in accordance with the latest adopted editions of the following codes and standards:

- ANSI – American National Standards Institute
- IEEE – Institute of Electrical and Electronics Engineers

- ICEA – Insulated Cable Engineers Association
- NFPA 70 – National Electrical Code (NEC)
- NEMA – National Electrical Manufacturers Association
- OSHA – Occupational Safety and Health Administration
- UL – Underwriters Laboratories
- FM – Factory Mutual

Where conflicts exist between referenced standards, drawings, and this specification, the more stringent requirement shall govern. Requests for clarification shall be submitted prior to quotation.

4. Basis of Design and Intent

This specification is intended to define all technical requirements necessary to correctly specify a 480/277-volt, three-phase, low-voltage switchgear suitable for the McDuffie facility. Equipment shall be rated for the electrical system characteristics indicated on the single-line diagram(s) and shall be suitable for continuous operation in an industrial environment.

The switchgear shall be designed to provide:

- Safe and reliable operation under continuous industrial duty
 - Maintainability and accessibility for testing and servicing
 - Compatibility with existing and future electrical systems
 - Compliance with grounding, bonding, and safety requirements
- Vendors shall not deviate from the requirements of this specification without written approval from Alliance Engineering.

5. Equipment Features

The switchgear lineup shall be furnished as a complete, factory-manufactured system consisting of one or more shipping sections designed for field assembly into a single integrated lineup. The Supplier shall provide all equipment, devices, controls, wiring, protective relays, instrumentation, accessories, hardware, interconnections, and miscellaneous materials required for a complete, fully functional, and operational installation. All shipping sections shall be factory assembled, inspected, and tested prior to shipment to ensure proper fit, alignment, and electrical performance following field installation in accordance with the manufacturer's recommendations.

5.1 Ratings

The switchgear assembly shall be rated in accordance with Data Sheet 250525.01-XXXX and the associated single-line diagram, and shall be suitable for continuous, unattended operation in the coastal industrial environment at the McDuffie site.

- Surface temperature on any external part of the switchgear shall not exceed 50°C at a 40°C ambient temperature while carrying rated continuous current.

- Hottest-spot temperature rise for buses and primary connections shall not exceed 65°C above ambient, with a hottest total temperature not to exceed 105°C at rated continuous current.
- Equipment shall be suitable for continuous operation under the environmental conditions specified for the project site.

5.2 Basic Construction

The lineup is designed around a single main breaker supplying a common main bus with eight (8) distribution breakers supplying power to downstream loads.

- The switchgear shall consist of a factory-assembled, metal-enclosed, low-voltage switchgear lineup arranged in a single-main configuration consisting of one (1) main vacuum circuit breaker and eight (8) vacuum circuit breakers, as shown on the project single-line diagram.
- The switchgear shall be designed for front entry and front accessibility. All power, control, protection, metering, and auxiliary connections shall be accessible from the front of the switchgear lineup. No rear access shall be required for normal installation, operation, inspection, testing, maintenance, or removal/replacement of circuit breakers and associated equipment.
- All incoming and outgoing cable/conduit connections shall be arranged for front entry. The switchgear shall be configured such that feeder and main power cables can be routed and terminated from the front of the lineup. The Manufacturer shall coordinate the cable termination compartments and bus arrangements to provide adequate space for cable bending, routing, and termination.
- All circuit breakers shall be front-facing and oriented in the same direction, with breaker operating mechanisms, controls, indicating devices, and protective relays accessible from the front of the switchgear lineup.
- Circuit breakers shall be front accessible for installation, operation, inspection, testing, maintenance, and removal/replacement without requiring access to the rear of the switchgear.
- The lineup shall include one (1) main vacuum circuit breaker section, eight (8) vacuum circuit breaker sections, ground buses, protective relaying, dedicated feeder metering, control equipment, and all auxiliary devices required for complete operation.
- The switchgear shall be rated 600 V class, suitable for indoor installation, NEMA 1.
- The assembly shall be designed, manufactured, and tested in accordance with ANSI, IEEE, NEMA, and applicable NEC requirements.
- A continuous copper ground bus shall extend throughout the entire lineup.
- The switchgear lineup shall include an integral 120 VAC distribution panelboard complete with branch circuit breakers for supplying auxiliary loads, including but not limited to interior lighting, space heaters, ventilation fans, convenience receptacles, emergency lighting, fire alarm equipment, motor charging circuits for vacuum circuit breakers, fused switch control power, and other miscellaneous auxiliary equipment required for proper operation of the switchgear.
- The Manufacturer shall provide a complete front-accessible design and shall identify any component, connection, or maintenance activity that cannot be performed from the front

of the switchgear. Any such exception shall be clearly identified in the proposal and shall be approved by the Engineer prior to manufacture.

