OFFICE OF WASTEWATER MANAGEMENT

WASHINGTON, D.C. 20460

SOLICITATION OF PUBLIC COMMENT FOR PROJECT-SPECIFIC BUILD AMERICA, BUY AMERICA NONAVAILABILITY WAIVER PROPOSAL

SUBJECT: UNDER EVALUATION: Project-Specific Nonavailability Waiver of Build America, Buy America Act for the Manufactured Product Requirements to the Jordan Valley Water Conservancy District in West Jordan, Utah, for Engine Generators

Intro: This solicitation of public comment by the U.S. Environmental Protection Agency (EPA) is to evaluate a Build America, Buy America (BABA) waiver request submitted by an assistance recipient based on nonavailability of a product for a single project. This solicitation of public comment does not represent a final agency decision. The purpose of this proposal is to inquire whether potential alternative domestic products may be available that were not identified by the assistance recipient or through the EPA's domestic product research efforts, and whether other factors should be considered in the evaluation of a waiver. The EPA has completed its market research efforts and was unable to identify an alternative domestic product meeting the performance-based specifications in sufficient and reasonably available quantities and of a satisfactory quality. The EPA makes every effort to locate domestic alternative products through its waiver process and the public comment period provides an additional meaningful opportunity to augment the Agency's research. In the EPA's experience, a viable domestic product may be identified through public comment. Through this public comment period, commenters may provide information that indicates an item is domestically available. In that circumstance, the EPA would not issue a final waiver.

Public comments are requested for 15 days (specific dates noted on the EPA's website). Please submit comments to BABA-OW@epa.gov. Please include information in the subject of the email identifying it as a public comment on this waiver request, such as "Waiver Comment: Jordan Valley Engine Generators" or similar. The proposed waiver will also be posted to the Made in America website.

Background

The Buy America Preference set forth in section 70914 of the BABA included in the Infrastructure Investment and Jobs Act (Pub. L. No. 117-58), requires all iron, steel, manufactured products, and construction materials used for infrastructure projects under Federal financial assistance awards be produced in the US.

Under section 70914(b), the EPA may waive the application of the Buy America Preference, in any case in which it finds that: applying the domestic content procurement preference would be inconsistent with the public interest; types of iron, steel, manufactured products, or construction materials are not

produced in the US in sufficient and reasonably available quantities or of a satisfactory quality; or the inclusion of iron, steel, manufactured products, or construction materials produced in the U.S. will increase the cost of the overall project by more than 25 percent. All waivers must have a written explanation for the proposed determination; provide a period of not less than 15 calendar days for public comment on the proposed waiver; and submit the proposed waiver to the Office of Management and Budget's (OMB) Made in America Office for review to determine if the waiver is consistent with policy.

Summary

Proposed Waiver: The EPA is soliciting comments regarding whether to issue a project waiver of the manufactured product requirements of section 70914 of the BABA included in the Infrastructure Investment and Jobs Act (Pub. L. No. 117-58), for engine generators used in an infrastructure project funded as directed in the 2024 Consolidated Appropriations Act.

Waiver Type: Nonavailability of a domestic product in sufficient and reasonably available quantities or of a satisfactory quality.

Waiver Level and Scope: Project level waiver for a single product for a single project. No other project will utilize the waiver.

Proposed Waiver Description: Project-specific nonavailability waiver of BABA manufactured product requirements to the Jordan Valley Water Conservancy District (Applicant) in West Jordan, Utah, for four (4) engine generators for the JVWCD Generators Phase II project (project).

Project Summary: The Applicant operates a regional water system consisting of 30 wells, 11 pump stations, and four (4) water treatment plants. The Applicant is facing the challenge of ensuring reliable water supply in the event of a system-wide power loss. As the Applicant's service area continues to grow, the current emergency power capability across the system is not sufficient to provide power for District facilities to meet future water demand projections. The treatment plants and some pump stations already have backup power generation on site. After an extensive analysis of system demand and risk prioritization, the Applicant decided to prioritize emergency power generation at critical pump stations for this project, provided by engine generators. The Applicant's goal is to provide uninterrupted water service to its customers, both retail and wholesale, as well as to fulfill its contractual obligations to other water districts and irrigators.

Length of the waiver: From the effective date of the final waiver until project completion, estimated to be January 31, 2030.

Summary of Items Covered in the Proposed Waiver (including NAICS): The Applicant is seeking a waiver for engine generators (NAICS code 335312; PSC 2920), which are BABA manufactured products. The Applicant proposes to procure engine generators manufactured outside the United States. No domestic alternative products were identified by the Applicant, or through the EPA's market research completed in March 2025.

For additional information on the project and waiver request, see the attached original waiver request from the assistance recipient and supporting documents.

Description of Efforts Made to Avoid the Need for a Waiver

Once aware that the BABA requirements would likely apply to the project, the Applicant has made good-faith effort to comply, soliciting bids with reference to BABA and conducting due diligence to identify compliant engine generators meeting the project's technical specifications.

No domestic alternative products were identified by the Applicant, or through the EPA's market research completed in March 2025. The market research process included thorough review of the waiver request submission, examination of domestic manufacturer catalogs and other technical data and marketing materials, personal communication with domestic manufacturers, inquiries of regional project officers, and outreach to contractors and engineers with expertise and familiarity with the project. During market research, the EPA contacted eight (8) manufacturers and suppliers. No (zero) manufacturers indicated they could produce BABA-compliant engine generators that meet the technical specifications of the project. In addition, the EPA inquired about generators with the Department of Energy and confirmed that no concurrent activity was occurring within their department. Based on the technical evaluation conducted, the claim that there are no BABA-compliant engine generators available that meet the project's specifications is supported.

