

VIRGIN ISLANDS WATER & POWER AUTHORITY



REQUEST FOR PROPOSAL

VIWAPA Randolph Harley Power Plant Expansion

General Construction

199312.70.0100

PR-04-20

Prepared by: Production and Black & Veatch

Date: August 2019

**VIRGIN ISLANDS WATER & POWER AUTHORITY
RANDOLPH HARLEY POWER PLANT EXPANSION - GENERAL CONSTRUCTION
RFP PACKAGE**

Contents

I.	REQUEST FORPROPOSAL.....	6
	a. Instructions to Offerors.....	6
	b. Submittal.....	6
	c. Offeror’s Withdrawal.....	7
	d. Owner’s Right.....	7
II.	GENERAL CONTRACT REQUIRMENTS.....	8
	a. Legal Requirements	9
	b. General Contract Requirements.....	10
	c. Taxes.....	10
	d. Performance Bond/ Letter of Credit.....	11
	e. Business License.....	12
	f. Liquidated Damages.....	12
	g. Insurance.....	13
	h. Environmental Responsibility.....	13
	i. Federal Funded Projects.....	13
	j. Utilization of Small, Minority and Women’s Owned Enterprises	14
	k. Section 3 Requirements.....	15
	l. Affirmative Action Plan.....	16
	m. Drug and Alcohol Testing for Contractor Employees.....	16
	n. Communication with Authority Board Members/ Employees/ Evaluation Committee Members.....	17
	o. Confidentiality.....	17
	p. Contract Execution.....	18
	q. Notice to Proceed.....	18
III.	ATTACHEMENT A.....	19
	01100 - General Requirements and Scope of the Work.....	20
	General Description.....	20
	Project Description	20
	Scope of Work	22
	Owner-Furnished Equipment	29
	Codes and Standards	29
	Drawings and Technical Attachments.....	30
	Supplemental Specifications	31
	01101 – Additional Project Requirements	31
	Major Facility Features	31
	Facility Operational Requirements.....	32

Emissions Control	32
Fuel Specification.....	33
Electrical System Interconnection.....	33
Instrumentation and Controls	33
Site Structures and Buildings	34
Fire Protection	34
Gas Detection and Protection.....	34
Facility Water Supply	34
Seismic and Wind Design	34
Sound Attenuation.....	34
Wastewater Discharge Requirements	34
Facility Tie-In Locations.....	35
General Clarifications	35
Division of Responsibility – RICE Plant	35
Equipment, Systems, and Structures	35
Engineering, Procurement, and Construction Items.....	38
Stack Design	42
Selective Catalytic Reduction System.....	42
Selective Catalytic Reduction System Catalyst	43
SCR Reagent System	43
Oxidation System Catalyst.....	45
Division of Responsibility – Combustion Turbine Generator (Simple Cycle)	45
Equipment, Systems, and Structures	46
Engineering, Procurement, and Construction Items	48
Stack Design	52
Selective Catalytic Reduction System.....	52
Selective Catalytic Reduction System Catalyst	53
SCR Reagent System	53
Oxidation Catalyst System.....	54
Division of Responsibility – Combustion Turbine Generator (Combined Cycle)	54
Equipment, Systems, and Structures	55
Engineering, Procurement, and Construction Items.....	61
Stack Design	64
Selective Catalytic Reduction System.....	65
Selective Catalytic Reduction System Catalyst	65
SCR Reagent System	66
Oxidation Catalyst System.....	66
01610 - Plant Performance Guarantees and Tests	67
General	67
Performance Guarantees	67
Thermal Performance Guarantees	
Guaranteed Air Emissions.....	69
Guaranteed Start Time.....	69
Guaranteed Ramp Rate.....	69
Guaranteed Minimum Down Time.....	69
Guaranteed Noise Emissions	69
Guaranteed Reliability	69
Facility Demonstration	70
Performance Test.....	70

Thermal Performance Tests.....	70
Noise Emissions Test	70
Reliability Run.....	70
Facility Capability Demonstration Tests	71
19000 - Quality System Requirements	73
General Quality System Requirements	73
Quality System.....	73
Quality System Manual.....	73
Sub-tier Contractors	75
Inspection and Test Plan	75
Inspections by Owner.....	75
21000 - Technical Supplemental Specifications	76
D200 Design Ambient and HVAC Criteria.....	77
Q100 General Welding Requirements.....	78
Q100.1 General.....	79
Q100.2 Welding Processes	79
Q100.3 Welding Procedure Qualification	79
Q100.4 Welder/Welding Operator Performance Qualification	80
Q301 Manufacturer's Standard Coating	80
Q301.1 Control and Electrical Equipment.....	81
Q301.2 Mechanical Equipment	81
Q301.3 Documentation.....	81
Q400 General Equipment Requirements.....	81
Q400.1 Fabrication Restrictions	81
Q400.2 Nameplates and Tags	81
Q400.3 Tools	82
Q500 Shop Drawings and Instruction Manuals.....	82
Q500.1 Submittal Requirements.....	82
Q500.2 Compliance Reports.....	82
Q500.3 Not Used	82
Q500.4 Drawings	82
Q501 Instruction Manuals	85
Q501.1 Submittal Requirements.....	85
Q501.2 Instruction Manuals	85
S100 Seismic Design.....	86
S100.1 General	87
S100.2 Seismic Forces.....	87
S100.3 Seismic Design and Certifications.....	91
S100.4 Documentation	92
S300 Structural Design Loads	93
S300.1 General	93
S300.2 Design Loads	93
S300.3 Minimum Uniform Live Loads	94
S500 Building Code Required Special Inspections and Tests for Structures and Structural Components.....	95
S500.1 Fabricators Approved to Perform Work without Special Inspection.....	95
V100 Noise Abatement	96
Attachments.....	98

IV. PROPOSAL FORM FORM.....113

- a. Proposal Evaluation Criteria
- b. Pricing Combustion Turbine Generator – Combined Cycle
- c. Pricing Combustion Turbine Generator – Simple Cycle
- d. Pricing – RICE Plant

V. GENERAL CONTRACT TERMS WITH FEDERAL REQUIREMENTS.....120

REQUEST FOR PROPOSAL

INTRODUCTION:

The Virgin Islands Water and Power Authority (VIWAPA, WAPA, Authority, or Owner) is an autonomous instrumentality of the Government of the Virgin Islands with a Governing board. The primary objective of VIWAPA is to produce and distribute clean, safe, reliable, and affordable potable water and electrical power to residents and businesses in the U.S Virgin Islands.

INSTRUCTIONS TO OFFERORS

PROJECT LOCATION

The project will take place at St. Thomas, Virgin Islands. This project is being funded by Federal Community Development Block Grant program with (CDBG-DR) as authorized under, Title I of Housing and Community Development Act of 1974, as amended.

MANDATORY PRE-BID MEETING

Attendance at the Pre-Bid Meeting is required for this project. For Offerors who have not been to the site, it is highly recommended that you do site visits prior to submission of your bid.

COMMUNICATION

All correspondence shall be identified by Request for Proposal number and title and shall be sent, via e-mail, to the Owner's representative at the address below.

Ms. Delores Donovan
Manager, Contract Administration
Virgin Islands Water and Power Authority
P.O. Box 1450
St. Thomas, VI 00804
Phone Number: (340) 774- 3552 ext. 2038
contractservices@viwapa.vi

SUBMITTAL

The Owner will receive via email a copy of the proposal from the Offeror as outlined in the transmittal letter. Late proposals will not be accepted.

Proposal must be submitted to:

Ms. Delores Donovan
Manager, Contract and Administration
Virgin Islands Water and Power Authority
contractservices@viwapa.vi

All proposal should be in strict accordance of the following:

1. Agreement to the payment schedule.
2. Rates for labor, services, equipment and material add-on percentage shall be attached. Prices should be submitted on a firm basis without escalation. Payment of invoices will be subject to satisfactory performance and acceptance of Work by the Owner or a representative of the Owner. All pricing will be firm for the duration of the Contract.
3. The Offeror must submit, with its proposal, a preliminary project schedule. This schedule shall detail the basic planning steps:
 - i. Project phases
 - ii. The breakdown of phases into tasks
 - iii. Time estimates for each task
 - iv. Critical path of the schedule
4. Proposals not electronically submitted will not be considered.
5. No proposal received after the time specified for receiving them will be considered.
6. Each proposal shall adhere to the following conditions:
 - i. Address the proposal to the Owner at the address given in this section.
 - ii. It is the responsibility of the Offeror to see that its proposal is received on time
7. The Offeror is required to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and equipment available for use in performing the work. Offeror is also required to submit qualifications for work previously performed.
8. The Offeror shall provide a designated start date, or notice to proceed (NTP), and an associated end date, or commercial operation date (COD) for the included scope of work. The Offeror must be aware that if the job falls behind schedule then they must make up the time by extended working hours, shifts or manpower.

BID WITHDRAWAL

Any Offeror may withdraw their proposal, by written request, via email to contractservices@viwapa.vi at any time prior to the scheduled time for proposal opening. No Offeror may withdraw its proposal for a period of one hundred twenty (120) days after the date set for opening thereof, and all proposal shall be subject to acceptance by the Owner during this period.

OWNERS' RIGHTS

Owner has a right to reject any or all proposal and to waive informality and irregularity in the proposal and the proposal process.



GENERAL CONTRACT REQUIREMENTS

LEGAL REQUIREMENTS

ALL PROPOSALS RESPONSES SHALL ADHERE TO THE REQUIREMENTS OF THE AUTHORITY'S PROPOSAL REQUEST AND THE AUTHORITY'S GENERAL CONTRACT TERMSREQUIREMENTS IN THE RFP PERTAINING TO THE OFFEROR'S RESPONSIBILITY FOR TAXES, PLACEMENT OF A PERFORMANCE BOND, BID BOND, INSURANCE, HIRING OF LOCAL WORKERS AND THE APPLICATION OF LIQUIDATED DAMAGES, ARE OF PARAMOUNT IMPORTANCE TO THE AUTHORITY AND SHALL APPLY, UNLESS EXPRESSLY WAIVED BY THE AUTHORITY. A COPY OF THE AUTHORITY'S GENERAL CONTRACT TERMS IS ATTACHED HERETO AS EXHIBIT A.

ALL PROPOSAL RESPONSES SHALL ALSO COMPLY WITH THE TERMS AND CONDITIONS OF THE HUD GENERAL PROVISIONS (HUD RIDER) WHICH APPLY WHEN ANY PORTION OF FUNDING IS DERRIVED FROM GRANTS MADE BY HUD. A COPY OF THE HUD GENERAL PROVISIONS IS ATTACHED HERETO AS EXHIBIT B

THE OFFEROR'S PROPOSAL RESPONSE MUST EXPRESSLY STATE THE TERMS AND CONDITIONS OF THE AUTHORITY'S GENERAL CONTRACT TERMS, AND THE HUD GENERAL PROVISIONS TO WHICH THE OFFEROR TAKES EXCEPTION. NO EXCEPTIONS SHALL TAKE EFFECT UNLESS EXPRESSLY ACCEPTED BY THE AUTHORITY IN WRITING. THE AUTHORITY RESERVES THE RIGHT DEPENDING ON THE STATED EXCEPTION TO CONSIDER ANY PROPOSAL NON-RESPONSIVE AND NOT SUBJECT TO FURTHER CONSIDERATION.

ALL QUESTION AND INQUIRIES REGARDING ANY MATTER AFFECTING THE PROPOSAL OR RESPONSE MUST EXCLUSIVLEY BE DIRECTED, IN WRITING, TO THE AUTHORITY'S MANAGER OF CONTRACT ADMINISTRATION, MS. DELORES DONOVAN.

ALL RFP's IN THEIR ENTIRETY ARE QUALIFIED BY THE FOLLOWING GENERAL REQUIREMENTS:

ALL COSTS AND EXPENSES ASSOCIATED WITH DEVELOPING AND/OR SUBMITTING A PROPOSAL IN RESPONSE TO THIS RFP AND/OR ANY RELATED ACTIVITY FOLLOWING THE SUBMISSION OF ANY SUCH PROPOSAL SHALL BE BORNE BY THE OFFEROR. WHILE WAPA HAS ENDEAVORED TO SUPPLY USEFUL INFORMATION IN THIS RFP, WAPA MAKES NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, AS TO THE ACCURACY OR COMPLETENESS OF ANY INFORMATION CONTAINED HEREIN OR OTHERWISE PROVIDED TO ANY OFFEROR BY, OR ON BEHALF OF WAPA. WAPA SHALL HAVE NO LIABILITY RELATING TO OR ARISING FROM ANY SUCH INFORMATION OR THE USE THEREOF. OFFERORS ARE ENCOURAGED TO CONDUCT THEIR OWN INVESTIGATION AND ANALYSIS OF ANY AND ALL INFORMATION CONTAINED HEREIN OR OTHERWISE PROVIDED BY OR ON BEHALF OF WAPA. THE RFP IS NOT AN OFFER OR COMMITMENT AND IS NOT CAPABLE OF BEING ACCEPTED TO FORM A BINDING AGREEMENT. WAPA RESERVES THE RIGHT, IN ITS SOLE DISCRETION, TO WITHDRAW OR MODIFY THE RFP AT ANY TIME, TO ACCEPT OR REJECT ANY OR ALL PROPOSALS FOR ANY REASON, TO WAIVE ANY IRREGULARITIES OR INFORMALITIES IN THE PROPOSAL PROCESS OR ANY NONCONFORMANCE WITH THE REQUIREMENTS OF THE RFP, AND TO ENTER INTO FURTHER DISCUSSION OR INTERVIEWS WITH ANY ONE OR MORE OFFERORS.

GENERAL CONTRACT REQUIREMENTS:

TAXES:

The Price proposed by Offeror shall be the total consideration, inclusive of taxes, that are applicable. The Offeror, if awarded the Contract, may be subject to local Virgin Islands tax such as gross receipt taxes; excise taxes, import taxes or custom duty, depending on the nature of the scope of work. All taxes are the responsibility of the Offeror unless exempted by law. The Offeror is advised to contact the Virgin Islands Bureau of Internal Revenue ("IRB"), (340) 715-1040, for information on their tax obligations. Neither the Authority, nor its employees or representatives, shall be responsible or liable due to any inquiries or representations regarding the Offeror's tax liability. **To the extent an Offeror claims an exemption from any applicable Virgin Island Tax or custom duty, Offeror must, upon contract execution, present the Authority documented evidence from IRB or other Virgin Islands Government Department establishing that the Offeror is not responsible for taxes.**

Pursuant to 33 VIC § 44(a) (b) of the Virgin Islands Code as amended, the Government of the Virgin Islands and its instrumentalities, agencies and public corporations are required, when making a payment to any person, partnership, firm corporation of other business association that is subject to the payment of gross receipt taxes under the law, to deduct and withhold from such payment, gross receipt taxes as required by law at 33 VIC § 43 (a). Payment for the purposes of withholding is defined by law as:

1. any single payment of at least \$30,000
2. any payment pursuant to a contract providing for a total expenditure of \$225,000 or more.

In Contracts where the Offeror will provide to the Authority, equipment, supplies, materials or parts (the “Materials”) which are to become the property of the Authority and where such Materials are subject to custom duties and/or excise taxes (“Taxes”), those Taxes related to importation of the Materials will not apply if : (i) the Materials are consigned to the Authority at a port other than the Virgin Islands, (ii) such consignment provides that the Offeror retains the risk of loss for the Materials until the scope of work of the contract is completed; (iii) the Offeror provides insurance against loss or damage to the Materials in the amount of 100% of the value of the Materials provided for the benefit of the Authority.

Attached please find further direction from the Virgin Islands Bureau of Internal Revenue regarding tax obligations for contractors working in the Virgin Islands.

PERFORMANCE BOND/LETTER OF CREDIT:

Offeror shall obtain from a surety authorized to conduct business in the United States Virgin Islands, a performance bond commitment letter, which letter must be submitted with its bid response. The Commitment letter shall contain a guarantee from the surety that it will, prior to execution of a contract, provide a bond in an amount as outlined in the table below:

\$0	to	\$1,000,000	-	100% of contract value
\$1,000,000	to	5,000,000	-	Not less than 80% of contract
\$5,000,000	to	10,000,000	-	Not less than 60% of contract
\$10,000,000	to	25,000,000	-	Not less than 50% of contract
\$25,000,000	and Over		-	\$10,000,000.00

The Bond shall remain in effect throughout the entire duration of the Contract and for a period of not less than one (1) year after the Authority has accepted the Work. Any change to the Scope of Work resulting in an increase in the contract consideration may at the Authority’s option require the amount of the performance bond to be increased in accordance with the table at Paragraph 22 of the General Contract terms.

A copy of the performance bond, the format of which will be provided by the Authority, must be presented to the Contracting Officer of the Authority prior to or upon execution of the Contract. Failure by Offeror to present its performance bond shall be grounds to rescind the Contract award.

Any bond provided must provide for the coverage of any and all changes to the contract that adds to the scope of work

Contractor may, in lieu of a performance bond, be allowed to provide a letter of credit upon the express written permission of the Authority's Contracting Officer. The request for this option must be contained in the bid document. The amount of the letter of credit must correspond with the amount required for the performance bond. The terms of the letter of credit must adhere strictly to the Authority's sample letter of credit, which will be furnished upon request. Any variations from the terms of the proposed letter, without the consent of the Authority's Contracting Office may, at the Authority's option, result in rejection of the letter of credit, and the Offeror shall be required to post a performance bond to secure performance.

BUSINESS LICENSE:

Offerors and its subcontractors must comply with the licensing laws of the Virgin Islands and obtain all licenses required for the performance of the project. The Offeror is advised to contact the Department of Licensing and Consumer Affairs ("DLCA") at (340)774-3130 for information on the requirements for obtaining a business license, information on whether their operation requires or does not require a business license, or to obtain a waiver of the business license requirement. Should Offeror wish to claim that the scope of the services being provided do not require it to obtain a Virgin Islands business license, Offeror must present to the Authority documented evidence from DLCA that the Offeror is not required to obtain a business license.

Copies of all necessary and applicable license(s), for the Offeror and its subcontractor or copy of a business license waiver shall be obtained by the Offeror and copies presented to the Contracting Officer concurrent with the execution of the Contract. Additionally, Offeror must supply the Authority with its taxpayer identification number. **Failure by Offeror to present its license(s) or that of its subcontractor prior to execution of the contract or within such other reasonable time as agreed to by the parties may be grounds for the Authority to rescind the Contract award.**

At contract execution, the Offeror, must, for itself and its subcontractor(s) present the following:

- a) a business license, or**
- b) a waiver letter from DLCA that a business license is not required, or**
- c) evidence, subject to verification, that an application for a business license has been submitted to DLCA for processing**

Failure to submit the required document(s) may, at the Authority's sole discretion, result in the contract award being rescinded.

LIQUIDATED DAMAGES:

The Authority shall assess liquidated damages solely for Offeror's delay in achieving contract completion. For each day that the project extends beyond the specified contract completion date, for any cause

other than excusable causes as defined in Paragraph 13a of the attached General Contract Terms, the Offeror and its sureties shall be liable to the Authority and shall be assessed a liquidated damage. (Liquidated Damages will be negotiated during the contract negotiations for this project).

The Authority reserves the right under this clause to forego its claim for liquidated damages for delays and to sue for actual damages incurred as a result of such delays.

INSURANCE:

The Offeror is required to obtain and maintain in effect insurance coverage pursuant to Exhibit A, Clause 20 of the General Contract Terms. In addition, the Offeror shall submit proof of insurance coverage to the Manager of Contract Administration upon award of the Contract. **Failure to provide the required insurance at contract execution shall be grounds to rescind the Contract award.** Errors and Omission Liability Insurance in an amount not less than \$2,000,000.00 is required for this project.

ENVIRONMENTAL RESPONSIBILITY:

The Offeror shall, in the performance of the Scope of Work, be responsible for complying with any federal or local laws and any Rules, Regulations and Guidelines issued by the U.S. Environmental Protection Agency (EPA), V.I. Department of Planning and Natural Resources (DPNR), and any other Federal or local regulatory agencies with regard to the discharge or spilling of contaminants prohibited by law during the performance of the Contract.

Offeror shall become familiar with and adhere to the policies and practices of the Authority regarding the discharge or spilling of oil, petroleum products, and any other policies applicable to the work as determined by the Authority.

In addition, Offeror shall be responsible, at its expense, for the clean-up of any and all substances, regulated or not, which it spills or causes to be spilled on the Authority's premises or work sites. The Offeror shall indemnify the Authority for any and all fines and penalties, assessed to the Authority as a result of Offeror's failure to adhere to EPA, OSHA and DPNR regulations and directives, and shall further pay all the Authority's costs, expenses and attorney's fees, in connection therewith. Additionally, the Offeror shall indemnify the Authority for the cost of cleaning up all spills and discharges if the Authority has performed such work on Offeror's behalf.

FEDERAL FUNDED PROJECTS

A.