5.3 Switchgear Enclosure Requirements

The low-voltage switchgear shall consist of factory-assembled, metal-clad, dead-front, metal-enclosed switchgear designed, manufactured, and tested in accordance with ANSI C37 and IEEE standards. The enclosure shall be suitable for continuous operation in a coal terminal environment and shall provide protection against coal dust, moisture, corrosion, marine environment, and ultraviolet exposure.

The switchgear enclosure shall meet the following minimum requirements:

- ANSI/IEEE C37.20.2 metal-clad construction
- NEMA 1 indoor enclosure
- Corrosion-resistant hardware and exterior finish
- Dead-front construction with grounded metal barriers between compartments
- Front-access design for operation and maintenance
- Fully compartmentalized construction including:
 - Main bus compartment
 - Circuit breaker compartment
 - Cable termination compartment
- Arc-resistant construction
- Stainless steel door hinges and latching hardware
- Lockable compartment doors with provisions for padlocking
- 120 VAC duplex convenience receptacle
- Copper ground bus extending the entire length of the switchgear lineup
- Lifting provisions for shipping and installation
- Removable gland plates and cable entrance provisions for bottom cable entry
- Suitable for seismic anchoring where required

The enclosure shall be suitable for operation under the following environmental conditions:

- Ambient temperature: 14°F to 104°F (-10°C to 40°C)
- Relative humidity: up to 100%, non-condensing
- Coal dust exposure
- Non-hazardous (unclassified) location
- Elevation: Up to 3,300 feet above sea level unless otherwise specified

5.4 Power Cable Terminations

Cable termination space shall accommodate all incoming and outgoing feeders shown on the one-line diagram, with sufficient compartment depth and clearance to properly terminate shielded low-voltage cable without stressing the connections.

- Cable termination space shall be provided for all incoming and outgoing feeders shown on the one-line diagram.
- The switchgear shall accommodate top or bottom cable entry.
- Sufficient cable compartment depth shall be provided to permit bending and termination of shielded low-voltage cables.
- The distance from cable entrance location to termination pads shall be not less than 36 inches.
- Non-metallic cable supports shall be provided to prevent cable weight from being imposed on terminations.
- Termination pads shall utilize standard NEMA two-hole bolt patterns.
- Phase-to-phase and phase-to-ground barriers shall be provided at all customer cable termination locations.

5.5 Bus System

One (1) common bus section serving all eight (8) distribution circuit breakers. The main bus shall be continuous through the lineup and shall be rated for the full ampacity of the incoming main breaker.

- The main bus shall be rated 4000 amperes continuous.
- The main bus shall be rated to withstand the available fault current of 100 kA.
- Main buses shall be tin-plated aluminum in accordance with the manufacturer's standard construction and shall be fully rated for the specified continuous current and available fault duty.
- Bus joints shall be bolted utilizing corrosion-resistant hardware and shall be factory assembled and tested.
- Bus insulation shall be epoxy-coated or equivalent factory-applied insulation system suitable for 480 V class service.
- Bus supports shall be track-resistant epoxy, cycloaliphatic epoxy, or equivalent insulating material suitable for medium-voltage applications.
- All bus bars shall be braced to withstand the available short-circuit current indicated on the project data sheet.
- A continuous copper ground bus shall extend the full length of the switchgear lineup, including across both back-to-back sections.
- The ground bus shall be sized to withstand the available fault current for a minimum of two (2) seconds and shall include provisions for connection of the facility grounding electrode system at both ends of the lineup.
- The switchgear shall be designed to permit future extension at either end without requiring replacement of existing bus sections.