Anticipated Impact if No Waiver is Issued

The Applicant's service area continues to grow, and current emergency power capability across the system would not be sufficient to provide power for District facilities to meet future water demand projections. Absent a waiver, the Applicant would be unable to reliably meet future water demand following emergencies that result in power loss.

Description of Award

Recipient Name and/or Unique Entity Identifier (UEI): WMDDMDX87L25

Federal Financial Assistance Identification Number (FAIN): N/A

Common Government-wide Accounting Classification: 068

Federal Financial Assistance Funding Amount: $2,873,120

Total Cost of Infrastructure Expenditures: $4,309,680

[redacted]

TECHNICAL MEMORANDUM

NOTE: Information in this waiver may have been redacted or removed due to issues of proprietary business information or incompatibility with Federal accessibility requirements. To request the information redacted for purposes of accessibility requirements, please email BABA-OW@epa.gov.

To: Environmental Protection Agency

From: [redacted]

Re: **Project-Specific BABA Waiver Application (JVWCD Generators Phase II)**

Date: March 31, 2025

PROJECT SUMMARY

The Jordan Valley Water Conservancy District (District) is facing the challenge of ensuring reliable water supply in the event of a system-wide power loss. The District's service area continues to grow, and current emergency power capability across the system would not be sufficient to provide power for District facilities to meet future water demand projections. The District's goal is to provide uninterrupted water service to its customers, both retail and wholesale, as well as to fulfill its contractual obligations to other water districts and irrigators.

The District operates a regional water system consisting of 30 wells, 11 pump stations, and 4 water treatment plants. The treatment plants already have backup power generation on site as well as some pump stations. After an extensive analysis of system demand and risk prioritization, the District has decided to prioritize emergency power generation at five critical pump stations for this project.

The project includes improvements at the following locations:

1. **3300 W 13400 S Pump Station**
    a. 750 kW Permanent Generator
2. **4800 W 4500 S Pump Station**
    a. 750 kW Permanent Diesel Generator
3. **3145 W 11400 S Pump Station**
    a. 750 kW Permanent Generator
4. **Terminal Pump Station**
    a. 200 kW Permanent Generator

BABA WAIVER NECESSITY

To the best of our knowledge, a project specific waiver for the Build America, Buy America (BABA) Act requirements will be needed for this project; the specified generators are not manufactured within the United States. Efforts to domestically source the necessary generators have led us to believe that at least a portion of the required products for this project are only manufactured outside the United States. It is critical that the generators used for this project meets all engineering design specifications to maintain performance and reliability standards for the District.

DUE DILIGENCE

During the bidding process for the project, contractors were instructed to bid American-made products wherever possible to meet BABA requirements. There were requests for a BABA-approved manufacturer list, which we were not able to provide. Electrical subcontractors have expressed concern that BABA compliant generators are not available. Contractors proceeded with their due diligence and bids were received, including the apparent low bid from [redacted] Attached to this document is a spreadsheet with a comprehensive list of generators required for this project. We also provided this list to [redacted] electrical subcontractor so that the research could commence in parallel through this process.

QUANTITY AND MATERIALS

Refer to Attachment 1 for product descriptions and references to technical specifications for more detailed information. The generators are listed by pump station location.

SPECIFICATIONS AND DESIGN CONSIDERATIONS

Refer to Attachment 2 for details and considerations regarding the generators.

UNIT COSTS

Refer to Attachment 1 for detailed information on unit costs. This information has been completed with the assistance of [redacted] received quotes and manufacturer research.

PROJECT SCHEDULE

Figure 1 shows the proposed construction schedule for the project. The required Substantial completion date as stated in the project contract documents is December 01, 2027, and final completion is January 15, 2028.