The Federal Law requires that all contractors performing work on projects involving federal funds must be vetted to determine if they have been suspended or debarred from bidding on Federal Government Projects. Before you can bid on federal funded projects, you need to obtain a Dun & Bradstreet, or D-U-N-S, Number, a unique nine-digit identification number for each physical location of your business. D-U-N-S Number assignment is free for all businesses required to register with the federal government for contracts or grants. When bidding, Offerors must provide their Data Universal Numbering Systems Number (DUNS) at the time of submission of their bid or upon contract execution

Where federal funds are used for payment of contract services, contractors that are serving an active suspension, or are currently debarred by the Federal Government from the federal procurement process will not, absent compliance reasons, be allowed to participate in the Authority's procurement process. Any proposal submitted by an excluded contractor shall not be eligible for consideration, nor shall a debarred or suspended contractor be allowed to serve as an individual surety. Further, the Authority shall not, absent compelling reasons, award a contract to a contractor that subcontracts any portion of the Authority's work to any firm, company, individual or corporation that is serving an active suspension or is currently debarred by the Federal Government. During the procurement process, the Authority will check the System Award Management ("SAM"), a Federal Government owned and operated free website that consolidates the capabilities in Central Contractor Registration (CCR)/FedReg, Online Representations and Certifications Applications (ORCA) and the Excluded Parties List System (EPLS) to determine if contractors or any of its subcontractors have been debarred or suspended.

The Authority will make semi-annual checks on SAM to verify that all contractors that are performing work on federally funded projects of the Authority are in good standing and have not been suspended or debarred. All verification attempts shall be documented. If after contract award or during the performance of any contract, it is found that a contractor has been debarred or suspended, any active contract(s) of an excluded contractor will remain in effect unless such contract(s) is terminated for default or for convenience under separate provisions of the contract.

B.

In instances where Federal funds are utilized for the payment of the Scope of Work, the Contractor shall comply with the Davis Bacon and Related Acts (DBRA). These regulations can be found in-part from the Code of Federal Regulations (Title 29 CFR, parts 1,3,5,6 and 7).

The Davis-Bacon Act requires that all contractors and subcontractors performing work on federal contracts (and contractors or subcontractors performing on federally assisted contracts under the related Acts) in excess of \$2,000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits listed in the Davis-Bacon Wage Rate Determination for corresponding classes of laborers and mechanics employed on similar projects in the area. Davis-Bacon labor standards clauses must be included in covered contracts.

Prevailing wages are computed by the Department of Labor (DOL) and are issued in the form of a Federal Wage Decision. This decision includes a Wage Rate Determination for each work classification listed by construction type, for each county where work is performed. Each contractor and subcontractor hired must sign a contract which includes the Federal Wage Decision listing and a Wage Determination for its employees by worker classification.

Attached as Exhibit C to the RFP is a Notice of Federal Guidelines related to the Davis-Bacon Act and its requirements.

UTILIZATION OF SMALL, MINORITY and WOMEN's OWNED ENTERPRISES

The Offeror will take necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used in subcontracting when possible. Steps include:

- i. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

- ii. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- iii. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;
- iv. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises; and
- v. Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

SECTION 3 REQUIREMENTS

- A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. § 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD's regulations in 24 C.F.R. part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The Offeror agrees to send to each labor organization or representative of workers with which the Offeror has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the Contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The Offeror agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 C.F.R. part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 C.F.R. part 135. The Offeror will not subcontract with any subcontractor where the subcontractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 C.F.R. part 135.
- E. The Offeror will certify that any vacant employment positions, including training positions, that are filled: (1) after the Offeror is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 C.F.R. part 135 require employment opportunities to be directed, were not filled to circumvent the Offeror's obligations under 24 C.F.R. part 135.
- F. Noncompliance with HUD's regulations in 24 C.F.R. part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

- G.** With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. § 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible: (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

AFFIRMATIVE ACTION PLAN

In order to comply with **Section 3** and **Executive Order 11246**, the U.S. Department of Housing and Urban Development requires that all contractors develop and implement an Affirmative Action Plan. This plan is a series of forms and statements, which show specific steps taken by the contractor to promote Equal Opportunity and the utilization of area residents and business in the implementation of this Contract. **This plan must be submitted to VIWAPA upon contract execution.**

DRUG AND ALCOHOL TESTING FOR CONTRACTOR EMPLOYEES:

The use of drugs, alcohol, and unauthorized substances are prohibited on all the Virgin Islands Water and Power Authority's (hereinafter the "Authority" or "WAPA") business locations, power generating, transmission and distribution, and potable water facilities, workplaces, worksites, and parking areas (hereinafter "Premises").

- Drugs are any drug or controlled substance which is not legally obtainable under both local and/or federal law, including but not limited to marijuana, opiates, PCP (phencyclidine), cocaine, heroin, amphetamines, barbiturates, benzodiazepines, narcotics, hallucinogens, inhalants, designer drugs, and/or any substances and/or paraphernalia that are prohibited by federal or local law.
- Unauthorized substances are over-the-counter or prescription drugs that are used, possessed, purchased, transferred, dispensed, or distributed in the manner outlined below:
 - a. prescription drugs that are not prescribed and/or prescribed on an invalid prescription;
 - b. prescription drugs that are prescribed at non-therapeutic levels or used in a manner or quantity other than as set forth in the prescription;
 - c. over-the-counter drugs in a manner or quantity other than set forth in the directions; or
 - d. over-the-counter or prescription drugs in a manner that contradicts the direction or instructions for use.
- Alcohol is defined as a colorless volatile flammable liquid that is produced by the natural fermentation of sugars and is the intoxicating constituent of wine, beer, spirits, and other drinks.

All Contractors (and their subcontractors or agents) that furnish temporary employees that work alongside WAPA employees or that are assigned to work at any WAPA worksite must have a Drug, Alcohol, and Unauthorized Substance Testing Policy for their respective employees, which policy shall include reasonable suspicion and post-accident testing. In the event a Contractor, its agent or subcontractor do not have a Drug, Alcohol, or Unauthorized Substance Testing Policy, the Contractor, its agent or its subcontractor shall apply

the Authority's Drug, Alcohol, and Unauthorized Substance Policy, approved April 26, 2016, and shall confirm in writing, to the Authority's Project Manager, within ten (10) work days after the effective date of the contract that its employees and employees of its agents or subcontractors have been notified of and instructed on the Authority's Policy requirements. Failure by the Contractor, or its agent, or subcontractor to have a Drug, Alcohol, or Unauthorized Substance Testing Policy and to present evidence of such upon contract execution, or to agree to use the Authority's policy in the event they do not have a policy of their own; or to verify in writing their employees have been trained on the Authority's policy may be grounds to rescind the contract award or terminate the contract.

The Authority reserves the right to notify the Contractor if the Authority suspects that the Contractor's employee, agent or subcontractor employee is in violation of the Contract or the Authority's Drug, Alcohol, and Unauthorized Substance Policy. If notified, the Contractor shall immediately invoke reasonable suspicion or post-accident testing. The Contractor shall provide the Authority with a written report advising of the results of the testing, its investigation into the Authority's complaint and the status of the employee involved in the investigation. Any Contractor employee, or employee of a subcontractor, or agent that fails a drug, alcohol, or substance abuse test shall not be allowed to return to the Authority's

Premises until the Contractor provides written verification to the Authority that the employee has passed a subsequent test and is appropriately rehabilitated. Provided however, the Authority may require the removal from the jobsite any employee of a Contractor or subcontractor or agent if in the judgment of the Contracting Officer such removal is necessary to protect the interest of the Authority.

A copy of the Contractor, Subcontractor or Agent's Drug, Alcohol, and Unauthorized Substance Policy must be presented upon contract execution.

COMMUNICATION WITH AUTHORITY BOARD MEMBERS / EMPLOYEES / EVALUATION COMMITTEE MEMBERS

To preserve the integrity of the procurement process, and unless otherwise instructed, all communication, written or oral, regarding any RFP must be submitted through the Authority's Contract Administration Manager. Any direct contact made by an Offeror with the Authority's Board Members, Officers, Directors, employees or the members of the Authority's Evaluation Committee concerning the procurement in an attempt to influence the procurement is prohibited and may be grounds for disqualification.

CONFIDENTIALITY

Offerors are advised that any and all materials, information and documentation in any proposal submitted in connection with an RFP may become a record of the Authority and may be subject to the provisions of Title 3 V.I.C. § 881, et seq. (Public Records Act). The Public Records Act requires disclosure of public documents upon request of any citizen unless the public document is deemed to be confidential or otherwise exempted by law. To date no court of law has ruled on the application of this law to independent instrumentalities such as the Authority. "Confidential Information" includes all technical business, personnel, taxpayer or other information including customer or client information and details of customer accounts, however, communicated or disclosed to the

receiving party or its employees, relating to past, present and future research, development and business activities of the disclosing party and that has been identified as “confidential”. Both parties agree: (i) that the receiving party and its employees may disclose Confidential Information to others if required by law or with the prior written consent of the disclosing party; (ii) not to make use of Confidential Information other than for the performance of this Agreement; and (iii) that it will not use such information for its own advantage to the detriment of the disclosing party or its customers. Confidential information shall not include information which: (i) becomes generally available to the public (other than by the acts or omissions of the receiving party or its employees); (ii) was known prior to the date of this Agreement by “or becomes known to” the receiving party or its employees and was not obtained from any person under any obligation of confidentiality to the disclosing party, (iii) is independently developed by the receiving party; or (iv) is required to be disclosed pursuant to legal process or regulation.

CONTRACT EXECUTION

The final contract sent to the Offeror for execution must be executed and returned to the Division of Contract Administration within seven (7) business days of receipt. Failure by the Offeror to return the executed contract within the stated time may result in the contract award being rescinded. It is the responsibility of the Offeror to timely advise the Authority of any issues affecting contract execution so that the parties may discuss additional time for execution.

NOTICE TO PROCEED

The Notice to Proceed contains the commencement date of the contract work. The Notice to Proceed form must be executed and a copy presented to the Manager of Contract Administration prior to the final execution of the contract by the Authority’s Contracting Officer.



ATTACHMENT A

01100 - General Requirements and Scope of the Work

01100.1 General Description

This section covers the general project description, scope of the work, and supplementary requirements for the engineering, procurement, construction, and commissioning of the power plant expansion project at the Randolph Harley Power Plant located on the Island of St Thomas. In the event of technical conflicts, errors, or discrepancies herein, the requirements of the numerical sections of the technical specification take precedence over the Supplemental Technical Specifications located in Section 21000 and the Attachments.

The US Virgin Islands Water and Power Authority (VIWAPA, WAPA, Authority or Owner), which serves the islands of St. Thomas, St. Croix, St. John and Water Island, is developing additional capacity on the island of St. Thomas to meet VIWAPA's future power supply portfolio needs.

VIWAPA is requesting 36-40 MW of generating capacity (in dispatchable blocks no greater than 10MW each) burning both liquefied petroleum gas (LPG), in the liquid or gaseous state, and ultra-low sulfur diesel (ULSD). Storage for the LPG and ULSD is currently on-site, and no additional storage capacity is contemplated for this specification.

The project will be executed in two (2) phases. Phase one (1) will be the engineering and design while phase two (2) will be the procurement and construction. During phase one (1), a contract (Engineering Agreement) will be issued for the detailed engineering package that will clearly define the scope of work (SOW) for the procurement and construction phase. During phase two (2), and upon approval of the engineering package by VIWAPA and a local professional engineer (PE), the successful EPC Contractor and VIWAPA will negotiate the final cost for the procurement and construction phase. Upon successful negotiations, the EPC Contractor and VIWAPA will enter into a contract for the procurement and construction phase of the Randolph Harley Power Plant Expansion Project. All bids shall be submitted with a not-to-exceed project cost.

Contractor shall develop a project schedule specific to their offering and include as part of their proposal.

In this specification "Facility" refers to the new equipment and structures being added as part of this project.

For reference, the existing combined cycle plant on the site is no longer in service.

General scope of work descriptions and project requirements are located in this Section 01100 of the specification documents; further specifications are located in Sections 01101.

1100.1.1 Project Description

1100.1.1.1 New Generation

The project will consist of reciprocating internal combustion engine (RICE) units or combustion turbines, henceforth referred to as "thermal units," ranging from 7 MW to 10 MW each in accordance with one of the following options:

Generation Option 1: RICE Plant (further defined in Section 01101.3)

Generation Option 2: Combustion Turbine Generator - Simple Cycle (further defined in Section 01101.4)

Generation Option 3: Combustion Turbine Generator - Combined Cycle (further defined in Section 01101.5)

The power generators and BESS equipment are proposed to be located at an existing building^[1] that is built to Virgin Islands' code and VIWAPA's specification and standards, **unless an alternative site is recommended by the potential bidder(s) and agreed to and confirmed by VIWAPA.**

Contractor is allowed to submit bids for any or all generation options listed above.

It is the Contractor's responsibility to determine or confirm proposed units will work within the existing infrastructure (foundations, utilities, conduits, etc.). The net electrical output of the Facility shall be at the ambient conditions defined in Section 21000 – Technical Supplemental Specifications.

1100.1.12 Battery Storage Alternative.

Contractors shall provide pricing for battery storage with applicable controls systems at the Randolph Harley Power Plant site, sized for 9 MW/18 MWh. The use case for the Battery Energy Storage System (BESS) should focus on spinning reserve and voltage/frequency regulation. This energy storage facility would be in addition to the thermal units at the Facility discussed herein. Contractor shall coordinate the location of the energy storage equipment with the Owner.

In addition to the BESS defined above, Contractor may propose energy storage alternatives for consideration that meet 9 MW/18 MWh.

1100.1.2 Scope of Work

The equipment, materials, and services described in the various design criteria and system definitions shall be incorporated into a fully functional LPG / ULSD power plant. The scope of work shall include the design, engineering, procurement, construction, construction management, commissioning, operator training, demonstration, and testing of the project. The Contractor shall provide or cause to be provided materials and equipment, machinery, tools, labor, transportation, construction fuels, chemicals, construction utilities, and administration and other services and items required to complete the project. The Contractor shall be responsible for engineering, design, procurement, delivery, receiving, unloading, storing, installation, commissioning and testing of all equipment.

Notice to Proceed

Notice to Proceed (NTP) will be issued in two steps. NTP 1 will allow for the EPC Contractor to begin their initial design functions and proceed with work necessary to secure all environmental studies and permits necessary to move the project forward. The EPC Contractor will also be allowed to set up offices and work on any and all submittal reports necessary to meet the requirements of this RFP. No construction activities will be allowed until issuance of NTP 2 by VIWAPA.

NTP 1 will be limited in allocated funds. The EPC Contractor will be allowed to begin design work and to develop the required submittals associated with the project as outlined in the Engineering Agreement.

The Scope of Work is further detailed below. This phased approach will allow for work to be delineated for environmental review purposes between the engineering/design phase and the procurement/construction phase.

1100.1.2.1 Engineering and Design.

Contractor shall perform all engineering and design work, required for the Facility, and offsite utilities specified in these contract documents.

Within one (1) month following award of the Contract, Contractor shall develop and submit to Owner a

facility design manual defining the design criteria for the Facility. The design manual shall be subject to review and approval by Owner with respect to level of detail and conformance with the requirements of the Contract. Contents of the facility design manual shall include the following items as a minimum:

- Design criteria for each engineering discipline
- Results of the site subsurface investigation
- Contractor's equipment and system designation methods
- List of systems and system designations
- Water/mass balances
- Cycle heat balance at minimum and 100% of the net power output guarantee point
- Piping and instrument diagrams
- Auxiliary load lists
- Equipment lists
- Generator capability curves
- Emissions data

An up-to-date printable index listing all Contractor drawings by number, title, and revision shall be maintained and available to Owner at all times. An updated copy of the index shall be issued to the Owner in the monthly report. Electronic copies shall be provided in a searchable format.

All vendor drawings shall be assigned a project drawing number. An up-to-date printable index listing all vendors' drawings received shall be maintained and be available to Owner at all times. The listing shall show the Contractor assigned number, vendor's drawing number, title, and revision number. An updated copy of the index shall be issued to the Owner in the monthly report. Electronic copies shall be provided in a searchable format.

All engineering and design calculations prepared by Contractor during the design of the Facility shall be made available for Owner to review as requested. Such calculations shall include architectural, civil, electrical, mechanical, instrumentation/control details, and any other calculations required for the engineering and design of the Facility.

The Facility shall be designed and fabricated in accordance with all United States standards and local regulations pertaining to the electric power industry or the equipment and services furnished pursuant to the Contract.

Contractor shall designate an Engineering Manager who will be responsible for the overall management and administration of engineering and design work.

1100.1.2.2 Procurement.

Contractor shall be responsible for the procurement, handling, and delivery to the site of all equipment and services, including, without limitation, locating, negotiating, inspecting, expediting, shipping, unloading, receiving, verifying, customs clearance and claims. Contractor shall also be responsible for unloading and onsite storage of Owner Supplied Materials and Equipment, if applicable. Storage of Owner Supplied Materials and Equipment shall be in accordance with the manufacturer's requirements.

Contractor shall store all equipment at the project site in accordance with Good Utility Practice and equipment manufacturer's recommendations. Contractor shall take all actions necessary to preserve equipment manufacturer warranties. Contractor shall use reasonable measures to keep the equipment free from dirt and debris. Contractor shall perform all maintenance activities, including without limitation, lubrication checks, rotations, temporary heater operation, and megger checks, to ensure compliance with equipment manufacturer recommendations. Contractor shall maintain a log of such maintenance activities,

such log to include the dates of such activities and the signatures of the personnel performing such activities. Such log shall be available to Owner for review at all times.

Contractor shall be responsible for the procurement of all bulk materials, permanent or temporary, needed for the proper erection of systems and components of the Facility. This includes, but is not limited to, all grading and fill material, foundation materials (including piling, concrete, rebar, and forms), steel, pipe, hangers, conduit, cable, cable tray, and insulation and lagging.

All technical portions of purchase orders and subcontracts for permanent engineered equipment shall be prepared in accordance with Contractor's standard practices and numbering system.

Contractor shall provide to Owner, for review and comment, all technical sections of the bid specifications for permanent equipment and materials incorporated into the Facility. Contractor shall provide record copies of conformed technical specifications for such equipment and materials.

Promptly after receipt by Contractor, Owner shall have access to shop inspection reports, shop and field performance test reports, equipment data sheets, operations and maintenance manuals, and performance curves and data for all permanent equipment as described in Supplemental Specification Section Q500. Contractor shall provide a reference list with their proposal documents of similar installations for the proposed technology.

1100.1.2.3 Construction

Contractor shall be responsible for all erection and installation work. Contractor shall manage the performance of all subcontractors and shall be responsible for the quality and time of performance for all subcontract work.

Contractor shall be responsible for all indirect construction costs including, without limitation, costs for personnel and supervision, employee travel and per diem, construction equipment (including mobilization and demobilization), material, consumables, utilities, facilities, tools, apparatus, temporary buildings, temporary utilities, scaffolding, project job office expenses, quality control testing (such as for concrete and welding), and demobilization costs.

Contractor shall be responsible for all site clearing, grubbing, stripping, grading, excavation, dewatering, backfill, foundations, and piling. Contractor shall be responsible for the offsite disposal of all waste material from clearing and grubbing of the site. Excavated materials shall be utilized in site grading design to achieve balanced earthwork quantities or disposed offsite.

Contractor shall be responsible for all air blows on air and fuel piping, including all temporary equipment, piping, silencers, targets, and water treatment chemicals. Contractor shall furnish to Owner, for review and approval, the air blowing procedures and acceptance criteria proposed by Contractor no less than fourteen (14) days prior to Contractor commencing such air blows.

Contractor shall be responsible for managing all subcontractors on the site, controlling the flow of traffic and personnel entering and leaving the site, and coordinating the use of heavy equipment and rigging equipment.

Any work found to be in non-compliance with any drawing, specification, standard, or code, which requires any type of engineering evaluation to determine acceptability for use or corrective action to bring into compliance, shall be documented and dispositioned by appropriately trained and authorized personnel. Written documentation of the non-compliance shall be provided to Owner at the time of discovery. Written

documentation of the evaluation and disposition by Contractor shall be promptly provided to Owner.

During construction, Contractor shall keep on file one set of current "conformed-to-construction records" ("as-built") drawings. Such drawings shall be available to Owner for review at all times. The information contained in these drawings shall be incorporated into subsequent formally issued revisions of these drawings. The information contained in these drawings shall be incorporated into the final "conformed-to-construction records" drawings issued to Owner in both native and PDF format as a requirement for Final Completion.

Contractor shall designate a resident Construction Manager who will be responsible for the overall management and administration of the Facility's construction effort. This shall include supervision and execution of subcontracts, maintenance of safe working conditions, and insuring that contract terms and conditions are fulfilled and that the installation is in accordance with plans and specifications.

All temporary construction office facilities, furnishings, janitorial services, and supplies shall be furnished by the Contractor. Contractor shall also provide furnishings and services for these trailers including appropriate office furniture, copier/fax/scanning/printing machines, Internet connections, phones lines, power, janitorial services, potable water and sanitary service, and drinking water as required for Contractor's use. All facilities must be installed, functionally tested, and permitted prior to occupying.

The Contractor shall be responsible for site security during the construction of the Facility including inspection, walk through, and daily door lock check at hours identified by Owner.

The Contractor shall be responsible for all construction laydown space requirements; Owner preference is to utilize off-site laydown areas which shall be procured by the Contractor.