5.6 Main Incoming Vacuum Circuit Breaker

The main vacuum circuit breaker serves as the incoming source connections, equipped with a dedicated SEL-735 Power Quality Meter, providing intelligent metering. The breaker shall be:

- Drawout vacuum circuit breaker
- Double narrow frame type
- 600 V class, 480 V Nominal
- 4000A frame
- 4000A continuous current rating
- 100 kA interrupting current rating
- Electrically operated stored-energy mechanism
- Anti-pump protection
- Mechanical open/closed indication
- Mechanical spring-charged indication
- Local and remote operation capability
- Padlocking provisions
- Suitable for integration with SEL metering

5.7 Distribution Feeder Compartments

Eight (8) vacuum circuit breakers, equipped with Digitrip RMS trip unit or supplier equivalent, shall be furnished as shown on the project single-line diagram. Each distribution breaker compartment shall be:

- Drawout vacuum circuit breaker
- Standard frame type
- 600 V class, 480 V Nominal
- 800A frame
- 800A continuous current rating
- 100 kA interrupting current rating
- Electrically operated stored-energy mechanism
- Anti-pump protection
- Mechanical open/closed indication
- Mechanical spring-charged indication
- Local and remote operation capability
- Padlocking provisions
- Suitable for integration with SEL metering

Each compartment shall be provided with instrument transformers as required for protection and metering. Current transformer (CT) and potential transformer (PT) accuracy classes shall be selected to meet the intended application and specified metering requirements. Unless revenue or billing metering is required, metering CTs shall be IEEE C57.13 Accuracy Class **0.3 B-0.2**, and PTs shall be IEEE C57.13 Accuracy Class **0.3**. Where revenue metering is specified, the Supplier

shall furnish instrument transformers with the accuracy class required to satisfy the applicable utility or Owner metering requirements.

5.8 Arc-Flash Isolation

Arc-flash PPE requirements shall be based on the calculated incident energy at the specified working distance in accordance with NFPA 70E and IEEE 1584. The design objective shall be to limit the calculated incident energy within the Power Monitoring and Controls Section to **8 cal/cm² or less** under normal operating conditions. Where the calculated incident energy does not exceed **8 cal/cm²**, personnel shall wear arc-rated PPE with a minimum arc rating of **8 cal/cm²**. If the calculated incident energy exceeds this value, the Supplier shall identify the calculated incident energy and the corresponding minimum arc rating required for personnel protective equipment.

5.9 Protection-Integration Equipment

One (1) SEL-735 Power Quality Meter shall be installed in the switchgear lineup for main incoming power monitoring. Location shall be approved prior to final assembly. The meter shall be connected to instrument transformers arranged to provide metering of the switchgear lineup. The meter shall provide centralized monitoring of three-phase voltage, current, real and reactive power, apparent power, energy, demand, frequency, power factor, and power quality data for the complete switchgear lineup and shall communicate these values to the plant SCADA/HMI system.

5.10 Protection, Relaying, and Metering

The switchgear shall be furnished with all current transformers, voltage transformers, metering devices, communications equipment, protective relays, wiring, and accessories required for a complete and fully functional protection and metering system. The main feeder power meter shall be SEL-735 and shall likewise be coordinated with that scope. The supplier shall furnish complete relay settings files, meter configuration data, and coordination documentation.

Device	Rating	Protection / Power Quality Monitoring
Main Breakers	4000AF Vacuum Circuit Breaker	SEL-735 – power quality monitoring.

- Continuous current sensor ratios (CTs) as shown on the one-line diagram.
- SEL-735 for power quality metering at the main incoming breaker.

5.10.1 Breaker Protection

The main breaker and eight (8) distribution breakers shall be equipped with the Digitrip RMS trip unit or supplier equivalent.

5.10.2 Power Monitoring Metering

One SEL-735 shall be provided at the main incoming breaker. The meter shall provide, at a minimum:

Power Quality Recording

- Voltage Sags
- Voltage Swells
- Interruptions
- Harmonics
- Flicker
- THD
- K-Factor
- Power Factor
- Frequency Deviations

Demand Calculations

- kW ; kW-h
- kVAR
- kVA
- Current Demand

Communications

- EtherNet/IP

Event Recording

- Oscillography enabled
- Sag/Swell recorder enabled
- Waveform recording
- Sequence of Events
- Trigger on: Overvoltage, Undervoltage, Frequency Deviation THD Limits Digital Inputs

Digital Outputs

- High Demand Alarm
- Voltage Alarm
- Frequency Alarm
- Power Factor Alarm
- Communications Failure

Alarm Threshold

Alarm	Typical Value
Overvoltage	110%
Undervoltage	90%
Overcurrent	User defined
Frequency High	60.5 Hz

Alarm Threshold

Alarm	Typical Value
Frequency Low	59.5 Hz
THD Voltage	5%
THD Current	8–10%

Voltage Configuration

Parameter	Setting
System Type	3-Phase
Voltage	480 V
PT Ratio	480:120
PT Secondary	120 V

Current Configuration

Parameter	Setting
CT Ratio	4000:5
CT Secondary	5 A

Dedicated main breaker metering shall provide power quality data that is isolated from protection settings, logic, and relay configuration changes. The meter shall record energy and demand parameters at a user-configurable interval of 1 to 15 minutes. The default logging interval shall be 15 minutes unless otherwise specified. The meter shall maintain historical energy and demand data with a minimum storage capacity of 12 months. Meter records shall be time-stamped and accessible through the facility SCADA system.