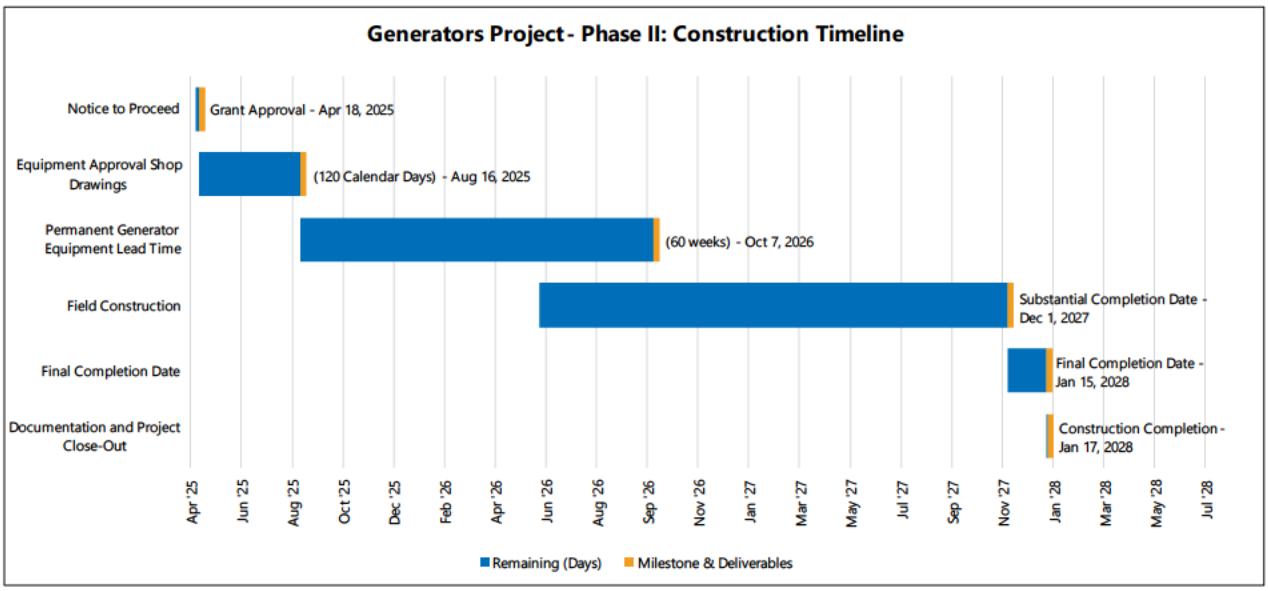

Figure 1: Timeline for Project Construction

Significant lead times are anticipated for several items, including a 45-week lead time for generators and a **60-week lead time for automatic transfer switches**. The required equipment must be on site before **October 2026** to avoid significant project schedule disruptions.

If you have any questions, please feel free to reach out to me directly by email at [redacted] or by phone at [redacted]

Sincerely,

[redacted]

Cc: Kevin Rubow, PE – JVWCD Project Manager
Alyssa Azari – EPA Region 8 Water Division Representative

Attachments:

Attachment 1 – BABA Compliance Spreadsheet
Attachment 2 – Project Technical Specifications

Item No.	Product - Description	Unit Cost	Site Name	Specification Reference	BABA Compliant (Y/N)	Comments
1	Generator (SW134-GEN 1) - 750 kW @ .8PF, 937.5 kVA, 277/480 VAC Output, 60 Hz, 3 PH	$ [redacted]	3300 W 13400 S	26 32 13	N	
2	Generator (NW45-GEN1) - 750 kW @ .8PF, 937.5 kVA, 2400/4160 VAC Output, 60 Hz, 3 PH	$ [redacted]	4800 W 4500 S	26 32 13	N	
3	Generator (SE2-GEN1) - 750 kW @ .8PF, 937.5 kVA, 277/480 VAC Output, 60 Hz, 3 PH	$ [redacted]	3145 W 11400 S	26 32 13	N	
4	Generator (NWTR-GEN1) - 200 kW @ .8PF, 250 kVA, 277/480 VAC Output, 60 Hz, 3 PH	$ [redacted]	3800 W 5820 S	26 32 13	N	

SECTION 26 32 13
ENGINE GENERATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. **The site elevations (above sea level) are approximately as listed below. All equipment as noted within the Contract Documents shall carry a rating as indicated at this noted site elevation. The equipment manufacturers shall be responsible for applying all necessary altitude de-rating factors.**
   a. 3300W 13400S Pump Station: 4,576 feet
   b. 4800W 4500S Pump Station: 4,465 feet
   c. 3145W 11400S Pump Station: 4,565 feet
   d. 3800W 5820S Terminal Pump Station: 4,610 feet
2. Furnish and install complete engine generator set(s), fully assembled as indicated on the Drawings, tested and ready to operate including fuel supply, exhaust system and cooling equipment. Both engine and generator shall be the responsibility of a single manufacturer and be of a standard model or series in regular production at the manufacturer's place of business. No unit assembled by anyone other than a recognized manufacturer will be accepted. Unit(s) shall be installed at the site(s) as indicated below.
   a. 3300W 13400S Pump Station
   b. 4800W 4500S Pump Station
   c. 3145W 11400S Pump Station
   d. 3800W 5820S Terminal Pump Station

B. Related Work:

1. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
2. Section 26 05 26 - Grounding And Bonding For Electrical Systems
3. Section 26 05 34 - Conduit
4. Section 26 05 37 - Boxes
5. Section 26 05 53 - Identification For Electrical Systems
6. Section 26 24 16 - Panelboards
7. Section 26 36 00 - Automatic Transfer Switch
8. Section 26 13 02 - Medium Voltage Automatic Transfer Switch

1.02 DESCRIPTION OF SYSTEM

A. After failure of normal power, the engine starts automatically, attains rated voltage and frequency and in conjunction with the automatic transfer switch, transfers power to the load in less than 10 seconds from the time of the power failure signal. Upon restoration of utility power, automatically retransfer load back to normal power, and then shuts down the generator (after programmable cool down period) and returns to readiness for another operating cycle.

B. Generator shall meet most current and adopted emissions standards in project location for an Emergency Standby application.

1.03 QUALITY ASSURANCE

A. Built to NEMA Standards, U.L. 2200 listed (generator set), and in accordance with NFPA 70. The engine generator set will be a packaged unit and will be the product of a single manufacturer, with all warranties for the complete unit provided by the factory.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

A. The electric generating system consists of a prime mover, generator, governor, coupling and all controls.

B. Conform to N.E.C. and applicable inspection authorities

1.05 WARRANTY

A. The manufacturers and dealer shall provide a warranty which shall be for a period of five (5) years (1500 operating hours) from date of initial startup of the system.

1. The warranty shall include repair parts, labor, reasonable travel expense necessary for repairs at the jobsite, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair.
2. Applicable deductible costs shall be specified in the manufacturer's warranty.
3. Submittals received without written warranties as specified will be rejected in their entirety.

1.06 SHOP DRAWINGS AND PRODUCT DATA

A. Submit in accordance with General Requirements

B. Clearly indicate all connection points, installed weight, dimensions, clearance requirements, accessory description, fuel requirements, air quantity requirements, electrical rating, power factor, short circuit available amperes (R.M.S. value), voltage regulator type, temperature rise of the alternator, ambient air rating of the radiator, recommended pipe sizes and routing.