1100.1.2.4 Commissioning and Functional Testing

Facility commissioning is defined as all those activities, procedures, and tests required to start-up and bring installed systems and equipment to a state of readiness for contract testing and subsequent Owner acceptance and commercial operation. Facility commissioning shall include all prerequisite component and system testing, cleaning, flushing, initial operation, mechanical testing, and electrical testing, including, but not limited to:

- Hydrostatic testing of piping and pressure vessels and leak testing of tanks
- Equipment alignment checks
- Balancing of rotating equipment, as required by equipment supplier technical service representatives
- Chemical cleaning, flushes, air blows for components and systems, as required
- Lubrication checks
- Inspection, stroking and adjustment of all manual valves, motor operated valves and control valves, and setting of torque, limit, and position indicating switches
- Setting of all relief and safety valves that are not factory certified
- Testing and calibration of all instrumentation (e.g., meters, relays, gauges, transmitters, switches, emergency shut-down devices etc.) that are not factory calibrated
- Testing and tuning of all analog and digital controls and control loops; verification of indications, alarms, human-machine interface (HMI), and annunciators in each thermal unit/balance of plant (BOP) local control system
- Verification of analog and digital interlocks and protective devices and schemes
- Verification and testing of protective devices (relays, thermal overloads, etc.) including transformer protection, medium/low voltage bus protection, generator protection, and motor protection

- Electrical wire and cable termination checks
- Megger, continuity, and high potential tests (as applicable)

Facility commissioning shall be completed on a system-by-system basis. Appropriate documentation, referred to as System Turnover Packages, verifying successful commissioning of systems and equipment shall be submitted to the Owner on a system-by-system basis for review and approval prior to Acceptance Testing Readiness. Turnover packages shall be available 60 days before the first scheduled turnover for Owner review and comment.

The System Turnover Package shall contain all information and data relevant to the design, construction, and commissioning of a system. The information shall be contained in a heavy duty three ring binder provided in PDF format and organized in a consistent fashion for each system. System boundaries shall be defined using project P&IDs and one-line drawings.

Each System Turnover Package shall contain a turnover control sheet. The turnover control sheet shall have signature blocks which, when signed and dated, shall signify the formal transfer of lockout/tagout control for a system from the construction manager to the commissioning manager and from the commissioning manager to Owner.

Each System Turnover Package shall contain, as a minimum, the following items, if applicable for the given system:

- Table of Contents
- List of all system components
- Hydrostatic, pneumatic, and leak tests (procedures, acceptance criteria, and attested results)
- Piping system velocity flushes (procedures, flow paths, acceptance criteria, and attested results)
- List of piping non-destructive examination (NDE) criteria and results
- Initial equipment alignment, lubrication, and adjustment
- High potential and megger tests
- Wiring integrity and continuity tests
- Wire termination checks
- Equipment and system commissioning data (pressures, temperatures, flow rates, currents, voltages, vibration levels, etc.)
- System P&IDs with system boundaries marked
- System control wiring diagrams
- Circuit verification records (loop checks), including verification from field device to control system operator interface
- System logic diagrams or applicable RICE control system configuration printouts
- System defect/deficiency list

Functional testing shall be in accordance with requirements indicated in Section 01610.

Facility commissioning and functional testing shall be conducted in accordance with a written plan to be submitted to Owner for review not less than sixty (60) days prior to initial commissioning activities.

Contractor shall provide to Owner, week-ahead and day-ahead schedules for any commissioning activities that involve the delivery of electric power to the grid to allow Owner to coordinate such delivery with third parties. Such schedules shall include reasonably accurate estimates of the quantity of electric energy to be delivered on an hour-by-hour basis. Contractor shall promptly provide any revisions to such schedules. Contractor shall cooperate with Owner in meeting any scheduling requirements of third parties.

Contractor shall designate a resident commissioning manager who shall be responsible for implementing the Facility commissioning and functional testing program.

1100.1.2.5 Scheduling and Progress Reporting

Contractor shall plan, schedule, and report the progress of the work using the critical path network scheduling method. Contractor shall prepare and maintain a detailed project schedule using Primavera Project Planner software, or equivalent software approved by Owner. The project schedule shall be developed in consideration of the durations and interdependence of all activities of the work, including engineering, procurement, manufacturing, delivery, construction, startup, commissioning, and testing activities. The project schedule shall be resource loaded with engineering and field man-hours and construction commodity quantities. The project schedule shall identify the critical path (least float) chain of activities.

Within fifteen (15) days following award of the Contract, Contractor shall submit for Owner's review and comments the project Level 3 schedule. The Contractor shall incorporate all reasonable comments provided by the Owner. Thereafter, the project schedule shall be updated and submitted to Owner on a monthly basis (or more frequently if necessary) reflecting actual progress for prior activities and its effects on future activities. Each submittal of the project schedule shall be made in hard copy form and electronic form (in the native format of the scheduling software), provided however, it may exclude resource loading information.

The Level 3 schedule shall include the following minimum of detail. The detailed engineering and procurement schedule shall support the construction and startup plan. It shall contain sufficient detail to identify critical path engineering deliverables, equipment deliveries, material installation items, and key construction sequences to support startup. This CPM schedule shall be based on the standard logic showing the start and finish dates of all deliverables to be produced during the life of the project, including activities for constructability studies or reviews. Schedule activity details shall be added to result in activities with durations that do not exceed 1 month, except in those instances where the smallest logical division of the work is greater than 1 month (e.g., fabrication of long-lead equipment). The engineering and procurement activities shall be connected to the construction and startup activities with suitable logic driven relationships.

Plan dates (also called target dates) shall be established for every activity in the form of a base line schedule (plan/target date schedule). It shall contain construction and startup activities showing the installation and commissioning of all discrete components of the project.

Contractor shall prepare a weekly progress report to accurately describe the construction activities which occurred during the most recently completed week. The report shall include, as a minimum, sections on the following subjects:

- Summary of major construction activities completed or commenced since the last weekly progress report.
- Summary of significant activities planned for the upcoming period.
- Total labor hours worked.
- Installed quantities of materials such as concrete, pipe, wire, conduit, etc.
- Equipment deliveries received since the last weekly progress report.
- Equipment deliveries expected during the upcoming period.

The weekly progress report shall be submitted to Owner by Tuesday of the week following the reporting week.

Contractor shall prepare a monthly progress report to accurately describe the current status of the project in

the main categories of engineering, procurement, construction, and commissioning. The report shall begin with an executive summary and shall include, as a minimum, sections on the following subjects:

- Summary of major engineering, procurement and construction/commissioning activities completed since the last progress report.
- Summary of significant engineering, procurement and construction/commissioning activities planned for the upcoming period.
- Procurement status including an aggregate list of purchase orders and contracts executed, including date of execution.
- Expediting status including an aggregate list of equipment delivered to the site, including date of delivery and acceptance by Contractor.
- Schedule analysis and overview, including the most current project schedule, milestones met, milestones not met and reasons why, targeted milestones for the next month and next ninety (90) Days, slipped dates, plan to recover slippages, etc.
- Identification of any construction quality problems.
- Identification of any safety accidents and events.
- List of any problem areas and a plan for correction.
- Updated list of significant action items for Contractor and Owner.
- List of approved and pending Change Orders.
- Drawing list with current revisions and approval dates, as appropriate.
- Construction photos with captions.
- On site labor statistics including Contractor and Subcontractor craft man-hours, broken down by craft.
- Status of Contractor permits.

The monthly progress report shall be submitted to the Owner by the fifth day of each month following the reporting month.

1100.1.2.6 Operator Training

The Contractor shall provide training for Operator's personnel. Such training will be conducted to familiarize operating and maintenance personnel with each of the various operating systems, the major mechanical and electrical equipment, and the control systems.

Contractor's training shall be provided for 20 personnel. Applicable vendors shall provide training on major systems and equipment. At a minimum, vendors shall provide training for the thermal units, steam generator, steam turbine, auxiliaries, air pollution controls, and control system as applicable.

The total scope of each class will include approximately ten (10) days of training. The logistical scheduling of the classes will be determined by the Contractor so as to limit the mobilization and cost of the instruction provider. All training materials need to be submitted to the owner 20 days before training commences.

The training program shall consist of a combination of "hands-on" training and formal classroom sessions. The classroom sessions shall be completed prior to the commencement of the Facility's commissioning.

Contractor shall provide all training aids and facilities, as required, such as, projectors, flip charts, and whiteboards. As part of the training program, each member of the operating and maintenance staff will be provided with copies of the P&ID's, the electrical single-line diagram, the major equipment list, and the system definitions. The trainees will be expected to "walk down" each of the systems using these reference documents to establish the location and function of all equipment and major control components in the Facility.

The classroom training will be conducted by knowledgeable instructors in a formal classroom setting. The classroom training sessions are intended to provide concentrated instruction in the design, capability, operation, inspection, and control of the equipment and systems within the Facility.

As a supplement to the classroom training, additional training will be accomplished in the form of “hands-on” indoctrination during the commissioning of the Facility. As part of this phase of the training, the operating and maintenance personnel will be expected to work with and provide assistance to the Contractor during commissioning of the Facility. In this way, commissioning will become an extension of their actual work.

The Contractor’s training program will assume that the trainees have some knowledge and experience with the types of systems and equipment to be found in power plants. The program is not intended to qualify operators having no prior knowledge and experience or training.

1100.1.2.7 Miscellaneous Materials Scope.

Miscellaneous Materials Scope			
Item	Description	Contractor	Owner
1.	All nuts, bolts, gaskets, special fasteners, backing rings, and other accessories required for installation of components and furnished equipment.	X	
2.	All coupling guards, belt guards, and personnel safety items required for furnished equipment.	X	
3.	All valves and instruments required for automatic control and monitoring of the furnished system (or for manual control and monitoring of the system).	X	
4.	All instrument, power, and control wiring and raceway integral to equipment, skids, or packages furnished. Junction boxes shall be furnished with terminal blocks and internal wiring to these terminal blocks for equipment requiring external connection.	X	
5.	Electrical and control wiring to connect furnished equipment terminal points to the plant electrical and control systems.	X	
6.	Motor controls and starters for furnished equipment.	X	
7.	Ground pads and lugs for furnished equipment, skids and structures (minimum of two per skid or structure).	X	
8.	Heat tracing and insulation of pipe and devices to furnished equipment.	X	

Miscellaneous Materials Scope			
Item	Description	Contractor	Owner

9.	Recommended spare parts for thermal units and auxiliary systems. Spare parts required for startup are the responsibility of the Contractor. The Owner shall be responsible for operating spare parts after system turnover. Contractor shall provide a list of spare parts for Owner review.	X	X
10.	One set of maintenance tools required for dismantling, maintenance, and overhaul of the equipment. The tools shall be shipped in separate, heavily constructed wooden boxes provided with hinged covers and padlock hasps.	X	
11.	The use of all special tools and hardware required for erection of the equipment, exclusive of the maintenance tools furnished. Erection tools shall remain the property of Contractor, and all shipping costs to and from the jobsite shall be at Supplier's expense.	X	
12.	One set of consumable materials required for erection, startup and testing.	X	
13.	Permanently attached identification tags for all equipment and devices provided in accordance with Technical Supplemental Q400.	X	
14.	Shop applied coating including but not limited to finish paint on all shop fabricated equipment, ancillary skids, material, structures and ancillary skid systems.	X	
15.	Painting/coating	X	
16.	Touchup paint for field	X	
17.	Solvents and cleaning materials.	X	
18.	Lifting eyes and lugs for offloading and setting equipment.	X	
19.	Permanent foundations/tie-down pads	X	
20.	Leveling blocks, soleplates, thrust blocks, matching blocks, and shims.	X	
21.	Anchor bolts, soleplates, or other items required to be permanently cast into concrete.	X	

1100.2 Owner-Furnished Equipment

All equipment for the scope of work defined herein shall be provided by the Contractor; no Owner- Furnished equipment is anticipated.

1100.3 Codes and Standards

The design and specification of work shall be in accordance with applicable national and federal laws and regulations, and local codes and ordinances. The codes and industry standards used for design, fabrication, and construction are listed below and will be the editions in effect, including all addenda, as stated in equipment and construction purchase or contract documents. Other recognized standards may also be used as

design, fabrication, and construction guidelines when not in conflict with the listed standards.

- American Concrete Institute (ACI), when no local codes prevail
- American Institute of Steel Construction (AISC), when no local codes prevail
- American Iron and Steel Institute (AISI), when no local codes prevail
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society for Nondestructive Testing (ASNT)
- American Society for Testing and Materials (ASTM)
- American Society of Civil Engineers (ASCE). ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Water Works Association (AWWA)
- American Welding Society (AWS)
- Compressed Gas Association (CGA)
- Concrete Reinforcing Steel Institute (CRSI) when no local codes prevail
- Cooling Tower Institute (CTI)
- EN 10080 Steel for the Reinforcement of Concrete
- EN 12620 Aggregates for Concrete
- EN 197-1 Cement-Part 1: Composition, specifications and conformity criteria for cements
- EN 197-2 Cement-Part 2: Conformity Evaluation
- EN 206-1 Concrete-Part 1: Specification, performance, production and conformity
- Hydraulic Institute (HI)
- Illuminating Engineering Society (IES)
- Institute of Electrical and Electronics Engineers (IEEE)
- Instrument Society of America (ISA)
- Insulated Cable Engineers Association (ICEA)
- International Building Code (IBC)
- International Plumbing Code (when no local codes prevail)
- National Association of Corrosion Engineers (NACE)
- National Electric Code (NEC)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
- National Sanitation Foundation (NSF)
- Occupational Safety and Health Administration (OSHA)
- Steel Structures Painting Council (SSPC)
- Virgin Island Building Code (VIBC)

1100.4 Drawings and Technical Attachments

This article lists the drawings and other technical attachments that have been prepared for the work under these specifications.

Drawing No. or Other Designation	Rev. No.	Title
Attachment 1		Emissions Table
Attachment 2		Randolph Harley Power Plant Project Boundaries
Attachment 3		Randolph Harley Power Plant Electrical One-Line
Attachment 4		Bid Submittals

Attachment 5		Schedule of Submittals
Attachment 6		Randolph Harley BTT3 Specification
Attachment 7		Randolph Harley Generator Building Floor Plan (Option 1)

1100.5 Supplemental Specifications

Technical supplemental specifications that are applicable to the work covered under this technical specification section are identified and included in Section 21000.

01101 – Additional Project Requirements

1101.1 Major Facility Features

The below paragraphs contain general descriptions of the major features of the proposed LPG/ULSD power plant Facility. This information is not intended to be a complete, exhaustive listing, but is provided for convenience to the Contractor in developing an understanding of the overall scope of the project work.

The Site Boundary Drawings referenced in Section 01100.4 Drawings and Technical Attachments show the overall space available at the project site. The Contractor may arrange Facility equipment and structures as necessary to provide an optimized arrangement at the site.

The Facility shall consist of LPG/ULSD-fired, thermal units and associated BOP equipment.

The Facility shall be capable of operating for 24 hours at full load capacity and shall be capable of multiple starts each day. The Facility shall be in compliance with the requirements of all National and Local Codes and standards.

All RICE units shall be located indoors with acoustic provisions for noise reduction. All combustion turbine units shall be located in enclosures with acoustic provisions for noise reduction. The exhaust of each thermal unit, including silencers, shall be directed to atmosphere through exhaust stacks.

The thermal unit equipment cooling shall be provided from a closed cycle cooling system and a fin-fan type water to air heat exchanger with electric fan motors for each cell in the heat exchanger.

The existing sea water infrastructure currently does not have any pumping capability for cooling. If sea water is required for cooling of the Contractor's selected technology, the Contractor shall perform an assessment of the sea water intake infrastructure and make the final determination through prudent engineering of what modifications, enhancements, and construction is necessary to have this system operate based on the design and requirements of their proposed technology.

BOP equipment heat exchangers shall utilize air cooled heat exchangers for the individual equipment. All batteries and switchgear shall be located indoors.

All equipment and materials furnished pursuant to these Contract Documents shall be new and unused as of the delivery of such equipment and materials. All equipment and materials shall be of a proven commercial design and suitable for the intended service.

Redundancy shall be provided for all pumps, motors, compressors, fans, and automatically actuated valves. Redundancy is also required on all lube, hydraulic and liquid fuel filtration skids. Redundant equipment shall be installed in parallel such that a single failure will not result in the loss of generation.

Vibration sensors with alarms are required on critical components and shall be provided with adequate redundancy.

The Facility shall be designed to achieve a 30-year design life and shall be suitable for operation in a tropical salt-laden environment.

The entire Facility shall be designed to withstand a Category 5 hurricane and be available for dispatch immediately following the event.

1101.1.1 Facility Operational Requirements

Operating mode and basic control philosophy are listed below:

The Facility shall be designed to operate in daily cycling mode (multiple starts/stops daily).

The Facility control system shall be designed to automatically control voltage and frequency during loading and unloading in isochronous (grid isolated) mode, and automatically control load in droop (grid-connected) mode.

The Facility shall be designed to run continuously at Full Load over the entire range of ambient conditions.

The Facility shall be capable of running in a stable and controllable manner over the entire operating range from minimum load up to Full Load.

Performance of the Facility shall be optimized for operation at Full Load.

The Facility shall be capable of operating on any mixture of LPG and ULSD from 100% LPG to 100% ULSD and be capable of transferring, preferably under load, between the two during operation.

The thermal unit control system shall incorporate the BOP process equipment (separate control systems are not acceptable). All control and interlock functionality shall be designed in the unit control system. BOP electrical equipment control shall be added to the existing Randolph Harley control system. Contractor is responsible for this interface, inclusive of

new equipment, programming, etc. The unit(s) and other BOP equipment shall be designed to be operated primarily from the local HMI operator station(s) to be located in the existing control room.

Full Load is defined as the maximum output (all units running) over the entire range of ambient conditions.

1101.1.2 Emissions Control

Each thermal unit shall be fully compliant with the terms and conditions of the authorization(s) to construct and/or operate the unit(s) as issued by the U.S. Virgin Islands Department of Planning and Natural Resources,

Division of Environmental Protection and/or the United States Environmental Protection Agency (USEPA), Region 2, including, but not limited to, all emission limits, operational limits/conditions, and monitoring requirements.

Each thermal unit shall be fully compliant for operation as a new non-emergency unit in accordance with 40 CFR Part 60 Subpart IIII and 40 CFR Part 63 Subpart ZZZZ.

Additionally, each thermal unit shall be fully compliant with emission limits indicated in Attachment 1, Design Emissions Limitations to Secure Minor Source Permit.

Each thermal unit shall be fully compliant with the terms, conditions, and requirements of the aforementioned permit(s) and emissions standards when burning all applicable fuels, including ULSD and LPG. Offeror will be responsible for any combustion and/or post-combustion systems, including but not limited to air quality control systems, required to achieve compliance with all applicable emission limits.

1101.1.3 Fuel Specification

The Facility shall be designed to operate on LPG/ULSD. It shall be the Contractor's responsibility to ensure that all equipment and materials, and design provisions selected for equipment and systems using this fuel source, are suitable for heavy industrial marine application without component or coating failure and without requiring frequent repair, cleaning, or replacement.

1101.1.4 Electrical System Interconnection

The power generation and distribution system for the Facility shall be connected to the existing system as shown on Attachment 3. The Contractor shall provide all medium voltage switchgear, lower level voltage power transformers, uninterruptable power supply (UPS), and lower level voltage switchgear/motor control center (MCC) within their scope as necessary to support operation of the Facility including safe startup and shutdown.

Contractor shall coordinate with Owner regarding revenue metering, protection, and breaker control functions between the existing Randolph Harley Power Plant and VIWAPA distribution. The Contractor shall provide protection against closing a generator breaker into a dead bus.

The thermal unit package starting system and all associated equipment shall be provided by the Contractor.

1101.1.5 Instrumentation and Controls

Instrumentation shall be provided for control, monitoring and operation of the entire Facility for all modes of operation in a safe and efficient manner. The instrumentation shall be provided complete with associated process connection/piping, instrumentation cables, local instrument enclosures/racks and junction boxes. Control system, CEMS, and HMI factory acceptance test (FAT) must be witnessed and accepted by the Owner.

A single common control system shall be provided for data acquisition, modulating control (continuous), discrete control (sequential), alarm monitoring, information display, system data reporting, short term data

storage and long-term data storage of the entire facility during all operating conditions. The control system shall include cabinets, processors, input/output (I/O) hardware, associated HMI system (comprising of servers, workstations, printers etc.), engineering work station, software licenses, satellite clock time

synchronization system, network hardware (switches, routers, media converters, network cables, etc.), and power supplies as required for a fully functional system.

The control system design shall incorporate functional and component redundancy to ensure maximum reliability during system operation, so that no single component failure, with the exception of individual I/O modules, shall affect the control and data acquisition functions of the system. The Owner retains ownership of all software licenses needed to configure, monitor, and maintain the system.

Operating/engineering workstation HMIs shall be located in the existing Randolph Harley control room. Additionally, monitoring and control shall be provided locally for each generation unit.

1101.1.6 Site Structures and Buildings

Conceptual Site Arrangement drawings shall be provided by the Contractor with the bid. Buildings shall be of adequate hurricane resistant construction subject to owner review and acceptance. Allow for three (3) feet of clearance for equipment access around all equipment.

01101.1.6.1 HVAC. Building ventilation and cooling shall be provided as required to meet the control and electrical equipment specifications and VIBC energy code requirements.

1101.1.7 Fire Protection

A fire protection system shall be furnished and include both automatic and manual features to provide alarm, detection, and suppression capability for the Facility, consistent with national, local and VIBC code requirements. The fire protection system must be equipped with remote monitoring from the Randolph Harley Control Room.