5.11 Grounding and Surge Protection

- A continuous copper ground bus shall be provided throughout the lineup.
- Grounding provisions shall be provided within each compartment to permit temporary protective grounding during maintenance.

5.12 Control Power and Indication

Control power for the switchgear lineup shall be 120 VAC.

- Control power shall be 120 VAC unless otherwise noted.
- Control wiring shall be stranded copper with 600-volt insulation rating.
- Terminal blocks shall be provided for all field control and monitoring connections.
- All devices, terminal blocks, relays, meters, and compartments shall be permanently identified with engraved nameplates.

6. Testing, Inspection, and Factory Acceptance Test

The supplier shall perform routine factory testing in accordance with applicable IEEE standards, with certified test reports furnished at shipment. The supplier shall provide:

- General arrangement drawings
- One-line diagrams
- Elementary and wiring diagrams
- Equipment data sheets
- Relay and meter documentation
- Installation and maintenance manuals
- Recommended spare parts lists
- Verification of all equipment nameplates and model numbers
- Verification of enclosure construction, environmental controls, and power distribution components
- Point-to-point wiring continuity testing
- Fiber optic termination inspection and testing
- Ethernet network verification
- Managed switch configuration verification
- Verification of DNP3, Modbus TCP, IEC 61850, or other specified communication protocols
- Verification of alarm and status point mapping
- Power supply and control power verification
- Grounding and bonding inspection
- Verification of cabinet lighting, receptacles, heaters, and air conditioning equipment (where furnished)
- Verification of the arc-flash isolation requirements

A complete Factory Acceptance Test (FAT) procedure shall be submitted for purchaser review prior to testing. Pricing for a witnessed FAT, with all communications equipment energized and operational, shall be included as a separate line item on the proposal. The FAT shall include demonstration of:

- Communications with the main SEL-735 and distribution meters
- Ethernet switch functionality
- Fiber optic communications
- Network redundancy and failover functionality, if specified
- Communication to the Owner's DCS, SCADA, or gateway interface, when applicable

Upon completion of testing, the vendor shall provide a complete FAT report including test procedures, test results, equipment configuration files, network architecture drawings, relay and meter communication settings, switch configurations, and fiber optic test results.

7. Documents and Attachments

In addition to the documentation required under Section 6, the vendor shall furnish the following:

- General layout of equipment showing all dimensions, weights, location, and outline drawings showing the final assembled configuration
- Schematic and wiring diagrams
- Installation, operation, and maintenance instructions covering all cabinet equipment, including protective relays, meters, and similar components
- As-built drawings within two (2) weeks following shipment

The following reference documents are attached to this specification:

- McDuffie Coal Terminal 43East Expansion Switchgear Layout: 250525-EL-LAY-0004
- McDuffie Coal Terminal Single Line Diagram 43 East Expansion: 250525-EL-OL-0016A
- 480 V Low Voltage Switchgear Data Sheet: 250525-EL-DS-003

The Network Communications Compartment shall be guaranteed by the vendor against fault in design, defective or improper materials, poor workmanship, and failure from normal usage for twelve (12) months after being placed in the specified service, consistent with the warranty terms applicable to the remainder of the switchgear lineup.

480V SWITCHGEAR		Low Voltage Switchgear Data Sheet		Rev. A 8/14/26 Issued for Bid
1	Owner Name:	McDuffie Coal Terminal	Equipment Name:	480V SWITCHGEAR
2	Project Name:	43East Expansion	Item No. 1	Qty: 1 Sections
3	Location:	Mobile, AL	Sheet No.: 1 of 1	A
4	Capital Proj. No.:	250525	One Line Dwg. No.:	250525-EL-OL-0016A

OPERATING CONDITIONS

5	Area Classification ☒ General Purpose ☐ Haz. Class _____ Div. _____ Group _____ Equipment Location ☒ Indoor ☐ Outdoor	☒ Conditioned Areas - 70°F to 80°F and 50% humidity ☐ Non-Conditioned Area - 0°F to 104°F	A
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CODES AND STANDARDS