C. **Indicate the site rated value for kW and kVA.**

1.07 DELIVERY, STORAGE AND HANDLING

A. Generator Supplier shall deliver generator set (FOB) to the site, unload, and set directly onto the concrete pad.

1.08 OPERATION AND MAINTENANCE DATA

A. Include complete data in accordance with General Requirements for maintaining and operating the unit including fuel requirements, lubrication requirements, exercising, tests to be performed, spare parts list, troubleshooting guide, description of operation. Include a minimum of four hours for Owner instruction.

1.09 MOTOR STARTING CAPABILITY

A. Motor Starting Capability

1. The engine generator set shall have sufficient starting kVA to withstand the loading sequence for each site listed below. The staggered start sequencing indicated will be provided from plant PLC SCADA system programming, separate from generator system. During motor starting, instantaneous voltage dip shall not exceed the limits indicated per individual step. The Contractor shall submit calculations with the shop drawing submittal that confirm the unit's conformance with this requirement.
2. The supplier shall provide a larger unit than the specified size if required to meet the motor starting requirements. The use of field "boost", or similar means, is not acceptable. The generator size shall not be smaller than the capacity specified herein and as shown on the Drawings.

Starting Sequence - 3300W 13400S Pump Station:

a. Step 1 Loads:
   1) 75KVA of building auxiliary loading at a 0.9 power factor lagging
b. Step 2 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum allowable Frequency Dip and Frequency Dip per Step)
   1) (1) 600 HP NEMA motor started via a reduced voltage soft starter set to a current limit of 300%.

Starting Sequence - 4800W 4500S Pump Station:

c. Step 1 Loads:
   1) 45KVA of building auxiliary loading at a 0.9 power factor lagging
d. Step 2 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum Allowable Frequency Diph per Step)
   1) (1) 450 HP NEMA motor started via an 80% autotransformer **or;**
   2) (1) 350 HP NEMA motor started via a Full Voltage Non-Reversing Starter

Starting Sequence - 3145W 11400S Pump Station - Generator shall be sized to meet either Scenario No.1 or No.2 as noted below:

Scenario No.1:

e. Step 1 Loads:
   1) 45KVA of building auxiliary loading at a 0.9 power factor lagging
f. Step 2 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum Allowable Frequency Dip per Step)
   1) (1) 200 HP NEMA motor started via a reduced voltage soft starter set to a current limit of 600%.
g. Step 3 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum Allowable Frequency Dip per Step)
   1) (1) 200 HP NEMA motor started via a reduced voltage soft starter set to a current limit of 600%.

Scenario No.2:

h. Step 1 Loads:

1) 45KVA of building auxiliary loading at a 0.9 power factor lagging

i. Step 2 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum Allowable Frequency Dip per Step)
   1) (1) 250 HP NEMA motor started via a variable frequency drive set to a current limit of 110%.

j. Step 3 Loads (25% Maximum Allowable Voltage Dip and 10% Maximum Allowable Frequency Dip per Step)
   1) (1) 250 HP NEMA motor started via a variable frequency drive set to a current limit of 110%.

Starting Sequence - 3800W 5820S Terminal Pump Station:

k. Step 1 Loads (10% Maximum Allowable Voltage and Frequency Dip per Step)
   1) 105kW of ancillary building load operating at a power factor of 0.90 lagging.

1.10 SUPPLIER EXPERIENCE

A. It is the intent of this Specification that all equipment specified in this Section shall be furnished by a single source supplier who shall assume system responsibility along with the Contractor.

B. The engine generator set supplier shall be normally engaged in the assembly, installation, repair, and maintenance of generation equipment. The supplier shall have provided at least three (3) systems of equal or greater complexity/size in the last year.

C. The supplier shall be a factory authorized sales, parts, and service representative of the engine manufacturing company. The supplier shall demonstrate that it has spare parts in stock to service and maintain the engine and to repair the unit in 48 hours or less for most failures.

D. The supplier shall have a service depot within a 100 mile radius of the project site.

E. The supplier shall modify or supplement the supplier's "standard products" to meet these specifications. Standard products of a particular supplier that do not meet the functional and technical requirements of the specification are not acceptable.

F. The supplier shall have qualified, trained service personnel on staff who are capable of maintaining and repairing the equipment. The supplier shall be capable of offering an extended service contract after completion of the warranty period, including 24 hour, 7 day per week emergency services.

G. Upon request, the supplier shall submit:

1. List of three (3) projects referenced above, including customer's name, contact person, and phone number.

2. Description of service contract capability, including number of personnel, their location, and types of service contract available.

1.11 SITE REQUIREMENTS

A. Noise

1. The power generation system for this application shall meet the following noise requirements.
   a. Noise from the generation equipment shall not exceed 65dB over background noise 25 feet from the enclosure in any direction with the unit operating at full standby load conditions.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. The generator set shall be as manufactured by:

1. [redacted]
2. [redacted]
3. Prior approved equal

B. The engine, generator and all major items must be manufactured in the United States.

2.02 RATINGS

A. Voltage ratings

1. Generator set(s) shall have voltage ratings as indicated for each site:
   a. 3300W 13400S Pump Station
      1) 277/480 VAC output voltage at 60Hz, 3 phase.
   b. 4800W 4500S Pump Station
      1) 2400/4160 VAC output voltage at 60Hz, 3 phase.
   c. 3145W 11400S Pump Station
      1) 277/480 VAC output voltage at 60Hz, 3 phase.
   d. 3800W 5820S Terminal Pump Station
      1) 277/480 VAC output voltage at 60Hz, 3 phase.