It is not the intention to specify herein all details of design and construction for the fire protection system. The Contractor shall ensure that the equipment has been designed, fabricated, and erected in accordance with all engineering codes, standards, industry standards, governmental regulations applicable to the specified service, and all insurance company requirements.

1101.1.8 Gas Detection and Protection

Gas detection systems shall be installed in areas for which flammable or toxic gasses have the potential to accumulate in hazardous concentrations. Where gas detection systems are installed, they must be equipped with both local and remote alarm notification from the Randolph Harley Control Room.

1101.1.9 Facility Water Supply

Service and potable water shall be provided from the existing facility. Contractor shall coordinate with the Owner to determine adequate capacity and pressures to the various Facility users, such as sealing, flushing, wash-down, safety shower/eyewash stations (if required), and other water users throughout the Facility.

It shall be the Contractor's responsibility to ensure that all equipment and materials, and design provisions selected for equipment and systems in contact with water from this source, are suitable for reliable long-term operation without component or coating failure and without requiring frequent repair, cleaning, or replacement.

Although demineralized water treatment is not part of this scope of work, 200 gpm of demineralized water is available for water injection. Demineralized water transfer pumps, piping, valves, etc. from the existing water treatment system to the Contractor's equipment is part of this scope of work.

Contractor to provide demineralized water requirements with their proposal.

1101.1.10 Seismic and Wind Design

Seismic and wind design for the Facility shall be based on the requirements specified in the VIBC and/or IBC 2015, whichever is more stringent. Facility is located in a hurricane prone region and shall be classified as category V, essential facility required as an emergency backup facility to remain operational following the code defined maximum considered environmental event.

1101.1.11 Sound Attenuation

All equipment shall conform to the near-field requirements set forth in the V100 Supplemental.

1101.1.12 Wastewater Discharge Requirements

A wastewater collection and treatment system shall be provided to collect, treat (as required), and discharge the Facility wastewater in accordance with the Facility Waste Water Discharge permit.

The Contractor shall include sanitary drains and vent systems, oil/water separator(s), etc. required for a complete wastewater discharge system.

1101.1.13 Facility Tie-In Locations

All equipment up to the identified tie-in locations to offsite utilities required for operation of the Facility shall be furnished and installed by the Contractor.

These utility tie-in locations include, but not limited to, the following:

- 13.8 kV electrical connection
- Controls interface
- Service water supply
- Potable water supply
- Waste water discharge
- Sanitary waste discharge

The Contractor shall provide all materials and construction required to complete the connections to the Facility terminal points.

1101.2 General Clarifications

The Facility shall be designed to meet the requirements of the Owner obtained permits. Contractor shall be responsible for all demolition, construction, and building permits. Construction permits will be the responsibility of the Contractor, and the air permits will be applied for by the Owner after the technology is selected and the specifications are known regarding the emissions.

Transportation of all material and equipment to and from the jobsite is solely the responsibility of the Contractor. Costs to upgrade roads, bridges, railroads, etc., outside the project site for equipment transportation to the Jobsite shall be the responsibility of the Contractor.

The Contractor shall complete a survey of the property and establish permanent benchmarks to support the development of the site and design of the Facility.

Construction power and water is available at the Facility. Contractor to coordinate requirements with the Owner prior to commencement of work.

All construction, storage, and staging activities shall be confined to the Facility boundaries, unless otherwise facilitated by the Contractor.

Land, rights-of-way, and the operating permits as defined in the Division of Responsibility shall be provided by the Owner. Contractor shall be responsible for obtaining all other permits required for construction of the Facility, including associated fees.

The Contractor shall conduct a detailed geotechnical and underground utilities investigation as part of the scope of work to better define soil conditions and support detailed design activities.

1101.3 Division of Responsibility – RICE Plant

The Division of Responsibility Matrix defining the Contractor's scope of supply and the Owner's scope of supply is included below and supplements the responsibility definition provided throughout the Contract Documents.

1101.3.1 Equipment, Systems, and Structures

Division of Responsibility Matrix – RICE Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
RICE package(s), including all auxiliaries	X		
Exhaust silencer and piping between the silencer and the engine	X		
Exhaust mixing duct	X		
Exhaust expansion joint	X		
Exhaust stack, as described in the section below	X		
Continuous Emissions Monitoring System (CEMS)	X		
CEMS equipment	X		
Selective Catalytic Reduction (SCR) System, as described in the sections below	X		
Oxidation Catalyst System, as described in the sections below	X		
Division of Responsibility Matrix – RICE Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Intake air filter and associated piping/duct between the filter and the engine	X		
Intake air silencer	X		
Generator Breaker	X		
Fuel gas and/or oil filter/separator (per reciprocating engine)	X		
Fuel gas train per NFPA 37	X		
Fuel oil forwarding unit complete with pumps, filters, heaters, and auxiliaries (per reciprocating engine)	X		
Fuel oil injection pump (per reciprocating engine)	X		
Lube oil supply including waste and fresh oil take	X		
Lube oil coolers (direct oil-to-air or oil-to-water/glycol) (per reciprocating engine)	X		
Mobile scavenge system to remove lubrication oil	X		
Shell and tube or plate and frame central heat exchanger	X		
Preheating unit low temperature circuit	X		
Heat rejection to surroundings, radiator	X		

Circulation water pumps (motive force from central heat exchanger to heat rejection to surroundings)	X		
Circulation water piping, valves, instruments	X		
Chemical dosing system	X		
Fire detection and protection system	X		
Gas detection and protection system	X		
Maintenance water tank(s)		X	
Circulation water makeup pumps	X		
Radiator	X		
Battery for cranking and controls	X		
Manual/Automatic Transfer Switch	X		
Motor controls and starters (if applicable)	X		
Vibration Isolators	X		
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Automatic Voltage Regulator (AVR)	X		
Automatic Governor	X		
Engine Starting Method	X		
Protective Relays/Protective Relay Settings	X		
Lighting internal to Supplier-furnished enclosures	X		
Electrical, control and instrumentation design for Supplier-furnished equipment and systems	X		
Electrical and control systems interface with Owner-furnished equipment and systems	X		
Communications link between the Supplier's control system and the Randolph Harley facility	X		
Auto synchronization	X		
Local operator interface station	X		
Remote operator interface station (control room)	X		
Thermal unit and BOP control system	X		

Accessories including meters, switches, and lights as required to properly operate the complete generating unit as recommended by the Supplier	X		
UPS	X		
LPG/ULSD storage tank(s), including containment		X	
LPG/ULSD transfer and conditioning equipment	X		Per RICE manufacturer's requirements
Facility water supply		X	
RICE Building	X	X	The power generators and BESS equipment are proposed to be located at an existing building [1] that is built to Virgin Islands' code and VIWAPA's specification and standards, unless an alternative site is recommended by the potential bidder(s), and agreed to and confirmed by VIWAPA.
Power Transformer(s)	X		See Attachment 3 and Attachment 6
Medium Voltage Switchgear	X		
Division of Responsibility Matrix – RICE Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Low Voltage Switchgear	X		
Low Voltage Motor Control Center(s)	X		

1101.3.2 Engineering, Procurement, and Construction Items

Division of Responsibility Matrix – RICE Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Engineering design	X		
Architectural	X		
Conformed to Construction Record drawings	X		
Equipment specifications	X		
Equipment purchase and expediting services	X		
Engineering and construction QA and QC programs	X		

Equipment Transportation	X		Contractor is responsible for any requirements associated with the transportation of Contractor Equipment. Contractor is responsible for any lay-down space needed beyond that available on the Project Site.
Construction Permits	X		Contractor shall be responsible for obtaining and paying for any necessary construction permits.
Site survey	X		As required for design and construction.
Site security (during construction and startup)	X		Contractor is responsible for security of the Construction area and associated laydowns.
Site Demolition			
Demolition, removal, and disposal of all materials, equipment, and structures on the site, including below- grade equipment and utilities.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)
Remediation and disposal of all hazardous materials.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)

Division of Responsibility Matrix – RICE Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Permits required for the demolition and disposal of all materials (including hazardous materials), equipment, and structures.	X		
Geotechnical			
Soil borings	X		
Soils reports	X		
Soils resistivity	X		
Electrical Thermal Resistivity	X		
Disposal of chemical cleaning waste during construction	X		Neutralized wastes shall be hauled offsite and disposed of by a licensed chemical cleaning subcontractor.
Fuses, lamps, filters, gaskets, and other similar consumables required for startup	X		Contractor to provide for all equipment.

Initial charge of resins, gases, chemicals, desiccants, lubricants, and hydraulic fluids	X (1)	X (2)	(1) Contractor to provide initial charge and additional supplies for all equipment through Commercial Operation Date (COD). Fluid levels shall be full at time of turnover of care, custody and control to Owner. (2) Owner to provide continuous supply as needed after COD.
LPG/ULSD fuel supply	X (1)	X (2)	(1) Contractor to purchase initial charge of fuel from the Owner through Commercial Operation Date (COD). (2) Owner to provide continuous supply as needed after COD.
Civil works	X		
Erection	X		
Site preparation and earthwork design and construction	X		
Site clearing and grubbing	X		
Site final stabilization	X		
Final site landscaping	X		Final landscaping to be coordinated with the Owner.
Trash Disposal	X		
Construction telecommunications	X		
All construction craft and supervision	X		
Division of Responsibility Matrix – RICE Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Warranties			
Issues warranty claims on equipment to vendors	X(1)	X (2)	(1) Contractor shall issue claims while onsite. (2) After demobilization, Contractor with input
Resolve warranty claims on equipment with vendors	X		Contractor shall resolve warranty claims throughout Warranty Period.
Performs warranty work on equipment	X		
Checkout, Startup, Testing, and Training			
Checkout/commissioning procedures	X		
Checkout and turnover	X		
Mechanical/electrical/control checkout of systems	X		Using Owner's operators, if available.

Set, check out, and test all electric protective and metering devices including protective relays, breaker trip devices, motor control center trip and overload devices and metering	X		Including specific testing in accordance with Owner's requirements.
Startup procedures	X		
Startup of systems and facility	X ⁽¹⁾	X ⁽²⁾	⁽¹⁾ Supervision and craft labor. ⁽²⁾ Using Owner's operators.
Startup and commissioning spare parts for turbine, generator and auxiliaries	X		
Inert gas blow, and chemical cleaning	X		
Performance testing procedures	X		
Test equipment	X		
Performance test	X	X ⁽¹⁾	⁽¹⁾ Using Owner's operators.
Performance test report	X		
Operator training and training manuals	X		
Equipment instruction manuals	X		
Detailed operating procedures and manuals	X		

Division of Responsibility Matrix – RICE Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Operation and maintenance personnel	X ⁽¹⁾	X ⁽²⁾	⁽¹⁾ Contractor to be responsible for operation and maintenance until COD. Contractor may utilize Owner personnel. ⁽²⁾ After COD, Owner to provide operations and maintenance personnel.
Witness of performance tests	X	X	

The Contractor's scope of work also includes the design, supply, erection, start-up and testing of the following equipment and systems:

1101.3.3 Stack Design

Steel Stack Designed by Supplier - RICE	
Equipment name	Exhaust Stack
Quantity	Supplier to Specify
Steel stack function	RICE exhaust
Steel stack configuration	Round
Design exhaust gas flow	Supplier to Specify
Steel stack height, ft	100ft as necessary to maintain assurance of Ambient Air Quality Standards and meet PSD requirements
Stack diameter, ft	Supplier to Indicate

1101.3.4 Selective Catalytic Reduction System

The RICE plant may use non-catalyst/reagent technology as necessary to meet the emissions limits. If using an SCR, the following provisions apply:

Selective Catalytic Reduction System – RICE Plant	
Scope of Supply	
SCR housing	Yes
Catalyst support grid within reactor	Yes
Structural steel	Yes
Ammonia vaporization and injection system	Yes
Controls and Instrumentation	Yes
Computational fluid dynamics (CFD) model	Yes
Ductwork	As part of integrated exhaust train
Exhaust Gas Composition	By Supplier

SCR catalyst	
Number of layers required (excludes any spare levels)	By Supplier

Number of modules per layer	By Supplier
Pressure drop per catalyst layer, psi	By Supplier
Weight of catalyst per layer, lbs.	By Supplier
Space and supports for spare catalyst required	Yes
Control and Instrumentation System Design Services and Documentation	Yes

1101.3.5 Selective Catalytic Reduction System Catalyst

Catalyst for Selective Catalytic Reduction – RICE Plant	
Description of Supply	
SCR catalyst supplied	As part of engine genset package
Performance Requirements	
Minimum catalyst life of initial catalyst charge	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first.
Design Requirements	
Type	By Supplier
Flue gas flow direction through catalyst	By Supplier
Flue Gas Conditions	By Supplier

1101.3.6 SCR Reagent System

The RICE plant shall use ammonia or urea as defined in sections 01101.3.6.1 and 01101.3.6.2 defined below:

1101.3.6.1 Ammonia System

Ammonia System – RICE	
Item	Status
Scope of Supply	
Ammonia area monitoring equipment	Included
Ammonia injection system	Included
Ammonia vaporization system	Included
Feed pumps	Included
Vaporization chamber	Included
Instrumentation (Coriolis flowmeter)	Included, one per integrated exhaust train

Ammonia System – RICE	
Item	Status
Skid mounted	Included
Skid enclosure	If required by Supplier's design
Operating Parameters	
Ammonia type	Aqueous ammonia

NH3 percentage by weight	19%
Ammonia required, gpm	By Supplier
Equipment Guarantee	
Vaporized ammonia supply rate, lb/h	By Supplier
Vaporization/injection system turndown ratio	By Supplier, but to Minimum Emissions Compliance Load (MECL)
Control and Instrumentation System Design Services and Documentation	Yes
Ammonia Storage Requirement	4 weeks with all units running

1101.3.6.2 Urea System

Urea System – RICE	
Item	Status
Scope of Supply	
Dry urea unloading system	Included
Solutionizing/dissolving skid	Included
Urea solution tank	Included
Urea solution feed pumps	Included
Decomposition skid (w/pump and tank)	Included
Vaporization chamber	Included
Instrumentation (Coriolis flowmeter)	Included, one per integrated exhaust train
Heat tracing	Included
Skid enclosure	If require by Supplier's design
Operating Parameters	
Urea type	Dry urea to site, dry storage, and converted to NH3 in hydrolyzer
NH3 percentage by weight	By Supplier
Ammonia required, gpm	By Supplier

Urea System – RICE	
Item	Status
Equipment Guarantee	
Vaporized ammonia supply rate, lb/h	By Supplier, but to MECL
Power Consumption	By Supplier
Urea reagent usage @ 50% concentration	By Supplier
Control and Instrumentation System Design Services and Documentation	Yes
Urea Solution Storage Requirement	4 weeks with all units running

01101.3.7 Oxidation System Catalyst

Oxidation Catalyst System – RICE Plant	
Description of Supply	Equipment supplied as part of engine genset package
Scope of Supply	
Catalyst modules	Yes
Catalyst support structure	Yes
Catalyst casing	Yes
Include room for spare layer	Yes
Transition/spool piece	Yes
Catalyst monorail	No
Catalyst loading hoist	No
Insulation and lagging	Yes
Design Criteria	
Definition of volatile organic carbon (VOC) emissions	
For the purpose of this specification, VOCs are defined as	Nonmethane, nonethane, unburned hydrocarbon
Requirements for locating oxidation catalyst	The catalyst will be located according to the following criteria:
Operating requirements	
Maximum flue gas temperature which the catalyst and accessories must withstand, °F (°C)	By Supplier
Maximum flue gas pressure which the catalyst and accessories must withstand, psig (kPag)	By Supplier

Catalyst location and minimum operating temperature.	Determined by the Supplier
Operating Information	
Minimum catalyst life of initial catalyst charge, hours	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first.

01101.4 Division of Responsibility – Combustion Turbine Generator (Simple Cycle)

The Division of Responsibility Matrix defining the Contractor's scope of supply and the Owner's scope of supply is included below and supplements the responsibility definition provided throughout the Contract Documents.

1101.4.1 Equipment, Systems, and Structures

Division of Responsibility Matrix – Simple Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Combustion turbine packages for conventional and fast start, including all auxiliaries	X		
Inlet filter/silencer system and associated support steel to grade.	X		
Evaporative Cooler (if required)	X		
Pulse Air Compressed Air	X		
CT exhaust expansion joint	X		
Exhaust stack, as described in the section below	X		
Continuous Emissions Monitoring System (CEMS)	X		
CEMS equipment	X		
SCR System, as described in the sections below	X		
Oxidation Catalyst System, as described in the sections below	X		
Fuel gas train per NFPA 37	X		
Fuel oil forwarding unit complete with pumps, filters, heaters, and auxiliaries (per CT)	X		
Combined Lubricating Oil System	X		
Complete Turbine and Generator Lube Oil System including reservoir, AC motor driven lube oil pumps (Two (2) X 100%), DC motor driven lube oil pumps (One (1) x 100%), motors and starters, DC starter panel	X		

Division of Responsibility Matrix – Simple Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Turbine and Generator Hydraulic and Lift Oil System (combined) with reservoir (if required), ac motor driven hydraulic oil pumps (Two (2) X 100%), motors and starters	X		
Electro physical Separation Process (ESP) System for varnish mitigation	X		
Fuel Gas Performance System including heaters and separators and metering station if required	X		

On & Off-line Compressor wash system (not required for high-efficiency particulate air (HEPA) filtration system)	X		
Fire detection and protection system	X		
Gas detection and protection system	X		
Static Starting System configured for normal start	X		
Instrumentation	X		
Insulation and lagging	X		
Combustion Turbine and Generator control systems	X		
Turbine Generator Supervisory Instruments (TSI)	X		
Turbine Generator protection system	X		
Generator complete with all required auxiliary systems	X		
Generator bus duct / cable bus	X		
Generator circuit breaker	X		
Excitation system	X		
Automatic Voltage Regulator (AVR), including Power System Stabilizer (PSS)	X		
Generator neutral grounding equipment	X		
Transducers	X		
Protective relay panel and protective relays including relay settings	X		
Power Potential Transformer for Static Field Excitation	X		
Isolation Transformer for Static Starting	X		

Division of Responsibility Matrix – Simple Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Surge arrestors and capacitors (if required)	X		
Generator Step-up transformer	X		
Unit Auxiliary Transformer	X		
Additional relay for inadvertent energization protection without the use of the built-in functions associated with the primary and backup relays	X		
Cable between neutral grounding resistor (NGR) cubical and generator neutral connection (if applicable)	X		

Auto synchronization	X		
Local operator interface station	X		
Remote operator interface station (control room)	X		
Thermal unit and BOP control system	X		
UPS	X		
All necessary instrument, power and control wiring and raceways integral to any equipment furnished by Supplier	X		
Lighting internal to Supplier-furnished enclosures	X		
Electrical, control and instrumentation design for Supplier-furnished equipment and systems	X		
Electrical and control systems interface with Owner-furnished equipment and systems	X		
Communications link between the Supplier's control system and the Randolph Harley facility	X		
LPG/ULSD storage tank(s), including containment		X	
LPG/ULSD transfer and conditioning equipment	X		Per unit manufacturer's requirements
Facility water supply		X	
Combustion Turbine Generator Building / Enclosures	X		
Power Transformer(s)	X		See Attachment 3 and Attachment 6

Division of Responsibility Matrix – Simple Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Medium Voltage Switchgear	X		
Low Voltage Switchgear	X		
Low Voltage Motor Control Center(s)	X		

1101.4.2 Engineering, Procurement, and Construction Items

Division of Responsibility Matrix – Simple Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Engineering design	X		
Architectural	X		
Conformed to Construction Record drawings	X		

Equipment specifications	X		
Equipment purchase and expediting services	X		
Engineering and construction QA and QC programs	X		
Equipment Transportation	X		Contractor is responsible for any requirements associated with the transportation of Contractor Equipment. Contractor is responsible for any lay-down space needed beyond that available on the Project Site.
Construction Permits	X		Contractor shall be responsible for obtaining and paying for any necessary construction permits.
Site survey	X		As required for design and construction.
Site security (during construction and startup)	X		Contractor is responsible for security of the Construction area and associated laydowns.
Site Demolition			
Demolition, removal, and disposal of all materials, equipment, and structures on the site, including below- grade equipment and utilities.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)

Division of Responsibility Matrix – Simple Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Remediation and disposal of all hazardous materials.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)
Permits required for the demolition and disposal of all materials (including hazardous materials), equipment, and structures.	X		
Geotechnical			
Soil borings	X		
Soils reports	X		
Soils resistivity	X		
Electrical Thermal Resistivity	X		
Disposal of chemical cleaning waste during construction	X		Neutralized wastes shall be hauled offsite and disposed of by a licensed chemical cleaning subcontractor.