6	☒ ANSI American National Standards Institute ☒ IEEE Institute of Electrical and Electronic Engineers ☐ ICEA Insulated Cable Engineers Association ☒ NFPA 70 National Electric Code ☒ NEMA - National Elec. Manufacturer's Association	☐ NESC National Electric Safety Code ☒ OSHA Occupational Safety and Health Admin. ☒ UL Underwriter's Laboratories ☒ FM Factory Mutual ☐	A
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DOCUMENTATION

7	☒ Vendor Drawings Required Prior to Bid ☒ Refer to Specification for requirements	☒ Single Line Diagram Included ☒ Attachments Included ☒ As-Built Drawings Required After Mfg ☐	A
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GENERAL DESCRIPTION

8	General Description Voltage - ☒ 480 V ☐ 575 V 3 Phase 60 Hertz Available Fault Current ~ (100kA Bracing) Enclosure ☒ Nema 1 ☐ Nema 1A Gasketed ☐ Nema _____ ☒ Front Only (20" deep) ☐ Back to Back (25" deep) ☒ Standard Finish ☐ Custom Finish Incoming Power Feeder Line Enters ☒ Top ☐ Bottom ☒ Left ☐ Right ☐ Top Hat ☐ 18" ☐ ☐ Main Lugs ☒ Main Breaker ☐ Main Fused Disconnect ☒ Cable Feeder Lugs by Supplier ☐ By Others	Branch Feeder Units ☒ Thermal Magnetic - 3 Pole ☐ Fused Disconnect Switch - 3 Pole Interrupting Capacity ☐ 42000 RMS ☐ 65000 RMS ☒ 100000 RMS Insulation ☒ All Wiring rated 600 volt ☒ All wiring Copper ☒ Conductive Parts Copper Bus Plating ☒ Tin ☐ Silver Overload Relays ☒ Electronic ☐ Three Bimetallic Ambient Compensated ☒ Door mounted Reset Button Current Transformers (CT) ☐ 0 - 5 Amp Meter Movement ☐ Mounted in Starter ☐ Wired to Terminal Blocks (short-circuited at block) ☐ Butyl Molded Window Type ☒ Electronic Power Meter Communication Options ☒ EtherNet I/P ☐ DeviceNet	A
9	Power Bus ☒ Copper ☐ Aluminum ☐ 600A ☐ 800A ☐ 1200A ☐ 1600A ☐ 2000A ☒ 4000 Bus Barrier ☒ Isolated(Std.) ☐ Labyrinth (insulated & Isolated) ☐ With Shutters ☐ No Shutters Ground Bus ☒ Copper ☐ Aluminum ☒ Vertical Copper Ground Bus ☐ Horizontal Copper Ground Bus ☐ Top ☐ Bottom ☒ #4/0 Ground Lug Both ends of Bus	Control Relays ☒ 120 volt AC Coil ☒ Contacts - 4 pole 10 amp hermetically sealed ☒ Pre-wired to terminal blocks ☒ Wire markers both ends Single Phase Protection ☐ Solid State Line current monitor	A

10	NOT USED	Name Plates ☒ Equipment No. Nameplate - Lamacoid-black letters on white background (See Attachments) ☐ Testing and Inspection ☒ Factory Inspection Options: ☐ Thermostatically Controlled Space Heaters ☒ Ground Fault Detection Lights ☒ Ethernet Communications ☐ Provision for Future Expansion ☐ _____ ☐ Empty Unit Insert (1 Full Height Space) ☐ Empty Unit Insert (2 Full Height Spaces) ☐ Incoming Unit Painted Yellow ☐ Grace Voltage Indicator on Incoming Section ☐ Surge Suppression on Incoming Section ☒ IR Window - Incoming Section	A
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NOTES:

1. Reference specifications and attachments for additional requirements.
2. Main Circuit Breaker: Provide one (1) 4000-amp main circuit breaker, Easton MDS-C40 or approved equal.
3. Feeder Circuit Breaker: Provide feeder circuit breakers, Easton MDS-C08 or approved equal, as indicated on the drawings and schedule.
4. Main Breaker Metering: Provide one (1) SEL-735 Power Quality Revenue Meter, or approved equal, associated with the main circuit breaker. Meter shall be complete with all required current transformers, voltage connections, wiring, communications, and accessories necessary for a complete and operational installation.
5. Switchgear shall be front accessible and front entry.