B. Factory eKW/kVA ratings

1. Generator set(s) shall have eKW/kVA ratings as indicated for each site:
   a. 3300W 13400S Pump Station
      1) 750 Standby eKW @ .8PF, 937.5 kVA
   b. 4800W 4500S Pump Station
      1) 750 Standby eKW @ .8PF, 937.5 kVA
   c. 3145W 11400S Pump Station
      1) 750 Standby eKW @ .8PF, 937.5 kVA
   d. 3800W 5820S Terminal Pump Station
      1) 200 Standby eKW @ .8PF, 250 kVA
2. The standby (maximum or intermittent) rating of the unit shall not exceed the fuel rate limit of the engine based on two (2) hours of standby operation out of any 24 hour period at rated speed and rated voltage. The ambient temperature is 120 degrees F. This is measured two (2) feet from the end bearing housing of the generator in line with the shaft. The

standby rating shall be no greater than 10% above the prime rating. The rating must be adjusted for the elevation of the installation if necessary. The engine fuel rate must not be adjusted higher than the fuel rate recommended by the engine manufacturer.

3. The submittal shall include the efficiency of a similar production generator and the fuel utilization of a similar production engine after 4 hours of continuous operation at prime rated load. This data shall be based on #2 diesel fuel with a cetane rating of 40.
4. These ratings must be substantiated by the manufacturer's certified standard published curves. Special ratings or maximum ratings are not acceptable.

C. Ambient temperature: -20 Degrees F. minimum to +110 Degrees F. maximum

2.03 ENGINE

A. Type

1. Diesel utilizing number 2 fuel
2. Liquid cooled
3. Four cycle
4. 1800RPM
5. Full pressure lubrication system; engine driven lube oil pump
6. Lube oil filters
7. Spring loaded bypass valve
8. Lube oil cooler
9. Lube oil
10. Fuel transfer pump
11. Fuel priming pump
12. Fuel oil cooler
13. Flexible fuel lines (labeled for fuel flow direction)
14. Engine mounted fuel oil filter
15. Engine driven water pump
16. Dry type air cleaners with service indicators
17. Closed Loop Crank Case breather system (No oil may be routed to dump on the floor, all must be recycled)

2.04 GOVERNOR

A. Isochronous governor (electronic type with magnetic pickup) +/- ¼% speed regulation no load to full load

2.05 GENERATOR (IN ACCORDANCE WITH NEMA STANDARD MG1-22.40)

A. Type

1. Voltage as indicated for each site:
   a. 3300W 13400S Pump Station
      1) 277/480 volt, 3 phase, wye connected
   b. 4800W 4500S Pump Station
      1) 2400/4160 volt, 3 phase, wye connected
   c. 3145W 11400S Pump Station
      1) 277/480 volt, 3 phase, wye connected
   d. 3800W 5820S Terminal Pump Station

1) 277/480 volt, 3 phase, wye connected

2. Drip proof
3. Permanent magnet excitation
4. Brushless exciter with static regulator containing no moving parts
5. Field circuit with inherent protection against excessive field currents or voltages
6. Heavy duty single ball bearing type
7. Direct coupled to the engine through a semi-flexible coupling
8. NEMA Class “H” insulation
9. NEMA Class “F” temperature rise (115°C maximum)
10. Rating and voltage stamped on a permanent nameplate
11. Voltage regulator (solid state), +/- 2% from no load to full load
12. Voltage level adjustment, +/- 5%

2.06 OUTPUT CIRCUIT BREAKER

A. This section is applicable only to the following site(s):

1. 3300W 13400S Pump Station
2. 3145W 11400S Pump Station
3. 3800W 5820S Terminal Pump Station

B. The generator output circuit breaker(s) shall be mounted on the generator. The circuit breaker shall be molded case, provided with an adjustable electronic trip unit with adjustable LSIG functionality. In addition, the trip unit shall have a ground fault alarm function which is separately adjustable from the ground fault trip setting. The breaker shall have shunt-trip.

C. Customer Power:

1. Circuit breaker to be molded case, thermal magnetic, 1200 amperes, 3 pole, 480 VAC, 42 KAIC minimum. Circuit breaker shall incorporate an electronic trip unit with adjustable LSIG trip function for the following site(s):
   a. 3300W 13400S Pump Station
   b. 3145W 11400S Pump Station
2. Circuit breaker to be molded case, thermal magnetic, 400 amperes, 3 pole, 480 VAC, 42 KAIC minimum. Circuit breaker shall incorporate an electronic trip unit with adjustable LSI trip function for the following site(s):
   a. 3800W 5820S Terminal Pump Station

2.07 INSTRUMENTATION AND CONTROLS

A. The generator control panel shall be generator mounted and shall provide all operating, monitoring and control functions for the generator set.