Fuses, lamps, filters, gaskets, and other similar consumables required for startup	X		Contractor to provide for all equipment.
Initial charge of resins, gases, chemicals, desiccants, lubricants, and hydraulic fluids	X(1))	X(2)	(1) Contractor to provide initial charge and additional supplies for all equipment through Commercial Operation Date (COD). Fluid levels shall be full at time of turnover of care, custody and control to Owner. (2) Owner to provide continuous supply as needed after COD.
LPG/ULSD fuel supply	X(1))	X(2)	(1) Contractor to purchase initial charge of fuel from the Owner through COD. (2) Owner to provide continuous supply as needed after COD.
Civil works	X		
Erection	X		
Site preparation and earthwork design and construction	X		
Site clearing and grubbing	X		
Site final stabilization	X		
Final site landscaping	X		Final landscaping to be coordinated with the Owner.
Trash Disposal	X		
Construction telecommunications	X		

Division of Responsibility Matrix – Simple Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
All construction craft and supervision	X		
Warranties			
Issues warranty claims on equipment to vendors	X(1))	X(2)	(1) Contractor shall issue claims while onsite. (2) After demobilization, Contractor with input from Owner throughout Warranty Period.
Resolve warranty claims on equipment with vendors	X		Contractor shall resolve warranty claims throughout Warranty Period.
Performs warranty work on equipment	X		
Checkout, Startup, Testing, and Training			
Checkout/commissioning procedures	X		
Checkout and turnover	X		
Mechanical/electrical/control checkout of systems	X		Using Owner's operators, if available.

Set, check out, and test all electric protective and metering devices including protective relays, breaker trip devices, motor control center trip and overload devices and metering	X		Including specific testing in accordance with Owner's requirements.
Startup procedures	X		
Startup of systems and facility	X ⁽¹⁾)	X ⁽²⁾	⁽¹⁾ Supervision and craft labor. ⁽²⁾ Using Owner's operators.
Startup and commissioning spare parts for turbine, generator and auxiliaries	X		
Inert gas blow, and chemical cleaning	X		
Performance testing procedures	X		
Test equipment	X		
Performance test	X	X ⁽¹⁾	⁽¹⁾ Using Owner's operators.
Performance test report	X		
Operator training and training manuals	X		
Equipment instruction manuals	X		
Detailed operating procedures and manuals	X		

Division of Responsibility Matrix – Simple Cycle Plant

Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Operation and maintenance personnel	X ⁽¹⁾)	X ⁽²⁾	⁽¹⁾ Contractor to be responsible for operation and maintenance until COD. Contractor may utilize Owner personnel. ⁽²⁾ After COD, Owner to provide
Witness of performance tests	X	X	

The Contractor's scope of work also includes the design, supply, erection, start-up and testing of the following equipment and systems:

1101.4.3 Stack Design

Steel Stack Designed by Supplier - Simple Cycle Plant	
Equipment name	Exhaust Stack
Quantity	One per thermal unit
Steel stack function	Turbine exhaust
Steel stack configuration	Round
Design exhaust gas flow	Supplier to Specify
Steel stack height, ft	100ft as necessary to maintain assurance of Ambient Air Quality Standards and meet PSD requirements
Stack diameter, ft	Supplier to Indicate

1101.4.4 Selective Catalytic Reduction System

The Simple Cycle plant may use water, Dry Low NO_x (DLN) technology, or other non-catalyst/reagent technology, if any, as necessary to meet the emissions limits. If using an SCR, the following provisions apply:

Selective Catalytic Reduction System - Simple Cycle Plant	
Scope of Supply	
SCR housing	Yes
Catalyst support grid within reactor	Yes
Structural steel	Yes
Ammonia vaporization and injection system	Yes
Controls and Instrumentation	Yes
CFD model	Yes
Ductwork	As part of integrated exhaust train

Exhaust Gas Composition	By Supplier
SCR catalyst	
Number of layers required (excludes any spare levels)	By Supplier
Number of modules per layer	By Supplier
Pressure drop per catalyst layer, psi	By Supplier
Weight of catalyst per layer, lbs.	By Supplier
Space and supports for spare catalyst required	Yes
Control and Instrumentation System Design Services and Documentation	Yes

1101.4.5 Selective Catalytic Reduction System Catalyst

Catalyst for Selective Catalytic Reduction - Simple Cycle Plant	
Description of Supply	
SCR catalyst supplied	As part of combustion turbine package
Performance Requirements	
Minimum catalyst life of initial catalyst charge	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first.
Design Requirements	
Type	By Supplier
Flue gas flow direction through catalyst	By Supplier
Flue Gas Conditions	By Supplier

1101.4.6 SCR Reagent System

If using an SCR reagent, the Simple Cycle plant shall use ammonia as defined below:

Ammonia System - Simple Cycle Plant	
Item	Status
Scope of Supply	
Ammonia area monitoring equipment	Included
Ammonia injection system	Included
Ammonia vaporization system	Included
Feed pumps	Included
Vaporization chamber	Included
Instrumentation (Coriolis flowmeter)	Included, one per integrated exhaust train
Skid mounted	Included

Ammonia System - Simple Cycle Plant	
Item	Status
Skid enclosure	If required by Supplier's design
Operating Parameters	
Ammonia type	Aqueous ammonia
NH ₃ percentage by weight	19%
Ammonia required, gpm	By Supplier
Equipment Guarantee	
Vaporized ammonia supply rate, lb/h	By Supplier
Vaporization/injection system turndown ratio	By Supplier, but to MECL
Control and Instrumentation System Design Services and Documentation	Yes
Ammonia Storage Requirement	4 weeks with all units running

01101.4.7 Oxidation Catalyst System

Oxidation Catalyst System - Simple Cycle Plant	
Description of Supply	Equipment supplied as part of combustion turbine package
Scope of Supply	
Catalyst modules	Yes
Catalyst support structure	Yes
Catalyst casing	Yes
Include room for spare layer	Yes
Transition/spool piece	Yes
Catalyst monorail	No
Catalyst loading hoist	No
Insulation and lagging	Yes
Design Criteria	
Definition of volatile organic carbon (VOC) emissions	
For the purpose of this specification, VOCs are defined as	Nonmethane, nonethane, unburned hydrocarbon
Requirements for locating oxidation catalyst	The catalyst will be located according to the following criteria:
Operating requirements	
Maximum flue gas temperature which the catalyst and accessories must withstand, °F (°C)	By Supplier
Maximum flue gas pressure which the catalyst and accessories must withstand, psig (kPag)	By Supplier
Catalyst location and minimum operating temperature	Determined by the Supplier
Operating Information	
Minimum catalyst life of initial catalyst charge, hours	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first

1101.5 Division of Responsibility – Combustion Turbine Generator (Combined Cycle)

The Division of Responsibility Matrix defining the Contractor's scope of supply and the Owner's scope of supply is included below and supplements the responsibility definition provided throughout the Contract Documents.

1101.5.1 Equipment, Systems, and Structures

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Combustion turbine packages for conventional and fast start, including all auxiliaries	X		
Inlet filter/silencer system and associated support steel to grade.	X		
Evaporative Cooler (if required)	X		
Pulse Air Compressed Air	X		
CT exhaust expansion joint	X		
Exhaust stack, as described in the section below	X		
SCR System, as described in the sections below	X		
Oxidation Catalyst System, as described in the sections below	X		
Fuel gas train per NFPA 37	X		
Fuel oil forwarding unit complete with pumps, filters, heaters, and auxiliaries (per CT)	X		
Combined Lubricating Oil System	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Complete Turbine and Generator Lube Oil System including reservoir, AC motor driven lube oil pumps (Two (2) X 100%), DC motor driven lube oil pumps (One (1) x 100%), motors and starters, DC starter panel	X		
Turbine and Generator Hydraulic and Lift Oil System (combined) with reservoir (if required), ac motor driven hydraulic oil pumps (Two (2) X 100%), motors and starters	X		
Electrophysical Separation Process (ESP) System for varnish mitigation	X		
Fuel Gas Performance System including heaters and separators and metering station if required.	X		
On & Off-line Compressor wash system (not required for high-efficiency particulate air (HEPA) filtration system)	X		
Fire detection and protection system	X		

Gas detection and protection system	X		
Static Starting System configured for normal start	X		
Instrumentation	X		
Insulation and lagging for equipment	X		
Combustion Turbine and Generator control systems	X		
Turbine Generator Supervisory Instruments (TSI)	X		
Turbine Generator protection system	X		
Generator complete with all required auxiliary systems	X		
Generator bus duct / cable bus	X		
Generator circuit breaker	X		
Excitation system	X		
Automatic Voltage Regulator (AVR), including Power System Stabilizer (PSS)	X		
Generator neutral grounding equipment	X		
Transducers	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Protective relay panel and protective relays including relay settings	X		
Power Potential Transformer for Static Field Excitation	X		
Isolation Transformer for Static Starting	X		
Surge arrestors and capacitors (if required)	X		
Generator Step-up transformer	X		
Unit Auxiliary Transformer	X		
Additional relay for inadvertent energization protection without the use of the built-in functions associated with the primary and backup relays	X		
Cable between neutral grounding resistor (NGR) cubical and generator neutral connection (if applicable)	X		
Auto synchronization	X		
Local operator interface station	X		
Remote operator interface station (control room)	X		

Thermal unit and BOP control system	X		
UPS	X		
All necessary instrument, power and control wiring and raceways integral to any equipment furnished by Supplier	X		
Lighting internal to Supplier-furnished enclosures	X		
Electrical, control and instrumentation design for Supplier-furnished equipment and systems	X		
Electrical and control systems interface with Owner-furnished equipment and systems	X		
Communications link between the Supplier's control system and the Randolph Harley facility	X		
LPG/ULSD storage tank(s), including containment		X	
LPG/ULSD transfer and conditioning equipment	X		Per unit manufacturer's requirements

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Facility water supply		X	
Combustion Turbine Generator Building / Enclosures	X		
Power Transformer(s)	X		See Attachment 3 and Attachment 6
Medium Voltage Switchgear	X		
Low Voltage Switchgear	X		
Low Voltage Motor Control Center(s)	X		
Steam Turbine Generator			
Condensing type steam turbine	X		
Main steam stop and control valves	X		
Main steam stop and control valve before and after seat drain valves	X		
All steam valves required for safe start-up and shutdown of the Steam Turbine Generator	X		
All piping and supports within Supplier's turbine lagging.	X		
Piping and supports between main steam stop and control valves and the HP turbine inlet(s)	X		
Piping and supports required to fully interconnect, (both supply and drain), Supplier's hydraulic and control oil skid to the Steam Turbine Generator and associated valves	X		

Embedment's cast in the main concrete foundation pours	X		
Complete Turbine and Generator Lube Oil System (combined) with reservoir, AC motor driven lube oil pumps (Two (2) x 100%), DC motor driven lube oil pumps (One (1) x 100%), motors, DC starter panel	X		
Gland steam seal system design	X		
Steam seal packing	X		
Automatic steam seal regulator(s), desuperheater(s), and spray water control valve(s)	X		
Complete Gland steam condenser	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Instrumentation connected to Supplier's equipment and skids	X		
Fully automatic turning gear and motor	X		
Insulation and lagging (for equipment and steam stop/control valves)	X		
Turbine controls	X		
Turbine Supervisory Instruments	X		
Turbine protection system	X		
Turbine Electro Hydraulic Control (EHC) System	X		
Complete EHC system	X		
Turbine exhaust hood spray system including all interconnect piping, supports and valves between the condensate spray water supply termination point and the LP hoods.	X		Condensate water supply by Owner
100% capacity Steam Turbine bypass system	X		
AC motor starters for the Steam Turbine Generator unless otherwise specified	X		
Pre-manufactured metal equipment buildings for turbine/generator control panel(s) and excitation equipment	X		If not included in the Steam Turbine Generator Building
Generator complete with all required auxiliary systems	X		
Generator bus duct / cable bus	X		

Generator circuit breaker	X		
Excitation system	X		
Automatic Voltage Regulator including Power System Stabilizer	X		
Generator neutral grounding equipment	X		
Transducers	X		
Protective relay panel and protective relays including relay settings	X		
Power Potential Transformer for Static Field Excitation	X		
Generator bushing current transformers	X		
Voltage transformers	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Surge arrestors and capacitors (if required)	X		
Generator Step-up transformer	X	X	See Attachment 3
Additional relay for inadvertent energization protection without the use of the built-in functions associated with the primary and backup relays.	X		
Neutral grounding equipment	X		
Auto synchronization	X		
Local operator interface station	X		
Remote operator interface station	X		To be located in the Randolph Harley control room
All instrumentation and control devices, including control valves, transmitters, instrument fittings, internal power supplies, etc. required for complete and functional systems	X		
Lighting internal to Supplier furnished enclosures	X		
Coordination with Owner for a complete steam turbine system design	X	X	
Electrical, control and instrumentation design for Supplier-furnished equipment and systems	X		
Electrical and control systems interface with Owner-furnished equipment and systems	X		
Communications link between the Supplier's control system and the Randolph Harley facility	X		
Access platforms required for general maintenance or monitoring of the equipment.	X		

Heat Recovery Steam Generator (HRSG)			
Complete design and materials for steam generating system from steam generator inlet valve to main steam outlets including all interconnecting piping	X		
Foundations, grout, anchor bolts, nuts, washers	X		
HRSG grounding pads	X		
Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Structural supports, ductwork, platforms, walkways, stair towers, and ladders	X		
Expansion joint at HRSG inlet (CT outlet)	X		
Acoustical shroud at HRSG inlet	X		
Casing from CT outlet duct to HRSG inlet	X		
Exhaust stack	X		
HRSG exhaust stack isolation damper	X		
HRSG exhaust silencer	X		
Expansion joint at HRSG outlet (stack inlet)	X		
Boiler and drum trim	X		
Boiler circulating water pumps	X		
HP superheated piping and valves	X		
HP final stage steam attemperator, including spray water control valve (installed in Owner piping)	X		
HP steam stop valve(s) per ASME Section I	X		
Electrically operated PRV on LP superheated outlet			
Steam drums with steam/water separators	X		
Ammonia flow control skid, vaporization equipment, and dilution air blowers	X		
Ammonia injection grid and manifold	X		
Ammonia piping, to/from ammonia flow control skid to/from ammonia injection grid	X		
HRSG interconnecting piping (within ASME Section 1 code requirements)	X		
Steam silencers for PRVs, startup vents, relief/safety valves, etc.	X		
HRSG interconnecting piping insulation	X		
Steam drum insulation	X		

CT exhaust emissions connection upstream of duct burners (single connection located at inlet duct access door platform)	X		
---	---	--	--

Division of Responsibility Matrix – Combined Cycle Plant			
Equipment, Systems, and Structures	Contractor	Owner	Remarks
Combustible gas monitor and alarm	X		
Oxidation catalyst spool section (for future installation of oxidation catalyst)	X		
Oxidation catalyst system components including catalyst	X		
SCR system components including catalyst	X		
SCR spool section (for future installation of additional SCR catalyst layer)	X		
SCR ammonia injection control and instrumentation information including engineering services	X		
EPA connections (stack)	X		
Flow monitor connection (stack)	X		
Continuous Emissions Monitoring System (CEMS)	X		
CEMS equipment	X		
Burner Management System (BMS) - Incorporated into plant DCS	X		
BMS - Supplier-furnished stand-alone system with remote operator interface in DCS	X		
Data link between DCS and BMS	X		
Implementation in DCS	X		
Instrumentation for boiler control, including transmitters, instrument manifolds, and instrument blowdown valves,	X		
Conductivity analyzer	X		
HRSG stack lightning protection	X		
Complete set of wiring and schematic drawings showing electrical connections for all equipment furnished	X		

1101.5.2 Engineering, Procurement, and Construction Items

Division of Responsibility Matrix – Combined Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Engineering design	X		
Architectural	X		

Conformed to Construction Record drawings	X		
Equipment specifications	X		
Equipment purchase and expediting services	X		
Engineering and construction QA and QC programs	X		
Equipment Transportation	X		Contractor is responsible for any requirements associated with the transportation of Contractor Equipment. Contractor is responsible for any lay-down space needed beyond that available on the Project Site.
Construction Permits	X		Contractor shall be responsible for obtaining and paying for any necessary construction permits.
Site survey	X		As required for design and construction.
Site security (during construction and startup)	X		Contractor is responsible for security of the Construction area and associated laydowns.
Site Demolition			
Demolition, removal, and disposal of all materials, equipment, and structures on the site, including below- grade equipment and utilities.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)
Remediation and disposal of all hazardous materials.	X		All materials and debris to be removed from the US Virgin Islands (not disposed of in local landfills)
Permits required for the demolition and disposal of all materials (including hazardous materials), equipment, and structures.	X		
Geotechnical			
Soil borings	X		
Soils reports	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Soils resistivity	X		
Electrical Thermal Resistivity	X		
Disposal of chemical cleaning waste during construction	X		Neutralized wastes shall be hauled offsite and disposed of by a licensed chemical cleaning subcontractor.
Fuses, lamps, filters, gaskets, and other similar consumables required for startup	X		Contractor to provide for all equipment.

Initial charge of resins, gases, chemicals, desiccants, lubricants, and hydraulic fluids	X(1)	X(2)	Contractor to provide initial charge and additional supplies for all equipment through Commercial Operation Date (COD). Fluid levels shall be full at time of turnover of care, custody and control to Owner. Owner to provide continuous supply as needed after COD.
LPG/ULSD fuel supply	X(1)	X(2)	Contractor to purchase initial charge of fuel from the Owner through COD. Owner to provide continuous supply as needed after COD.
Civil works	X		
Erection	X		
Site preparation and earthwork design and construction	X		
Site clearing and grubbing	X		
Site final stabilization	X		
Final site landscaping	X		Final landscaping to be coordinated with the Owner.
Trash Disposal	X		
Construction telecommunications	X		
All construction craft and supervision	X		
Warranties			
Issues warranty claims on equipment to vendors	X(1)	X(2)	Contractor shall issue claims while onsite. After demobilization, Contractor with input from Owner throughout Warranty Period.

Resolve warranty claims on equipment with vendors	X		Contractor shall resolve warranty claims throughout Warranty Period.
Performs warranty work on equipment	X		

Division of Responsibility Matrix – Combined Cycle Plant			
Engineering, Procurement, and Construction Items	Contractor	Owner	Remarks
Checkout, Startup, Testing, and Training			
Checkout/commissioning procedures	X		
Checkout and turnover	X		
Mechanical/electrical/control checkout of systems	X		Using Owner's operators, if available.

Set, check out, and test all electric protective and metering devices including protective relays, breaker trip devices, motor control center trip and overload devices and metering	X		Including specific testing in accordance with Owner's requirements.
Startup procedures	X		
Startup of systems and facility	X ⁽¹⁾	X ⁽²⁾	⁽¹⁾ Supervision and craft labor. ⁽²⁾ Using Owner's operators.
Startup and commissioning spare parts for turbine, generator and auxiliaries	X		
Inert gas blow, and chemical cleaning	X		
Performance testing procedures	X		
Test equipment	X		
Performance test	X	X ⁽¹⁾	⁽¹⁾ Using Owner's operators.
Performance test report	X		
Operator training and training manuals	X		
Equipment instruction manuals	X		
Detailed operating procedures and manuals	X		
Operation and maintenance personnel	X ⁽¹⁾	X ⁽²⁾	⁽¹⁾ Contractor to be responsible for operation and maintenance until COD. Contractor may utilize Owner personnel. ⁽²⁾ After COD, Owner to provide operations and maintenance personnel.
Witness of performance tests	X	X	

The Contractor's scope of work also includes the design, supply, erection, start-up and testing of the following equipment and systems:

1101.5.3 Stack Design

Steel Stack Designed by Supplier – Combined Cycle Plant	
Equipment name	HRSR Exhaust Stacks
Quantity	One per unit
Steel stack function	HRSR exhaust
Steel stack configuration	Round
Design exhaust gas flow	Supplier to Specify
Steel stack height, ft	100ft as necessary to maintain assurance of Ambient Air Quality Standards and meet PSD requirements
Stack diameter, ft	Supplier to Indicate

1101.5.4 Selective Catalytic Reduction System

The Combined Cycle plant may use water, steam, DLN technology, or other non-catalyst/reagent technology, if any, as necessary to meet the emissions limits. If using an SCR, the following provisions apply:

Selective Catalytic Reduction System – Combined Cycle Plant	
Scope of Supply	
SCR housing	Yes
Catalyst support grid within reactor	Yes
Structural steel	Yes
Ammonia vaporization and injection system	Yes
Controls and Instrumentation	Yes
CFD model	Yes
Ductwork	As part of complete HRSG
Exhaust Gas Composition	By Supplier
SCR catalyst	
Number of layers required (excludes any spare levels)	By Supplier
Number of modules per layer	By Supplier
Pressure drop per catalyst layer, psi	By Supplier
Weight of catalyst per layer, lbs.	By Supplier
Space and supports for spare catalyst required	Yes
Control and Instrumentation System Design Services and Documentation	Yes

1101.5.5 Selective Catalytic Reduction System Catalyst

Catalyst for Selective Catalytic Reduction – Combined Cycle Plant	
Description of Supply	
SCR catalyst supplied	As part of a HRSG unit
Performance Requirements	
Minimum catalyst life of initial catalyst charge	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first.
Design Requirements	
Type	By Supplier
Flue gas flow direction through catalyst	By Supplier
Flue Gas Conditions	By Supplier

1101.5.6SCR Reagent System

If using an SCR reagent, the Combined Cycle plant shall use ammonia as defined below:

Ammonia System – Combined Cycle Plant	
Item	Status
Scope of Supply	
Ammonia area monitoring equipment	Included
Ammonia injection system	Included
Ammonia vaporization system	Included
Feed pumps	Included
Vaporization chamber	Included
Instrumentation (Coriolis flowmeter)	Included, one per HRSG
Skid mounted	Included
Skid enclosure	If required by Supplier's design
Operating Parameters	
Ammonia type	Aqueous ammonia
NH ₃ percentage by weight	19%
Ammonia required, gpm	By Supplier
Equipment Guarantee	
Vaporized ammonia supply rate, lb/h	By Supplier
Vaporization/injection system turndown ratio	By Supplier, but to MECL
Control and Instrumentation System Design Services and Documentation	Yes
Ammonia Storage Requirement	4 weeks with all units running

01101.5.7 Oxidation Catalyst System

Oxidation Catalyst System – Combined Cycle Plant	
Description of Supply	Equipment supplied as part of HRSG
Scope of Supply	
Catalyst modules	Yes
Catalyst support structure	Yes
Catalyst casing	Yes
Include room for spare layer	Yes
Transition/spool piece	Yes
Catalyst monorail	No
Catalyst loading hoist	No
Insulation and lagging	Yes
Design Criteria	
Definition of volatile organic carbon (VOC) emissions	

For the purpose of this specification, VOCs are defined as	Nonmethane, nonethane, unburned hydrocarbon
Requirements for locating oxidation catalyst	The catalyst will be located according to the following criteria:
Operating requirements	
Maximum flue gas temperature which the catalyst and accessories must withstand, °F (°C)	By Supplier
Maximum flue gas pressure which the catalyst and accessories must withstand, psig (kPag)	By Supplier
Catalyst location and minimum operating temperature.	Determined by the Supplier
Operating Information	
Minimum catalyst life of initial catalyst charge, hours	Sixty (60) months from startup, or seventy-six (76) months from delivery, whichever occurs first.

1610 - Plant Performance Guarantees and Tests

01610.1 General

This section specifies the overall plant Performance Guarantees and Performance Tests. The Performance Tests shall determine whether the Work satisfies the Performance Guarantees. Owner will provide all operating personnel under the supervision of the Contractor.

1610.2 Performance Guarantees

The Performance Guarantees consist of the following:

- Thermal Performance Guarantees:
 - Guaranteed Net Electrical Output
 - Guaranteed Net Heat Rate
- Guaranteed Air Emissions
- Guaranteed Start Time
- Guaranteed Ramp Rate
- Guaranteed Minimum Downtime
- Guaranteed Noise Emissions
- Guaranteed Reliability
- Facility Demonstration

Thermal Performance Guarantees shall be based on the stated conditions.

1610.2.1 Thermal Performance Guarantees

Preliminary heat balances shall be provided by the Contractor with the Contractor's proposal and finalized for the actual heat balances during detailed design.

The Thermal Performance Guarantees consist of Guaranteed Net Heat Rate at full load and Guaranteed Net Electrical Output at full load. The Performance Tests shall be conducted in accordance with ASME PTC 17. As-tested performance, corrected to the guarantee condition, without adjustment for the measurement uncertainties, will be compared to the guaranteed performance to determine performance margin or deficiency.

All corrections to as-tested performance will be made using manufacturer's supplied correction curves. Target values for Net Electrical Output and Net Heat Rate are as follows:

	LPG/ULSD Firing
Guaranteed Net Plant Electrical Output (Full Load)	(Contractor to Provide) MW,
Guaranteed Net Plant Heat Rate (Full Load)	(Contractor to Provide) Btu/kWh (HHV) Btu/kWh (LHV) – minimum 10,000 Btu/kWh

The Thermal Performance Guarantees are based on the following operating conditions and parameters, collectively known as the "Guaranteed Performance Conditions." Any deviations from the Guaranteed Performance Conditions during the Performance Tests shall require an appropriate correction of test data back to the Guaranteed Performance Conditions before comparison to the Thermal Performance Guarantees.

Any conditions not listed herein but required by the thermal unit Supplier shall also be required for correcting the test data:

Definition of Net Electrical Output	Net plant (facility) electrical output is equal to the sum of the electrical outputs measured on the high side of the step-up transformer, which is equivalent to the sum of each generator's gross output, minus plant auxiliary power and transformer losses.
Definition of Net Heat Rate	Net plant (facility) heat rate is equal to the total plant fuel heat consumption in Btu/h (HHV) divided by the Net Electrical Output.
Uncertainty Tolerance	Measurement uncertainty shall not be used to establish a measurement uncertainty tolerance. It is the Contractor's responsibility to account for measurement uncertainty within the Net Plant Electrical Output and Net Plant Heat Rate guarantees.
Operating Conditions	Full Load
Performance Guarantee	Net Plant Electrical Output and Net Plant Heat Rate
Ambient conditions	Within range of conditions presented in Section D200
Generator power factor	0.85
Frequency	60 Hz
Plant Auxiliary Power	Operation of auxiliary equipment shall be as indicated in Table 01610-1. Contractor to update as necessary.

Table 01610-1
Auxiliary Loads for Performance Tests

Facility Equipment	Number Installed	Number Operating During Performance Test	Comments
Thermal Unit and Auxiliary Equipment	Contractor Standard	Contractor Standard	Specific equipment to be detailed by Contractor

Heat Rejection System Fans	Contractor Standard	Contractor Standard	Corrected to expected fan auxiliary load at the guaranteed ambient conditions if all fans are not operating
Closed Cycle Cooling Water Pumps	Contractor Standard	Contractor Standard	As applicable
Air Compressors/Dryers	Contractor Standard	Contractor Standard	As applicable
DC Power Supply and UPS	Contractor Standard	Contractor Standard	As applicable
Control System	Contractor Standard	Contractor Standard	

1610.2.2 Guaranteed Air Emissions.

Refer to section 01101.1.2 Emissions Control for guaranteed air emissions requirements.

1610.2.3 Guaranteed Start Time.

For the purpose of determining plant generation dispatch capabilities, start shall be defined as follows:

Start Time – refers to restart time made any time after the last shutdown, defined as the time required from start initiation to the unit achieving Base Load output. “Any Time” can be defined as any time period ranging from Guaranteed Minimum Down Time to several weeks since last shutdown. Start time includes exhaust system purge.

1610.2.4 Guaranteed Ramp Rate.

For the purpose of determining plant generation dispatch capabilities, ramp rate shall be defined as follows:

Ramp Rate – refers to the rate of change in net facility output, in MW per minute, either up or down at all loads above MECL.

1610.2.5 Guaranteed Minimum Down Time.

For the purpose of determining plant generation dispatch capabilities, minimum down time shall be defined as follows:

Minimum Down Time – refers to the minimum permissible time required to restart the unit after the last shutdown.

1610.2.6 Guaranteed Noise Emissions

The environmental noise emissions shall comply with the requirements of Section V100.

The equipment envelope is the perimeter line that completely encompasses the facility buildings and equipment at a distance of 3 ft (1 m) from the face. During detailed design, the Contractor shall evaluate equipment near-field sound levels on an individual equipment basis as certain power plant equipment is inherently noisy and, for certain equipment, noise control measures may not be practical or reasonable for reasons of performance, cost, maintenance access, heat buildup, space limitations, safety, etc. Therefore, if it is not reasonable and feasible to meet the criterion, administrative controls shall be implemented in lieu of meeting the above criteria provided that Owner approval is obtained. Waiving the near-field requirements shall be evaluated on an individual equipment package basis. Administrative controls include posting warning signs, prescribing hearing protection, and limiting personnel access in order to protect workers.

1610.2.7 Guaranteed Reliability

The facility shall be guaranteed to demonstrate a reliability of 100 percent during the Reliability Run.

1610.2.8 Facility Demonstration

The facility shall be guaranteed to demonstrate the capabilities of the Facility Capability Demonstration Tests.

1610.3 Performance Tests

The Performance Tests consist of the Thermal Performance Tests, the Noise Emissions Test, the Facility Capability Demonstration Tests, and the Reliability Run.

The tests shall be conducted in general accordance with ASME PTC 17.

1610.3.1 Thermal Performance Tests

The Thermal Performance Tests shall be conducted to demonstrate the facility meets or exceeds the Thermal Performance Guarantees listed in Section 01610.2.

1610.3.2 Noise Emissions Test

The Contractor shall perform the Noise Emissions Test to demonstrate compliance with the requirements of Section 01101.1.11.

1610.3.3 Reliability Run

The Reliability Run shall be conducted to demonstrate the facility can meet the Guaranteed Reliability, or equivalent availability, over the reliability test period of 168 hours. Owner will provide the load schedule, which may include startups, shutdowns, and operation at any load between minimum and maximum loads. Equivalent Availability is defined as follows:

$$EA = \frac{(A + B + \sum C_i \alpha_i + D) \times 100\%}{PH}$$

where:

- EA = Equivalent Availability in percent.
- A = Total number of hours during the test the facility is demonstrating maximum load operation.
- B = Total number of hours during the test the facility is available for maximum load operation to produce "A" hours, but the Facility is under a load restriction attributable to the Owner.
- C_i = Number of hours accumulated during a specific facility load restriction event attributable to the Contractor. Load restrictions attributable to the Contractor include facility operation below the lesser of maximum load operation or any load restrictions attributable to the Owner.
- α_i = Partial load percentage for a specific load restriction event attributable to the Contractor. Partial load percentage is determined as the measured Net Electrical Output resulting from the restriction event divided by the Net Electrical Output measured just prior to the load restriction (during the most recent "A" or "B" hour).
- i = Subscript denoting each load restriction event attributable to the Contractor (i.e., 1, 2, 3, etc.).
- D = Total number of hours during the test the facility is not operating but is operable and available for normal operation up to maximum load, including startup and cool down

time.

PH = 168 hours

Data collection during the test shall include Net Electrical Output and operations logs which shall be maintained to document the status of facility generation, as appropriate, throughout the Reliability Run.

Upon completion of the Reliability Run, the Guaranteed Reliability shall be deemed achieved if the calculated Equivalent Availability is greater than or equal to the equivalent availability defined in Section 01610.2.7. If the Equivalent Availability is less than the Guaranteed Reliability, the test may, at the discretion of the Contractor, continue on an hour by hour basis until a continuous period equal to the Reliability Test Period is obtained that meets the Guaranteed Reliability. At any time during the test the Contractor may choose to forfeit the test and restart at a later time.

1610.3.4 Facility Capability Demonstration Tests

The purpose of the Facility Capability Demonstration Tests is to demonstrate the ability of the facility to meet certain design requirements and performance conditions provided by the Contractor. It is expected that most of the demonstration tests shall be conducted during functional checkout and commissioning of individual systems; however, the Contractor may decide the appropriate time to perform each test. Tests shall be conducted with the normal complement of Owner's operating staff and with plant controls in normal operating positions for such operation. Contractor personnel may direct and observe Owner's operating staff during these tests. Contractor shall notify Owner 24 hours prior to any test being performed.

The Facility Capability Demonstration Tests that shall be performed by the Contractor are as follows:

- LPG/ULSD Fire and Gas Protection System Test
- Part Load Stable Operation Test
- Starting Reliability Test
- Startup Time Test
- Ramp Rate Test
- Minimum down Time Test
- Over speed Trip Test
- Dead Bus Closure Test
- Reverse Power Test
- Load Rejection Test
- Load Acceptance Test
- Generator MVAR Test
- Fuel Transfer Test
- BESS Functionality Test
- CEMS Compliance Test
- Voltage and Frequency Control Test

1610.3.4.1 LPG/ULSD Fire and Gas Protection System Test

The Contractor shall demonstrate full functionality of the fire and gas protection systems for the entire Facility.

1610.3.4.2 Part Load Stable Operation Test

The Contractor shall demonstrate the facility's capability to operate in a stable condition (less than 2 percent deviation in net plant electrical output without operator intervention) and in accordance with Guaranteed Air Emissions for one continuous hour, at facility minimum load.

1610.3.4.3 Starting Reliability Test

Five (5) consecutive successful starts at various initial conditions (cold versus hot starts followed by synchronization and loading to various generation levels) for each RICE. These five (5) consecutive successful starts may occur anytime during Contractor's Startup and Testing program with notification

to the Owner.

1610.3.4.4 Startup Time Test

The EPC Contractor shall demonstrate the Facility's capability to achieve stable Base Load operation as follows:

Cold Startup - This test shall demonstrate the Facility's ability to achieve Base Load operation within the Guaranteed Start Time from initiation of a startup following a plant shutdown lasting at least 72 hours. Startup shall be performed within the startup rates recommended by the manufacturers of the thermal units. Prior to initiation of the startup, all systems shall be filled and all operational walkdowns shall have been completed.

1610.3.4.5 Ramp Rate Test

The Facility shall be demonstrated to accept changes in load at a rate no less than stated in the RICE operating and maintenance instructions.

1610.3.4.6 Minimum Down Time Test

The Facility shall be demonstrated to restart after a shutdown in a time no greater than the Minimum down Time.

1610.3.4.7 Overspeed Trip Test

The overspeed protection circuits for each unit shall be demonstrated by accelerating the equipment to its overspeed trip level specified in the operating and maintenance instructions and observing the unit trip. Electronic over-speed preferred.

1610.3.4.8 Dead Bus Closure Test

The Contractor shall demonstrate the Facility's dead bus protection scenarios by simulating with test sets.

1610.3.4.9 Reverse Power Test

The Contractor shall demonstrate the Facility's ability to protect from reverse power scenarios by simulating with test sets.

1610.3.4.10 Load Rejection Test

Contractor shall demonstrate each unit is capable of a full load rejection. The test shall be conducted by loading the unit to its rated full load and opening the generator circuit breaker. The test shall be declared successful if the unit continues to operate without resulting in an overspeed trip.

1610.3.4.11 Load Acceptance Test

The Contractor shall demonstrate the full generator nameplate capacity of each thermal unit while integrating with the existing Randolph Harley power plant.

1610.3.4.12 Generator MVAR Test

The Contractor shall conduct a steady state Generator MVAR test to confirm the generator nameplate MVAR ratings and satisfy utility requirements.

1610.3.4.13 Fuel Transfer Test

The Contractor shall demonstrate the thermal unit's ability to transfer between 100 percent LPG to 100 percent ULSD and 100 percent ULSD to 100 percent LPG, under load, during operation.

1610.3.4.14 BESS Functionality Test

The Contractor shall demonstrate the full BESS nameplate capacity while integrating with the new Facility and existing Randolph Harley power plant.

1610.3.4.15 CEMS Compliance Test

The Contractor shall demonstrate CEMS certification in compliance with 40 CFR Part 60 and/or Part 75 requirements, as applicable.

1610.3.4.16 Voltage and Frequency Control Test

The Contractor shall demonstrate system functionality to control voltage and frequency during loading and unloading in isochronous mode. The Contractor shall also demonstrate automatic control of load in droop mode.

19000 - Quality System Requirements

If the Contractor believes that an inconsistency exists between this section and other portions of the contract documents, the Contractor shall immediately notify Owner for resolution.

19000.1 General Quality System Requirements

19000.1.1 Quality System

The Contractor's quality system shall comply with ISO 9001 Quality Management Systems and or ASME and the codes and standards listed throughout this document.

The Contractor's quality management system shall ensure that all equipment, assemblies, services, and commodities supplied are in conformance with the contract drawings and specifications.

The Contractor's quality management system shall provide assurance that design, procurement, materials, manufacturing processes, inspection and testing, packaging, shipping, storage, and related services comply with the requirements of the contract documents.

The Contractor's quality management system shall have a defined process for reporting, segregation, evaluation, disposition, and closure of nonconforming product. This quality management system shall be available to the Owner for review and/or audit at all of Contractor's locations where work is being performed subject to these contract documents.

19000.1.2 Quality System Manual

The quality management system shall be documented in the Contractor's quality system manual. One quality system manual shall be submitted to the Owner as defined in the Schedule of Submittals if a current version is not already on file with the Owner. If the Contractor's program has been certified by a registered certification agency as satisfying the requirements of ISO 9001, a copy of the Certification Letter or Certification of Authorization shall be submitted instead of the Quality Manual.

19000.1.2.1 Revisions

Revisions to the Contractor's quality system manual shall be submitted to the Owner throughout the life of these contract documents. If the Contractor has previously submitted a quality system manual to the Owner, the Contractor shall submit (in writing) the following information:

Title and number designation of the document, e.g., QP 500 Quality Assurance Manual.

Applicable Contractor location(s) covered by the document.

Revision level and date of the manual that is currently being used.

19000.1.3 Sub-tier Contractors

The Contractor shall obtain the Owner's approval in writing prior to using sub-tier Contractors for manufacturing or engineering activities. Material/commodity sub-tier Contractors are exempted from these requirements.

All applicable requirements of the contract documents (i.e., technical, quality, and administrative) shall be passed on to the applicable organizations within the Contractor and sub-tier Contractor's companies. The Contractor shall ensure that sub-tier Contractors have the capabilities to fulfill contract document requirements. Contractors shall monitor sub-tier Contractors' quality of work and shall indicate their strategy on their inspection and test plan. Contractors shall submit required procedures, drawings, quality manuals, and/or other submittals when required for approval and/or information of sub-tier Contractor's capabilities, processes, or in-process work involving the engineering, fabricating, and manufacturing of equipment and commodities for the Owner.

Sub-tier Contractor qualification and monitoring are the responsibility of the Contractor. Owner has the authority to perform quality audits and inspections and monitor and/or review sub-tier Contractor processes and facilities, at all locations where work is being performed subject to these contract documents.

19000.1.4 Inspection and Test Plan

A detailed inspection and test plan (i.e., a Quality Assurance/Quality Control Plan) for the work/equipment shall be submitted to the Owner as specified in the contract documents prior to starting fabrication. The Owner will designate any additional test witness points or other inspection points required during review of the Contractor's submitted detailed inspection and test plan.

The inspection and test plan shall identify the inspection and testing points including the acceptance criteria for major components of the work, relevant procedures, specifications, codes, the facility location for each inspection or test, and inspection target dates for each inspection or test. Commercial off-the-shelf items are exempted from these requirements.

The Contractor shall keep the Owner informed of the progress of the work. When inspection and test points have been designated by the Owner as witness, in-process and/or hold points, the Contractor shall notify the Owner at least 14 calendar days in advance of the appropriate times for inspections and testing. The work shall not progress past the Owner's designated hold point until the Owner has verified the work or witnessed the designated test.

A witness inspection point is a step-in manufacturing where the Contractor is obligated to notify the Owner in advance of the performed operation so that it may be witnessed. If the Owner is not present at the time and date specified by the Contractor, the Contractor may proceed.

A hold inspection point is a designated stopping place during or following a specific activity at which the Owner's inspection or witness is required before further work can be performed. The Contractor may not proceed beyond the hold point without inspection or witness by the Owner unless prior written authorization is obtained from the Owner.

An in-process inspection point is an Owner inspection that occurs during the manufacture of the Contractor goods. If the Owner is not present at the time and date specified by the Contractor, the Contractor may proceed.

The Owner may waive the witness of tests; waivers for hold points shall be in writing. Waivers in no way absolve or relieve the Contractor of complying with contractual requirements.

If the Contractor has notified the Owner defining the specific test date and time and the Contractor is not ready to conduct the test at the stated date and time, the Contractor shall be accountable for all additional expenses

incurred by the Owner.

The following table lists the minimum surveillance activities that the Owner will perform. The Owner may make additions and deletions of surveillance activities based on, but not limited to, the following:

Contractor Inspection and Test Plan (ITP).

Contractor performance.

Client requests.

Equipment assessment

Design reviews.

Post award communication between the Owner and Contractor regarding Inspections and Tests shall be done with the ITP.

Surveillance Type	Task
RICE or Combustion Turbine	Witnessed Performance Test
Control System	Witnessed Factory Acceptance Test

19000.1.4.1 Inspection Release

The Contractor must obtain a written inspection release from Owner prior to releasing the equipment item from their fabrication facility. All Schedule of Submittal items must be resolved prior to issuing an Inspection Release.

19000.1.5 Inspections by Owner

The Owner may elect to perform assessments, quality audits, or witness testing at any time during the manufacturing process. The Owner may designate an authorized agent for assessments, witness testing, or quality audits. Authorized agent may be an employee of the Owner or an outside agency. When an outside agency is designated as an authorized agent for the Owner, such designation will be in writing with a copy provided to the Contractor. When the term "Owner's representative" is used, it may mean the Owner or the authorized agent.

The following requirements shall apply for Owner's inspection at the Contractor's mill, factory, yard, warehouse, or sub-tier Contractor's facilities.

19000.1.5.1 Access

The Owner's representative shall have the right to access the Contractor's and sub-tier Contractor's work and related documents during the manufacturing process without delaying the schedule. The Contractor shall provide, without cost, reasonable facilities including tools, personnel, and instruments for demonstrating acceptability of the work.

19000.1.5.2 Surveillance Activities

In accordance with the contract documents, designated hold points for witnessing, mill and/or factory tests shall be performed in the presence of the Owner's representative unless waived in writing by the Owner's representative. The Contractor shall bear all costs for such tests, except the compensation and expense of the Owner's representative.

19000.1.5.3 Control of Special Processes

It is Contractor's responsibility to ensure that qualified personnel are employed to perform special processes such as welding, NDE, coating, painting, etc. If special processes are conducted by unqualified employees, the Owner has the right to validate and test the product at Contractor's expense and/or reject the product. The Contractor shall be able to demonstrate the qualifications of personnel in writing.