B. The control panel shall include the following functional requirements:

1. LCD display with text based alarm/event descriptions.
2. Automatic and manual start/stop controls
3. Local run/off/auto control
4. Emergency stop pushbutton
5. Lamp test
6. Voltage control

7. Speed control
8. Password protected system programming
9. Spare relay - programmable

C. Controls shall provide the following keypad accessible digital readouts for the engine and generator:

1. Engine
    a. Engine oil pressure
    b. Engine oil temperature
    c. Engine coolant temperature
    d. Engine RPM
    e. Battery Volts
    f. Hours Run
2. Generator
    a. AC Voltage (L-L & L-N)
    b. AC Amps
    c. Generator AC Frequency
    d. KW (total & per phase)
    e. KVA (total & per phase)
    f. KVAR (total & per phase)
    g. Power Factor (average and per phase)
    h. KWhr (total)
    i. KVARhr (total)
    j. % of rated KW (total)
3. Voltage Regulation
    a. DC voltage
    b. DC current

D. Alarms and Shutdowns (Engine)

1. Low oil pressure alarm/shutdown
2. High coolant temperature alarm/shutdown
3. Loss of coolant shutdown
4. Overspeed shutdown
5. Overcrank shutdown
6. Low coolant level alarm
7. Low fuel level alarm
8. Emergency stop shutdown
9. Low coolant temperature alarm
10. Low battery voltage alarm
11. High battery voltage alarm
12. Control switch not in auto position alarm
13. Battery charger failure alarm

E. Alarms and Shutdowns (Generator)

1. Generator over voltage
2. Generator under voltage w/ time delay
3. Generator over frequency
4. Generator under frequency w/ time delay
5. Generator reverse power
6. Generator overcurrent w/ time delay

7. Generator breaker open (alarm only)

F. Alarms and Shutdowns (Voltage Regulation)

1. Loss of excitation alarm/shutdown
2. Instantaneous over excitation alarm/shutdown
3. Time over excitation alarm/shutdown
4. Rotating diode failure
5. Loss of sensing
6. Loss of PMG

G. Auxiliary

1. Provide (6) programmable discrete inputs.
2. Provide (15) discrete outputs which shall be of the dry contact type rated for 120VAC. These outputs shall be configurable in the field but shall be initially configured to provide the following:
   a. Generator Running
   b. Generator not in auto
   c. Generator Pre-High Engine Temp
   d. Generator High Engine Temp
   e. Generator Overspeed
   f. Generator Low Engine Temp
   g. Generator Low Coolant Level
   h. Generator Pre-Low Oil Pressure
   i. Generator Low Oil Pressure
   j. Generator Fuel Tank Leak
   k. Generator Battery Charger Fault
   l. Four (4) Spares
3. Provide (6) programmable discrete outputs (rated for 2A at 30VDC):
   a. One discrete output to indicate “Generator Running” to SCADA Panel.
   b. One discrete output to indicate “General Common Shutdown Alarm” to SCADA Panel.
   c. One discrete output to indicate “General Pre-Shutdown Alarm” to SCADA Panel.
   d. One discrete output to indicate “Generator Low Fuel Pre-Alarm” to SCADA Panel.
   e. One discrete output to indicate “Generator Fuel Basin Rupture Detected” to SCADA Panel.
4. Provide (1) programmable analog output (4-20mAdc):
   a. One analog (4-20mAdc) output to indicate continuous fuel level to SCADA Panel.
5. Provide (1) Modbus TCP/IP protocol communication network connection to SCADA. A protocol conversion gateway shall not be required.

H. Enclosure

1. Mounted Integral to Generator

I. Indicating Lights

1. Low oil pressure
2. High coolant temperature
3. Overspeed

4. Overcrank
5. Emergency stop
6. Fault shutdown
7. Fault alarms
8. 3 Spare lights/4 spare inputs
9. Customer programmable (shutdown or alarm) to spare alarm or fault LEDs

J. Pre-alarm and LED indicators for

1. Approach high coolant temperature
2. Low coolant temperature (70 degrees F.)
3. Approach low oil pressure
4. Low DC volts
5. System not in “automatic”
6. Low fuel level
7. Fuel in rupture basin

2.08 REMOTE COMMUNICATIONS

A. Generator control shall include an external Ethernet communication port for connecting to the plant SCADA via Modbus TCP/IP protocol.

B. Remote serial annunciator panel (RSA) shall be furnished loose for installation at the site by the Electrical Contractor. The RSA shall enable the operator to monitor the status of the generator set from a remote location. The RSA shall be connected via RS-485 Serial Communication using Modbus or other industry standard protocol and a [redacted] data cable.

1. Applicable only to the following sites:
   a. 3300W 13400S Pump Station
   b. 3145W 1400S Pump Station
   c. 3800W 5820S Terminal Pump Station

2.09 STARTING SYSTEM

A. 12 or 24 volt DC starter motor(s) as applicable

B. Automatic reset circuit breaker to protect against butt engagement of starter motor(s)

C. Batteries, low maintenance, lead acid type (low antimony) adequately sized per the ambient temperatures stated

D. Corrosion resistant or coated steel battery rack

E. Required battery cables

2.10 BATTERY CHARGER

A. Automatic mode switching type. 10 ampere minimum rating.

B. Rating of at least 1/20 of the ampere hour rating of the batteries

C. Factory preset ranges – not field adjustable

D. DC output +/- 0.2% with AC input variation of +/- 10%

E. DC voltmeter

F. DC ammeter

G. NFPA malfunction alarm contacts

2.11 JACKET WATER HEATER(S)

A. 208 or 240V volts, single phase, as shown on the plans sized to manufacturer's recommendations

B. Adjustable thermostatic control

C. Isolation valves

D. Sized to maintain engine jacket water temperature at a minimum of 120 degrees F. when the engine is idle.

2.12 COOLING SYSTEM, ENGINE MOUNTED (AMBIENT RATING OF -20 F TO +110F)

A. Vertical core with built in expansion tank

B. Flanged for direct duct connection

C. Engine driven blower fan

D. OSHA type fan and belt guards

E. Low coolant level contactor

F. 50% ethylene glycol inhibited antifreeze liquid with additives

2.13 EXHAUST SYSTEM

A. Critical type silencer with thimble.

B. Silencer configuration shall be for horizontal installation with a bottom inlet, to be mounted to the roof of the generator room or enclosure.