19000.1.5.4 Corrective Action

Upon identification of a noncompliance with the requirements of the contract documents, the Contractor shall document the noncompliance issue. For noncompliance issues where the nonconforming characteristic can be restored to a condition such that the capability of an item to function reliably and safely is unimpaired, even though that item still does not conform to the original requirement, the Contractor shall submit the noncompliance to the Owner for approval. During witness and hold point activities, if the Owner's representative identifies a noncompliance issue, the Contractor shall document the noncompliance issue and provide a copy of the documentation to the Owner's representative.

If the Contractor disagrees and does not document the noncompliance, the Owner's representative shall issue a corrective action report to the Contractor for disposition and action. The Contractor shall correct, in a timely manner, all deficiencies identified in the corrective action report.

19000.1.5.5 Rejection

If any items or articles are identified that do not meet the requirements of the contract documents, the lot, or any faulty portion thereof, may be rejected. Before offering specified materials or equipment for shipment, the Contractor shall inspect the material and equipment and eliminate any items that are defective or do not meet the requirements of the contract documents. The fact that equipment or materials have been previously inspected, tested, and accepted does not relieve the Contractor of responsibility in the case of later discovery of flaws or defects.

19000.1.5.6 Receipt Inspection

Materials or equipment purchased under these contract documents may be inspected at the specified receiving points and will either be accepted or rejected. Receipt inspection will include testing to determine compliance with the contract documents. Initial receipt inspection acceptance tests will be performed by the Owner at the Owner's expense. Items found to be defective may be returned to the Contractor for correction at the Contractor's expense, including shipping cost, or the cost to correct and inspect the item will be charged to the Contractor.

19000.1.5.7 Deviation

Any technical deviations sought by the Contractor to the Contract Documents shall require written approval from Owner prior to the deviation or change being implemented.

19000.1.5.8 Rework/Repair

The Contractor shall submit a repair procedure to Owner for all major repairs. The Contractor shall obtain Owner approval of the repair procedure prior to starting the repair. Major repair is defined as a repair, or replacement with new, to correct a material or manufacturing defect which would affect the safety or operability of the equipment if not corrected properly. This includes any defect of a magnitude that Contractor's quality assurance procedures would require the manufacturing personnel to obtain approval from the Contractor's engineering personnel prior to making the repair.

21000 - Technical Supplemental Specifications

This section contains technical supplemental specifications that provide additional requirements applicable to the work covered under the technical sections.

D200 Design Ambient and HVAC Criteria

Area Specific Design. The general design ambient air conditions shall be used unless area specific or equipment specific conditions are indicated in the contract documents:

Area	Temperature, °F		Relative Humidity, %	
	Minimum	Maximum	Minimum	Maximum
General Outdoor Area	50	99.4	10	100
*Nominal outdoor minimum ambient design temperature for determining commodity material properties (pipe, valves, etc.) will be 50° F.				

Randolph Harley Power Plant Expansion Project HVAC Design Criteria: Space conditioning consisting of heating, ventilating, and air conditioning (HVAC) shall be provided as determined by Engineer to ensure design basis environmental conditions for equipment and personnel. HVAC systems shall be designed to maintain the indoor conditions listed above. Design shall be based on the following ambient temperatures:

Winter ambient design basis: ASHRAE 99% 70.3° F
for Cyril E. King Airport WMO# 785430

Summer ambient design basis: ASHRAE 2% 87.9 F DB 77.8° F WB
for Cyril E. King Airport WMO# 785430

Values of ambient dry-bulb, dew point, and wet-bulb temperatures correspond to the annual percentiles the value is exceeded on average by the percentage of the total hours in a year (8760). The 2% (warm) value is exceeded on average 175 hours per year. The 99% (cold) value for which the weather is less than the design condition for 88 hours per year on average. Buildings requiring heat will be provided with adequate heat capacity to prevent indoor temperatures below freezing on record low recorded temperatures.

The Randolph Harley Power Plant Expansion Project design criteria table above indicates the level of redundancy for HVAC equipment in the indicated areas. Multiplicity means that more than one partial capacity ventilation device shall be used. Some ventilation capacity shall be provided with a single component failure. When redundancy is indicated, only the major active components shall be provided with backup equipment. Static components such as ductwork, duct mounted heaters, duct mounted variable volume boxes, shall not be duplicated. Minimum ventilation rates shall be provided in normally continuously occupied areas in accordance with local codes. In the absence of applicable local codes, ASHRAE Standard 62 requirements shall be met.

The filtration levels are as defined in the International Society of Automation Standard ISA-71.04, Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants. This may involve the use of gas filtration, if required by the outdoor air quality as determined by Engineer. The air conditioning for control and electrical equipment shall be designed to meet the filtration levels indicated in the Randolph Harley Power Plant Expansion Project HVAC design criteria table above. Tabulated filtration efficiency and MERV levels are indicated in accordance with ASHRAE Standard 52.1, Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate

Matter and ASHRAE Standard 52.2, Method for Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particulate Size:

Filtration Level	Dust Spot Efficiency, %	Minimum MERV
High	80 to 90	13
Medium	20 to 60	7 to 11
Low	Less than 20	N/A

Noise criteria are indicated in the Randolph Harley Power Plant Expansion Project HVAC design criteria table above as NC levels, decibels, or as background. Noise criteria (NC) values are as indicated in the ASHRAE Handbook series for acoustic design criteria. Decibels are sound pressure levels, A-weighted to a reference of 0.0002 microbar at 5 feet from the equipment, as measured in a free field with a single reflecting plane. Background indicates that the HVAC equipment shall be 2 dBA less than the room noise at 6 feet above the floor with normal plant equipment in operation.

Mechanical equipment rooms containing refrigerants shall be designed in accordance with the requirements of ASHRAE 15, Safety Code for Mechanical Refrigeration.

A minimum of 5 air changes per hour of ventilation or recirculation air shall be provided for effective mixing during heat removal ventilation or air conditioning.

Maximum design temperatures represent the average building temperature. Cooler temperatures may occur near the ventilation inlets, and higher temperatures may occur at relief and exhaust points.

Randolph Harley Power Plant Expansion Project HVAC Criteria Table								
Building Area	Indoor Temperature		Humidity Control (%RH)	Minimum Ventilation Rate Based on a 16° F Rise or (ac/h) whichever is greater.	Minimum Particle Filtration Efficiency (% MERV)	Pressurization	Redundancy	Noise Criteria
	Maximum °F based on Summer ambient design basis	Minimum °F based on Winter ambient design basis						
Control rooms and control equipment rooms; for instruments and electronics	78	72	0-65	NA	30, (7)	Positive	100%	NC 45
Electrical Equipment	104	45	None	Minimum 5 ACH	20 (NA)	None	2 x 50%	85 dBA
Battery Rooms	77	77	None	As required for 1% hydrogen dilution	None	Negative	Exhaust 2 x 50%	85 dBA
Storage	104	65	None	Minimum 5 ACH	None	None	Multiplicity	75 dBA

Q100 General Welding Requirements

Unless otherwise specified, the applicable governing edition and addenda to be used for all references to codes or standards specified herein shall be interpreted to be the jurisdictionally approved edition and addenda. If a code or standard is not jurisdictionally mandated, then the current edition and addenda in effect at the time of (contract or specification) approval shall govern.

Q100.1 General

Any conflict identified between the requirements of this Welding Technical Supplemental Specification and the provisions of any applicable industry standard, code, regulation, or any specification, standard, or purchasing document contractually required for a given application shall be referred to Owner for resolution prior to the start of welding.

Where requirements of a referenced code or standard differ from this section, the more stringent or restrictive requirements shall apply.

Any request for deviation from specified requirements shall be submitted in writing and shall include the proposed deviation, rationale for the deviation, any technical data supporting the deviation, and historical experience supporting the deviation.

Q100.2 Welding Processes

Unless otherwise specified, only shielded metal arc welding (SMAW), gas metal arc welding (GMAW), flux cored arc welding (FCAW), submerged arc welding (SAW), plasma arc welding (PAW), stud welding, and gas tungsten arc welding (GTAW) processes shall be permitted within the restrictions or limitations specified in the applicable Welding Technical Supplemental Specification section. Other welding processes may be used, provided the governing code or standard permits it and written approval has been granted by Owner.

Any limitation or restriction specified for GMAW short-circuit arc transfer or a variation of controlled wave- form GMAW short-circuit arc transfer marketed by welding equipment manufacturers such as Miller Electric's RMD and Lincoln Electric's STT process shall be applied the same, whether a constant voltage (CV) power supply or other power supply developed by a welding equipment manufacturer is used.

Q100.3 Welding Procedure Qualification

Welding procedures shall be prepared and qualified in accordance with the referenced code. Unless otherwise specified, each manufacturer or contractor is responsible for conducting the tests required by the referenced code to qualify the Welding Procedure Specification (WPS).

Because of the number of different filler metal types and alloys within various alloy P-number groups, WPSs for welding P-Nos. 8, 10H, and 41 - 49 shall identify the required filler metal classification (s) vs the actual base material type(s) to be welded in production to ensure appropriate filler metal selection, e.g., E/ER316 for P-Nos. 8 (Type 316); E/ER308L for P-Nos. 8 Type 304L, etc. Alternatively, filler metal and base metal types may be cross-referenced to the WPS by other means, e.g., a weld map (or a separate listing of WPS and filler metal and base material grades, addendum to the WPS, etc.

Standard Welding Procedure Specifications (SWPSs) produced by the American Welding Society (AWS) may be used when permitted by the jurisdictional code. Any supplemental requirements mandated by the jurisdictional code shall be met.

Q100.3.1 Welding Procedure Submittals

WPSs and applicable Procedure Qualification Records (PQRs) shall be submitted for review by Owner prior to start of fabrication. Submittal of welding procedures and applicable PQRs shall apply to all Contractors and sub-contractors. Contractors shall review the documents in accordance with the applicable code and specification requirements and shall accept all of their sub-contractors' welding procedures and applicable PQRs prior to submitting accepted documents to Owner.

The submittal shall also include a weld map or tabulated listing of WPSs to be used. The applicable code(s) of construction and production base material types and grades shall be listed on the weld map or listing.

Q100.4 Welder/Welding Operator Performance Qualification

Welders and welding operators shall be qualified in accordance with the referenced code. The welder and welding operator qualification records shall be available at the shop facility or construction site and shall be made available for review when requested.

Field personnel not qualified and certified as welders or welding operators are prohibited from performing any welding activities such as tack welds, temporary welds, permanent welds, manufacturing aids, tools, fixtures, or other welded items. The only field personnel not qualified or certified as welders or welding operators who are permitted to perform welding are personnel completing welding training or performing welding performance qualification testing required by the applicable referenced code or specification.

Shop personnel not qualified and certified as welders or welding operators are prohibited from performing any welding activity on materials designated for permanent or temporary installation by the contract, such as tack welds or temporary welds.

Each manufacturer or contractor is responsible for the qualification of welders or welding operators. Welder or welding operator performance qualification testing shall be performed under the full supervision and control of the manufacturer or contractor.

Q301 Manufacturer's Standard Coating

The manufacturer's standard coating systems shall be applied in the shop to ferrous metal surfaces of equipment and materials. The coating systems shall provide resistance to corrosion caused by weather and industrial environments specific to the site. Manufacturer's standard coating systems shall be specified to provide medium (M) durability in accordance with ISO 12944, Paints and Varnishes – Corrosion Protection of Steel Structures by Protective Paint Systems, for the intended service environment. Surfaces that will be inaccessible after assembly shall be protected for the life of the equipment.

Coating material and application shall conform to the regulations of the air quality management agency having jurisdiction. Materials shall be formulated to contain less than 0.06 percent lead or chromium in the dried film.

Surfaces shall be cleaned, prepared, and coated in accordance with the coating manufacturer's instructions and specified codes. Surfaces to be painted shall be prepared, as necessary, to provide a smooth, uniform base for painting.

Coating films that show defects such as sags, checks, blisters, teardrops, and fat edges will not be accepted. Any coated surface that contains any of the previously mentioned defects shall be repaired or, if necessary, entirely removed from the member or unit involved and the surface recoated.

Surfaces to be finish painted after installation shall be shop painted with one coat of the manufacturer's standard primer.

Touchup paint shall be provided for repair painting of at least 10 percent of the finish painted equipment surface. The touchup paint shall be the same type and color as the shop applied material. Application instructions shall be provided.

No coating shall be applied to surfaces within 3 inches (75 mm) of field welded connections.

Coating dry film thicknesses shall be measured using a magnetic or electronic thickness detector in accordance with Society for Protective Coatings (SSPC)-PA2.

Additional coating shall be applied to all areas that show a deficiency in dry film thickness.

Q301.1 Control and Electrical Equipment

Control and electrical equipment, including panels, cabinets, switchgear, transformers, and motors, shall be finish painted. Exterior surfaces shall be the manufacturer's standard color unless specified otherwise. The interior portions of cabinets shall be painted a light reflecting color.

Q301.2 Mechanical Equipment

Mechanical equipment, including pumps, compressors, valves, valve operators, external piping surfaces, and other similar equipment, shall be cleaned, prepared, and primed. If mechanical equipment will operate at temperatures above 200° F (93° C) and will not be insulated, a high temperature coating system designed for the operating temperatures shall be applied.

Q301.3 Documentation

Shop drawings shall identify the shop applied coating systems. Data to be provided shall include the coating system manufacturer's name and product designation, the degree of surface preparation, dry film thickness, finish color, and Safety Data Sheets (SDSs). Final dry film thickness test results shall be submitted to Owner for verification.

Q400 General Equipment Requirements

Q400.1 Fabrication Restrictions

Unless specifically provided otherwise in each case, all materials and equipment furnished for permanent installation in the work shall conform to applicable standard specifications and shall be new, unused, and undamaged.

Asbestos containing materials will not be allowed.

Flanges, fittings, and valves manufactured in the People's Republic of China shall meet following requirements.

Manufacturer's quality system shall be in accordance with ISO 9001 and the manufacturer shall hold a valid ISO 9001 certificate issued by the certified ISO 9000 certification organization.

Manufacturer shall hold a manufacturer's license issued by the China Special Equipment Inspection & Research Center (CSEI) under General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) or an acceptable equivalent in accordance with Owner's Engineer.

Products shall have markings as required by ASME B16.1, ASME B16.5, ASME B16.9, ASME B16.10, ASME B16.11, ASME B16.25, or ASME B16.34 as applicable.

The final quality certificate and quality inspection documents shall bear the official stamp of CSEI or AQSIQ or its branches.

Individual parts shall be manufactured to standard sizes and gauges so that repair parts furnished at any time can be installed in the field. Like parts of duplicate units shall be interchangeable.

Q400.2 Nameplates and Tags

Nameplates and tags shall be furnished, and shop installed for all equipment with an Owner's identification number based upon the guidelines provided herein. The Owner will annotate the Contractor's drawings on initial submittals of technical drawings of the equipment. The information will include the nameplate description, tag number, physical size, and lettering height.

The type of nameplate will vary because of size constraints, equipment location and/or orientation, or the environment in which the equipment is located.

In general, nameplates shall be furnished for major equipment, including all operator interfaces, control and electrical panels, cabinets, and instrument racks. The nameplates shall be beveled, laminated white phenolic plastic engraving stock with black core or beveled, two-ply vinyl white with reverse engraved black fill. These nameplates shall be 2 inches by 8 inches (50 mm by 200 mm) with three lines of text. The top two lines of text shall be a brief description of the equipment. These lines of text shall be 3/8 inch (10 mm) high. The bottom line of text shall be the Owner's identification number of the equipment. This line of text shall be 3/16 inch (5 mm) high. Nameplates that are to be mounted on equipment to be installed in nonair-conditioned areas shall be attached with stainless steel panhead screws, rivets, drive screws, or epoxy glue. Nameplates that are to be mounted on equipment to be installed in heated and air-conditioned areas shall be attached with high performance adhesive tape. Nameplates shall be 1/16 to 1/8 inch (2 mm to 4 mm) thick.

Stainless steel tags shall be furnished for field instrumentation, process valves, and other small devices that a plant operator is not likely to have any direct interface with, as directed by the Owner. These stainless-steel tags shall be permanently attached to the equipment with stainless steel panhead screws, rivets, drive screws, or, with the Owner's acceptance, stainless steel wire. The size of these tags shall be a minimum of 1-1/4 inch by 2-1/2 inches (30 mm by 65 mm) 18 Ga thickness and include the Owner's identification number.

Lettering shall be electro/laser etched, stamped, or engraved on a polished plate, with text at least 3/16 inch (5 mm) in height. Text shall be sized as large as possible within the size constraints of the tag.

Separate nameplates are not required for pressure indicators. They may be provided instead with nameplate information, as described above, permanently engraved on the faces. Face engraving text size and layout shall be readable without magnification.

Q400.3 Tools

The Contractor shall furnish and ship with each piece of equipment one set of all special tools required for dismantling, maintenance, and overhaul of the equipment. The tools shall be shipped in separate, heavily constructed wooden boxes provided with hinged covers and padlock hasps.

Maintenance tools for each piece of equipment shall be boxed separately and the boxes shall be marked with the name of the project and the name of the equipment.

The maintenance tools shall include all special handling rigs, bars, slings, and cable. All maintenance tools shall be in new and unused condition and shall become the property of the Owner. The Offeror's proposal shall include the list of maintenance tools which shall be furnished with the equipment.

Q500 Shop Drawings and Instruction Manuals

This section, in conjunction with the Schedule of Submittals, stipulates the requirements for engineering data that Contractor shall submit for design information and review. Document submittal procedures shall be in accordance with the requirements of this Purchase Order.

Q500.1 Submittal Requirements

Technical data shall be submitted in electronic format. Electronic technical data submittals shall be made using the "LATER", a Web-based file transfer service. If Contractor does not already have "LATER" transmittal capability, the Owner will provide the required credentials for access upon Purchase Order award.

Notification to Owner that submittals have been posted to "LATER" shall be in accordance with the correspondence requirements of this Purchase Order.

Q500.2 Compliance Reports

Reports shall be submitted that record the tests and/or calculations.

Q500.3 Not Used

Q500.4 Drawings

Drawings shall be in sufficient detail to indicate the kind, size, arrangement, component weight, breakdown for shipment, and operation of component materials and devices; the external connections, anchorages, supports, and grouting requirement; the dimensions needed for installation and correlation with other materials and equipment; and the information specifically requested in the Schedule of Submittals.

Contractor shall fully complete, check, and certify drawings, including drawings produced by a subcontractor, for compliance with the Purchase Order requirements prior to submittal. Drawings shall have title block entries that clearly indicate the drawing is certified.

Each submitted drawing shall be project unique and shall be clearly marked with the name of the project, unit designation, Owner's Purchase Order title, Owner's Purchase Order file number, project equipment or structure nomenclature, component identification numbers, and Owner's name. Equipment, instrumentation, and other components requiring Owner-assigned identification tag numbers shall be clearly identified on the drawings. If standard drawings are submitted, the applicable equipment and devices furnished for the project shall be clearly marked.

The transmittal letter shall include the manufacturer's drawing number, revision number, and title for each drawing attached as well as all fields listed in the transmittal letter. Each drawing title shall be unique and shall be descriptive of the specific drawing content. Transmittal letters for resubmitted drawings shall include the Owner's drawing numbers.

Catalog pages are not acceptable, except as drawings for standard non-engineered products and when the catalog pages provide all dimensional data, all external termination data, and mounting data. The catalog page shall be submitted with a typed cover page clearly indicating the name of the project, unit designation, specification title, specification number, component identification numbers, model number, Contractor's drawing number, and Owner's name.

Drawings shall be submitted with all numerical values in English units.

All multi sheet documents shall be submitted in their entirety for all revisions.

Q500.4.1 Drawing Submittal

Drawings shall be submitted electronically in Portable Document Format (PDF). AutoCAD or MicroStation format files are not acceptable. If Contractor does not have the capability to provide Portable Document Format (PDF), an alternative submittal format shall be used as mutually agreed between Owner and Contractor.

Q500.4.2 Drawing Processing

Contractor's engineering schedule shall allow a minimum of two (2) weeks for transmittal, processing, and review of drawings and data by Owner.

Unless this Purchase Order indicates that a drawing or engineering data submittal by Contractor is to be for Owner's information only, Owner, upon receipt of submittals, shall review and return same to Contractor, marked "No Exceptions Noted," "Exceptions Noted," "Received for Distribution," "Returned for Corrections," "Release for Record," "Void," "Superseded" or "Hold".

Q500.4.2.1 No Exceptions Noted (NE) or Received for Distribution (RD).

Upon receipt of a submittal marked "No Exceptions Noted" or "Received for Distribution," Contractor may proceed with its Work to the extent of and in accordance with the submittal. Contractor shall not resubmit unless the drawing or document is revised, in which case it shall be resubmitted as a new document revision in accordance with Q500.4.2.7.

Q500.4.2.2 Exceptions Noted (EN).

Upon receipt of a submittal marked "Exceptions Noted" and if Contractor concurs with Owner's comments, Contractor shall incorporate same and may proceed with its Work to the extent of and in accordance with the annotated submittal. Contractor shall submit to Owner within fourteen calendar days a revision to the original submittal in which Owner's comments have been incorporated. If Contractor determines that it cannot incorporate Owner's comments without prejudice to Contractor's warranty or other obligations under this Purchase Order, Contractor shall so advise Owner in writing within seven calendar days of its receipt of Owner's comments, stating the reasons therefore. Contractor may proceed with its Work to the extent of and in accordance with the annotated submittal only upon Owner and Contractor resolving Owner's comments.