C. Mechanical contractor to construct roof support and connect silencer to generator as required. The electrical contractor shall provide dimensions required for mechanical to install.

D. Additional requirements applicable to the 4800W 4500S Site:

1. Provide flexible connections and 10" wye fitting for the generator exhaust. Flexible connections and wye fitting shall be provided by the generator manufacturer and installed by the Div. 22 Contractor.
2. Generator exhaust silencer shall be provided by the generator manufacturer and installed by the Div. 22 Contractor.

2.14 FUEL TANK SYSTEM - SW134-GEN1, SE2-GEN1, NWTR-GEN1

A. Note: The above ground external fuel tank required at the 4800W 4500S Site (NW45-GEN1) is speciried in Section 22 10 06.

B. 12 hour fuel supply at 100% load minimum

C. Mounted under the generator, double walled with leak detention to meet PCA requirements.

D. Coordinate foot print during submittal phase. The intent is to allow the generator manufacturer the freedom to provide a tank that best meets the site requirements.

E. Inlet - exterior mounted fuel fill box

F. Vents top of tank, Normal, Emergency, & Rupture Basin shall be extended through the generator enclosure by the generator supplier.

G. Engine return line top of tank

H. Low level fuel alarm with contacts for remote annunciation, prewired to generator control panel.

I. Visual Level Indicator

J. Leak detection alarm.

K. Fuel level gauge (4-20mA analog output).

1. The generator fuel gauge shall be calibrated to its zero value in the plant SCADA system prior to filling with diesel to provide an accurate high and low level signal.

L. Drain petcock at bottom of tank.

M. Utilize flexible metal hose for final connections of fuel supply and return lines

N. A (4) point lifting means for the total weight of the system less fuel shall be designed into the base.

2.15 ACCESSORIES

A. Glycol coolant mixture (50%)

B. Initial fuel fill (blended). See Part 3 for additional information.

C. OSHA approved ear protectors (four sets).

2.16 LUBE OIL SYSTEM

A. Forced-feed lubrication system with piston cooling, lube oil circulating pump with safety valve, lube oil filter, lube oil heat exchanger, filler neck, dip stick, and closed crankcase breather system.

2.17 ALL STEEL SKIN TIGHT STYLE WEATHER PROOF ENCLOSURE

A. This section is applicable only to the following site(s):

1. 3300W 13400S Pump Station
2. 3145W 11400S Pump Station
3. 3800W 5820S Terminal Pump Station

B. A weatherproof enclosure, designed to allow for full load operation of the engine generator system and all of its accessories, sized for the exact unit being

installed shall be supplied. The enclosure shall be sized and equipped with adequate doors for ease of inspection and servicing.

C. The enclosure shall be insulated with a high density foam insulation

D. The air openings shall include motor-operated intake and gravity exhaust dampers with fixed louvers on the intake and a 90 degree hood on the outlet sized to allow proper air flow (restriction not to exceed .5" H2O)

E. Doors shall be installed to allow sufficient access to the generator set and all accessories. All doors shall be hinged and equipped with positive locking assemblies and handles and be weather stripped.

F. The exhaust silencer shall be internally mounted and equipped with a vertical exhaust and a raincap.

G. The enclosure shall arrive at the jobsite completely wired (battery charger, jacket water heater, louver motors, etc.) and ready for final installation.

H. Enclosure shall be supplied with main auxiliary power disconnect (208V/1PH) and shall distribute power from an integral panelboard as required to feed all generator auxiliary power load requirements. Contractor to make 1 single point of power connection for auxiliary power at the unit.

I. Provide enclosure with enclosure mounted LED lights to sufficiently light the interior of the enclosure to 20 foot candles. Provide 2 enclosure mounted WP, GFCI duplex general purpose receptacles.

J. Provide LED wall packs on the exterior of the enclosure to provide 10 foot candles minimum immediately around the generator for maintenance. At a minimum, 1 light fixture shall be installed on each of the two sides of the generator where service doors exist. Exterior lights shall be on their own light switch and be provided with integral photocell. Light fixture shall be manufactured by RAB or Approved Equal.

K. Provide integral panelboard to provide power distribution to all equipment within the generator enclosure. Panelboard shall accept shore power as noted on the Electrical Drawings.

L. Provide integral mini-power zone to accept 480V/3PH shore power for the following sites. See the Drawings for further requirements:

1. 3300W 13400S Pump Station
2. 3145W 11400S Pump Station

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate with Electrical Contractor the unloading and proper placement of the engine generator set inside the generator room.

B. Provide all power feeders per Drawings and connect.

C. Tighten all lugs and bolts to manufacturer's recommendations.

D. Neatly dress conductors and bundle with nylon cable ties.

E. Provide all required control connections between generator control panel and ATS, between generator control panel and SCADA, and between SCADA and ATS.

F. Provide grounding at generator set location as indicated on the Drawings.

G. Use touch-up paint, as recommended by the manufacturer, to repair scratches and other surface defects.

3.02 CHECKOUT & STARTUP

A. Electrical Contractor shall contract with manufacturer of the electric generating plant and associated items covered herein to provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:

1. Ensuring the engine starts (both hot and cold) within the specified time.
2. Verification of engine parameters are within manufacturer’s recommendations.
3. Set no load frequency and voltage.
4. Single step load pickup per NFPA 110-1985, Paragraph 5-13.2.
5. Transient and voltage dip responses and steady state voltage and speed (frequency) checks.
6. Test all automatic shutdowns of the engine generator.

B. Furnish to engineer, a report indicating that installation has been tested by a manufacturer’s representative and is installed and operating properly.

3.03 TRAINING

A. Training for the Owner's personnel shall be for not less than eight (8) hours on the power generation systems.

B. All training sessions shall be at times that are preapproved with the Owner (7 days minimum advance notice).

C. Training shall be in accordance with Division 1 requirements.

3.04 WIRING

A. Wiring of the engine generator set, switchgear, lighting, outlets, panelboard, transformer, ventilation and other components of the integrated generation system shall meet all State requirements. These requirements shall include, but are not limited to:

1. Applying and paying for an electrical construction permit.
2. Installation by an electrician appropriately licensed by the State to which the project is located in.
3. Inspection and approval by an electrical inspector recognized by the State to which the project is located in.

3.05 TESTING

A. Testing During Fabrication

1. Engine Generator. The power generation system manufacturer or fabricator shall have:
   a. The power generation system is to be tested as a complete unit including engine, generator, excitation system, together with all subsystems in the enclosure and cooled by the engine radiator and fan.
   b. The manufacturer shall provide all equipment for the test including, but not limited to, ammeters, voltmeters, fuel supply, frequency meter, and load banks capable of 10% maximum steps to 100% of the engine generator's continuous standby rating; and the addition, in one step, of 50% of the continuous standby rating from a 50% continuous standby rating load point, or removal of the total load from the generator in one step. The load banks shall be connected through the switchgear or the power generation system's load terminals. The test program will cover the following items:
      1) Extended operation at 100% of continuous-standby rating, 2 (two) hours minimum.
      2) 50% load to 100% load test with a +10%-15% from nominal voltage dip, maximum, permitted with frequency fluctuation measurement. Code F motor inrush characteristics. Frequency deviation shall not exceed 3 cycles for 2 seconds.
      3) Engine protective device evaluation.
      4) No load operation with an addition of load to 50% of rating with 15% voltage dip maximum and frequency fluctuation not exceeding 2 cycles for 2 seconds.
      5) Various 10% load additions and subtractions.
      6) Evaluation of subsystems, noise, component installation and interconnections, workmanship, quality, engine and generator performance, etc.
      7) The test program will not start without all required equipment, including but not limited to load banks and voltmeter as required.

B. Site Testing

1. After installation, but prior to acceptance for substantial completion, the system shall undergo formal onsite testing. This testing will be witnessed by representatives of the Owner and the Engineer. The testing will include, but not be limited to:
   a. Demonstration of system features and functions.
   b. Machine performance.
   c. Use project loads and a separate resistive load bank equal to the generator capacity for testing purposes. Unit shall be tested as follows:
      1) With generator in a “cold start” condition and load at normal operating level, initiate a normal power failure by opening all switches or breakers supplying normal power

to the facility. Test load shall be that load which is served by the generator.

2) Observe and record the time delay on start.
3) Observe and record the cranking time until the generator starts and runs.
4) Observe and record the time required to come up to operating speed.
5) Record voltage and frequency overshoot.
6) Observe and record time required to achieve steady-state condition with all switches transferred to the emergency/standby position.
7) Record voltage, frequency and amperes.
8) Continue load test with building load for one (1) hour, observing and recording load changes and the resultant effect on voltage and frequency.
9) Return normal power to the facility, record the time delay on retransfer to normal (set to 15 minutes minimum) and the time delay on the generator cool down period and shutdown.
10) Confirm and record the time delays associated with the delayed transition feature of the switch and the “pre-transfer” signal to SCADA.
11) Perform a crank cycle test. Utilize any method recommended by the manufacturer to prevent the generator from running. Put the control switch into the “run” position to cause the generator to crank. Observe the complete crank/rest cycle specified and record.
12) After successful testing with the available facility loads, provide a resistive load bank to test the generator at full specified load at 1.0 power factor. Run generator at full load for two (2) hours. Record generator oil pressure, water temperature, and battery charge rate, voltage, frequency, and amperes at 5 minute intervals for the first 15 minutes and at fifteen minute intervals thereafter.
13) Test all safeties specified, as recommended by the manufacturer.

d. Perform testing at time pre approved by Owner and Engineer (7 day prior notice, minimum).
e. Submit record of site test procedures and results and include a copy in the O&M manuals.

2. If the system is not accepted or does not perform satisfactorily, repairs shall be completed and the unit retested until it performs to the Owner and the Engineer's satisfaction.

3.06 FUEL

A. Provide all diesel fuel for initial start up, training and testing procedures.

B. In addition to the fuel noted above, provide $4000 worth of fuel in the fuel tanks collectively (winter blend diesel fuel) at project completion. Intent is to leave the tank filled to at least half full capacity prior to leaving site. Provide copies of all fuel receipts to the Engineer to confirm quantity of fuel provided. Demonstrate fuel tank level to the Engineer and Owner prior to leaving site at project

completion.

3.07 SUPPLIES AND SPARE PARTS

A. Provide all supplies, spare parts, expendable items and related equipment for initial startup, training and testing procedures.

B. At project completion, provide Owner with a complete set of spare parts for the equipment, including, but not limited to lamps, fuses, etc. Provide twenty (20) percent spare fuses and lamps of each type furnished under this Section, but not less than six (6) of each type.

END OF SECTION