Q500.4.2.3 Returned for Corrections (RC)

Upon receipt of a submittal marked "Returned for Corrections," Contractor shall immediately take all necessary action to revise its submittal in accordance with Owner's comments, the Specification, and the Drawings, and shall resubmit to Owner for review the corrected original submittal, voiding previous information and adding new documents if required. In no event shall Contractor proceed with the affected Work until its revised submittals have been returned to Contractor marked "No Exceptions Noted" or "Exceptions Noted" by Owner.

Q500.4.2.4 Release for Record (RR)

Receipt of a submittal marked "Release for Record" indicates that there are no specific objections to the document. Work may proceed. Certain project information required by the Owner's document management system may have been added electronically to the drawing and provided to Contractor for the record. Contractor shall not resubmit the drawing or document unless revisions to the design are required. If revisions are required, Contractor shall incorporate Owner's information and resubmit as a new revision. Owner's project-specific information shall be added if future revisions and submittals are made.

Q500.4.2.5 Void (VO) or Superseded (SS)

Receipt of a submittal marked "Void" or "Superseded" does not require any action by Contractor. "Void" indicates that the submittal is no longer applicable to the project and is not being replaced by other drawings or data. "Superseded" indicates that different drawings or data have replaced the previously submitted drawings and data; this status does not pertain to revisions of the same drawings and data.

Q500.4.2.6 Hold (HO)

A submittal may be given a status of "Hold" by the Owner, or the Contractor may have "Holds" on the submitted drawing.

For a Hold status designated by the Owner, the Contractor shall not proceed with the work that is designated on "Hold" except as specifically directed by the Owner. Additional information required for the Contractor to release the "Hold" will be transmitted from the Owner later.

The Contractor shall provide information to the Owner about the cause for any "Holds" designated on the drawing and immediately take all action necessary to resolve the "Holds". The Contractor shall resubmit the drawing for review once the "Holds" are removed from the drawing and should make all efforts to not submit drawings to the Owner until drawing review comments have been received back from the Owner.

Q500.4.2.7 Resubmittals

If during or subsequent to the completion of the submittal process, Contractor makes further changes to the equipment and materials shown on submittals that have been reviewed by Owner, the changes shall be clearly marked on the submittal by Contractor and the submittal process shall be repeated. If changes are made by Contractor after delivery to the Jobsite, drawings conforming to construction records indicating the changes shall be prepared by Contractor and submitted to Owner for review. Any resubmittal of information shall clearly identify the revisions by footnote or by a form of back-circle, with revision block update, as appropriate.

Q500.4.2.8 Owner's Review. Owner's review of drawings and other submittals will cover only general conformity of the data to the Specifications and Drawings, external connections, interfaces with equipment and materials furnished under separate specifications, and dimensions that affect plant arrangements. Owner's review does not include a thorough review of all dimensions, quantities, and details of the equipment, material, device, or item indicated or the accuracy of the information submitted. Review and comment by Owner of Contractor's Drawings or other submittals shall not relieve Contractor of its sole responsibility to meet the requirements of this Purchase Order.

Q500.4.2.9 File Returns to Contractor

The project-specific web service will be used by Owner to return PDF files to Contractor.

Q501 Instruction Manuals

Q501.1 Submittal Requirements

The following number of copies shall be submitted to the Owner unless otherwise indicated in the Schedule of Submittals:

Submittal Description	Copies Required
Proof Copies	2
Final Copies	4

Q501.2 Instruction Manuals

Contractor shall furnish proof and final instruction manuals for the unloading, storage, installation, operation, and maintenance of the equipment.

Manuals shall include the following information specific to the furnished equipment. The documents or drawings submitted within the Instruction Manual shall be consistent with the documents or drawings previously submitted for Owner's review.

Table of contents and index tabs. (If multiple volumes are required, a table of contents listing materials included in each volume shall be supplied for each volume.)

Specifications, test data, and all performance curves specified in the technical specifications.

Description of the equipment, including illustrations showing elevations, cross section, and all details of the equipment with all parts named, numbered, and identified with Owner's tag numbers. When multiple model numbers are shown on the drawings, the equipment supplied for the project shall be clearly identified.

Complete and detailed operating instructions, including safety precautions, philosophy of operation and, where applicable, process optimization techniques.

Detailed minor and major maintenance instructions, including description, use of special tools furnished, and preventive maintenance schedule.

Inspection procedures.

Troubleshooting guide

All fluid systems schematics and piping diagrams.

Control logic diagrams, as applicable.

Electrical wiring diagrams, as applicable.

Calibration Data Sheet for each adjustable instrument included in the scope of supply.

Motor Information Sheets, as applicable.

Electric Actuator Information Sheets, as applicable.

Control Panel Arrangements, as applicable.

Supplier and Sub-supplier operating and maintenance manuals.

Illustrated parts breakdown.

Assembly drawings.

Parts lists.

List of acceptable lubricants.

Nameplate information and shop order numbers for each item of equipment and associated component parts thereof.

List of recommended spare parts.

List of maintenance tools furnished with the equipment.

The above listed requirements are the minimum requirements; however, requirements that are clearly not applicable to the equipment may be deleted with Owner's approval. Additional information that is necessary for proper operation and care of the equipment shall also be included.

Q501.2.1 Binding

Each copy of the manuals shall be assembled and bound in three-ring or post binders designed for rough usage. Light-duty binders will not be acceptable.

S100 Seismic Design

S100.1 General

This article specifies the general criteria and procedures that shall be used to ensure that structures, components, and equipment meet performance objectives during and following a seismic event.

The building or structure structural system shall provide a continuous load path or paths, with adequate strength and stiffness to transfer all seismic forces from the point of application to the final point of resistance.

Structures, components, and equipment shall be designed so that seismic forces are positively transferred to the supporting structure or foundation. The transfer method shall be acceptable to the Contractor and may include, but not be limited to, bolts, welds, guides, bumpers or shear lugs as appropriate. Frictional resistance due to gravity shall not be considered in evaluating the required resistance to seismic forces.

For seismic design of vessels, tanks, and other components, contents that are flammable, explosive, corrosive, acidic, caustic, toxic, or that otherwise present a danger if released shall be considered hazardous materials.

Seismic design shall be performed in accordance with the building code along with the applicable edition (as required by the specified building code) of the following references:

American Institute of Steel Construction (AISC), AISC 360, "Specification for Structural Steel Buildings."

American Institute of Steel Construction (AISC), AISC 341, "Seismic Provisions for Structural Steel Buildings."

American Concrete Institute (ACI), ACI 318, "Building Code Requirements for Structural Concrete."

American Concrete Institute (ACI), ACI 307, "Design and Construction of Reinforced Concrete Chimneys."

American Society of Mechanical Engineers (ASME), "Boiler and Pressure Vessel Code" and all addenda.

American National Standards Institute (ANSI), "ASME Code for Pressure Piping, ASME B31.1, Power Piping."

Manufacturers Standardization Society of the Valve and Fitting Industry (MSS), MSS SP-58, "Pipe Hangers and Supports - Materials, Design, and Manufacture."

American Petroleum Institute (API), API 650, "Welded Steel Tanks for Oil Storage."

American Water Works Association (AWWA), AWWA D100, "Welded Steel Tanks for Water Storage."

National Fire Protection Association (NFPA), NFPA 13, "Standard for the Installation of Sprinkler Systems."

Other nationally recognized and accepted design standards and references as appropriate.

S100.2 Seismic Forces

Seismic forces shall be determined from the basic seismic parameters prescribed by the building code. The design forces and their distribution over the height of the building or structure shall be determined using a linearly elastic analysis model and the procedures listed in the specified building code. Load combinations, including seismic, shall be in accordance with the specified building code.

W_p for tanks, bins, and silos shall represent the weight of the tank structure and appurtenances and the operating weight of the contents at maximum rated capacity. Hydrodynamic effects of contents shall be considered in the seismic design of vessels and tanks as required by the specified building code.

Seismic dynamic forces shall be considered in the seismic design of below ground structures in addition to the static soil pressures.

S100.3 Seismic Design and Certifications

S100.3.1 Buildings

Buildings shall provide sufficient strength and ductility to resist the specified seismic effects and may use any of the basic structural systems permitted by the specified building code. Usage of structural systems shall be in accordance with the limitations prescribed in the specified building code. The effects of both plan and vertical irregularities shall be considered, as required by the specified building code.

Buildings shall be seismically analyzed using either Equivalent Lateral Forces or Modal Analysis in accordance with the specified building code and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code.

The effective seismic weight, "W" as defined in ASCE 7, for buildings shall include the total dead load, the total operating weight of permanent equipment and the effective contents of vessels, and applicable portions of other loads, as required by the specified building code.

S100.3.2 Nonbuilding Structures

Nonbuilding structures include all self-supporting structures, other than buildings, bridges, and dams, that are supported by the earth; that carry gravity loads; and that may be required to resist seismic effects.

These include, but are not limited to, reciprocating engines, cooling towers, stacks, pipe racks, trussed towers, transmission towers and poles, tanks, vessels, bins, and hoppers. Design of nonbuilding structures shall provide sufficient strength and ductility, consistent with the requirements for buildings, to resist the specified seismic effects.

Nonbuilding structures shall be seismically analyzed using either Equivalent Lateral Forces or Modal Analysis in accordance with the specified building code, and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code and other referenced codes.

The effective seismic weight, "W," for nonbuilding structures shall include all dead load as defined for buildings and shall also include all normal operating contents of tanks, vessels, bins, and piping.

S100.3.3 Nonstructural Components

S100.3.3.1 General

Nonstructural components include architectural, mechanical, and electrical parts, portions, and equipment that are attached to and supported by a building or structure but are not part of the structural system, such as nonbearing walls and partitions, ceilings, storage racks, access floors, tanks, pumps, piping, fans, HVAC ductwork, elevators, electrical panels, cable tray, and other nonstructural items.

Components shall have the same Seismic Design Category as the structure to which they are attached. Components shall be assigned a component importance factor (I_p) and designed to withstand seismic forces and displacements determined in accordance with the applicable building codes and standards.

Lateral horizontal seismic loads shall be applied at the component's center of gravity and distributed relative to the component's mass distribution. The loads shall be applied independently in at least two orthogonal directions in combination with normal service loads associated with the component. In addition, the component shall be designed for a concurrent vertical seismic load that acts in either direction. Loads for components shall take into account the actual attachment relative to elevation in a structure and/or attachment to more than one structure. Loads shall account for the reversibility of seismic forces.

Lateral horizontal displacements shall be determined from the structure's structural analysis. In general, relative displacements between components with attachment at the same floor elevation may be considered negligible. Components attaching to two or more floor elevations or between two or more structures shall be evaluated for relative seismic displacements. Displacements between two structures shall be considered to be out-of-phase.

S100.3.3.2 Equipment

Seismic design of mechanical and electrical equipment, attachments, and supports shall consider the dynamic effects of the equipment; its contents; piping attached to its nozzles; and, when appropriate, its supports.

Most mechanical and electrical equipment is presumed to be inherently rugged and capable of surviving strong motions and earthquakes provided it is adequately attached to the structure.

Stresses due to seismic loading and displacements shall be combined with operating loads and any external nozzle loads and compared to the appropriate Code allowable.

Equipment mounted on vibration isolation systems shall have a bumper restraint or snubber in each horizontal direction. These seismic restraints shall be designed for the calculated seismic force acting on the equipment if the nominal clearance is less than or equal to 0.25 inches (6 mm) and for twice the calculated seismic force acting on the equipment if the nominal clearance is greater than 0.25 inches (6 mm). Seismic supports shall maintain positive engagement with the equipment.

If the equipment is essential and must remain functional after an earthquake or if the equipment contains hazardous materials, it may be seismically qualified by analysis, testing, or experience data in accordance with the specified building code. Adaptation of a nationally recognized standard such as ICC-ES AC 156 for qualification by testing is acceptable, provided the seismic capacity of the equipment equals or exceeds the requirements of the specified building code.

Seismic forces for equipment shall be determined in accordance with the applicable codes and standards.

S100.3.3.3 Piping Systems.

W_p for piping systems shall represent the total distributed operating weight of the piping system, including, but not limited to, any insulation, fluids, and concentrated loads such as valves, condensate traps, and similar components.

Seismic effects that shall be analyzed in the design of piping systems include the dynamic effects of the piping system, contents, and, when appropriate, supports.

The interaction between the piping system and the supporting structures, including other mechanical and electrical equipment, shall also be considered.

In addition to seismic loadings, piping systems shall be designed to withstand dead plus operating loading, occasional (wind or hydrotesting) loading, and thermal loadings. Wind loadings shall not be considered as acting concurrently with seismic loadings.

The design of piping systems, supports, and components shall be completed in accordance with the requirements of the ASME B31.1 Code. The following clarifications shall be utilized in the analysis of piping systems:

Piping systems, including supports, are considered to be high deformability elements due to the ductile nature of most steel utilized in piping systems. Where piping systems and support elements have limited or low deformability, appropriate values from Table 13.6-1 in ASCE 7 shall be used for the Component Response Modification Factor (R_p) in determining seismic loading.

Stresses due to seismic loading and structure displacements shall be determined for each of the two orthogonal directions and compared to the allowable code separately. As allowed by the code, stresses due to displacements may be evaluated as primary loads and combined with other occasional loads or evaluated as secondary loads and combined with other displacements such as thermal expansion.

Displacements within the same structure may be assumed in phase and applied to the pipe based on actual movements at attachment elevations. Displacements between buildings or structures shall be considered out-of-phase, and the displacement shall be applied to the piping system so that the values have a maximum range based on the actual movements at attachment elevations.

Seismic loads shall be combined with other occasional loads.

In-line components shall be designed with the same loads as the piping system, taking into consideration the center of gravity and weight of the component and all attaching items such as operators. Valve procurement specifications shall utilize the maximum seismic design load factors for allowable criteria so that valves may be installed at any elevation in the building or structure.

Seismic displacements shall be limited to 3 inches (75 mm) in each of two horizontal orthogonal directions and one vertical direction.

Seismic supports shall be designed to withstand the effects of seismic loading in both tension and compression.

Dead weight supports shall be evaluated for bucking and uplift. Rod supports shall not be put in compression due to seismic loading.

Spring supports shall be evaluated to ensure that variable and constant support assemblies remain loaded during the design seismic event.

Supports, attachments, and/or anchorages shall be designed for all loading conditions such as dead weight, occasional loads, displacements, and thermal expansion.

With the exception of piping and support systems required to be seismically analyzed and designed in accordance with NFPA 13, seismic design is not required for piping and attachments of high-deformability material where provisions are made to protect adjacent piping from impact, avoid impact with other structural or nonstructural components, or protect the piping in the event of such impact, and that meet the conditions below.

Piping in Seismic Design Category C

Any pipe with an I_p of 1.0.

Piping 2 inch (50 mm) nominal diameter and smaller with an I_p greater than 1.0

Piping in Seismic Design Category D, E, or F

Piping 1 inch (25 mm) nominal diameter and smaller with an I_p greater than 1.0

Piping 3 inch (75 mm) nominal diameter and smaller having an I_p of 1.0.

Seismic forces for piping shall be determined in accordance with the applicable codes and standards.

S100.3.3.4 Equipment and Components Supported by Owner Furnished Structures.

Seismic design of components supported by structures shall be based on the seismic design forces at the attachment elevation of the equipment or component, as noted in the technical specifications, in accordance with the requirements of the specified building code.

S100.3.3.5 Certifications.

S100.3.3.5.1 Certifications of architectural, mechanical, and electrical components

The Supplier shall submit manufacturer's documentation for components, supports, and attachments in accordance with ASCE 7 Section 13.2.1. This requirement is applicable to the following:

Architectural components, supports, and attachments.

Supports and attachments for Mechanical and Electrical components regardless of whether the component is part of a Designated Seismic System.

Mechanical and Electrical components of Designated Seismic Systems.

S100.3.3.5.2 Manufacturer's special certification of designated seismic systems

The Supplier shall submit manufacturer's certifications complying with ASCE 7 Section 13.2.2 subject to approval by the Authority Having Jurisdiction.

S100.3.3.5.3 Experience data

The use of experience data as an alternative for seismic capacity shall be in accordance with ASCE 7, Section 13.2.6. Seismic qualification shall be acceptable to the Authority Having Jurisdiction. Nationally recognized guidelines for acceptable experience data are provided in *Experience Based Seismic Equipment Qualification*. EPRI, Palo Alto, CA: 2007. 1016125. The following are features of acceptable experience data:

- Components are compared to equipment with performance of similar equipment in past earthquakes in locations with similar seismic design accelerations.
- Components are of equal or better construction than the referenced component.

- Data is based on earthquake motions measured by instruments.

S100.4 Documentation

Complete structural support and anchorage details shall be shown on all drawings, including the size of members, details of connections, and other connection information pertinent to the structures and/or foundations.

Equipment and component drawings shall indicate the total load and/or loads to be transmitted to the structure that must ultimately restrain the components, equipment, or structure. This information shall include the weight, dimensions locating the center of gravity of the component or equipment, or the seismic design forces (magnitude, direction, and location) acting on the supports.

If requested, design calculations shall be submitted for all structures, equipment, or components which are designed in accordance with this Supplemental Specification. If requested, these calculations shall be certified by a professional engineer registered in the appropriate jurisdiction.

The following seismic design data shall be indicated on the design drawings:

Occupancy Category/Risk Category.

Mapped Spectral Response Accelerations, S_s and S_1 . Spectral

Response Coefficients, S_{DS} and S_{D1} .

Site Class.

Seismic Design Category.

For Structures and Nonbuilding Structures Similar to Buildings:

Importance Factor, I .

Basic Seismic Force Resisting System.

Design Base Shear.

Seismic Response Coefficient, C_s .

Response Modification Factor, R .

Overstrength Factor, Ω_o .

Analysis Procedure.

For Nonstructural Components Including Equipment:

Component Importance Factor, I_p .

Seismic Design Force, F_p .

Component Response Modification Factor,

R_p . Component Amplification Factor, a_p .

S300 Structural Design Loads

S300.1 General

Design loads and load combinations for all buildings, structures, structural elements and components, handrails, guardrails, and connections shall be determined according to the criteria specified in this section, unless the governing building code requires more severe design conditions. Loads imposed on structural systems from the weight of all temporary and permanent construction, occupants and their possessions, environmental effects, differential settlement, and restrained dimensional changes shall be considered.

The live loads used in the design of buildings and structures shall be the maximum loads likely to be imposed by the intended use or occupancy but shall not be less than the minimum uniform live loads presented in Article S300.3, unless allowed by the governing building code. Components of the structural system may be designed for a reduced live load in accordance with the governing building code. Roofs shall be designed to preclude instability resulting from ponding effects by ensuring adequate primary and secondary drainage systems, slope, and member stiffness.

Structural elements supporting major equipment shall be designed for the greater of the uniform live load or the loading imposed by the actual equipment.

Construction or crane access considerations may dictate the use of temporary structural systems. Special considerations shall be made to ensure the stability and integrity of the structures during any periods involving use of temporary bracing systems.

S300.2 Design Loads

Design loads shall be in accordance with the following.

Load Types	Criteria/Source
Dead Loads	ASCE 7, Tables C3-1 and C3-2.
Pipe Support, major piping (Major piping is defined as hot pipe greater than or equal to 2 1/2 inches [65 mm] in diameter and cold pipe greater than or equal to 24 inches [610 mm] in diameter.)	Specifically determined, including thermal and dynamic loads, and verified against final pipe routing and analysis.
Pipe Support, other piping and electrical conduit and cable tray	Design for not to exceed uniform area, line, and/or concentrated loads located to create maximum moments and shears as a representation for the future actual loads if actual loads are not available to support the detailed design. Design loads shall be verified such that the resultant stresses from actual loads do not exceed the design stresses generated from the design loads.
Live Loads	Calculated weight of the contents of tanks: contents of silos, bins, and hoppers; movable loads, such as people, equipment, tools, and components during construction, operations, and maintenance; maximum loads likely to be imposed by intended use or occupancy, but not less than the loads in Article S300.3, nor actual equipment weight.

Impact Loads	Article S300.3 loads allow for ordinary impact conditions. Reciprocating or rotating machinery, elevators, cranes, pumps, and compressors shall have specific calculations addressing dynamic forces. Impact loads shall be as specified in ASCE 7 Chapter 4 unless analysis indicates higher values are required.
Soil and Hydrostatic Loads	Below grade structures shall include static and seismic lateral soil pressure, expansive soil pressure, hydrostatic pressure or buoyancy, compaction energy pressure, and potential surcharge loads from normal service or construction.
Wind Loads, buildings and structures	Design wind speed shall be in accordance with the specified building code. No shielding shall be permitted for ground conditions or for adjacent structural members.
Wind Loads, steel stacks	Loads and design in accordance with ASME STS-1.
Rain Loads	Where applicable, rain loads shall be in accordance with ASCE 7, Chapter 8, and the building code.

Load Types	Criteria/Source
Seismic Loads, buildings (by building, if appropriate)	Seismic loads for buildings shall be accordance with Technical Supplemental S100.
Seismic Loads, components and attachments	Seismic loads for components and attachments shall be accordance with Technical Supplemental S100. Amplification and response modification factors shall be in accordance with ASCE 7.
Construction Loads, roads	AASHTO HS 20 or equivalent.
Fatigue Loads	In accordance with AISC 360 - Specification for Structural Steel Buildings.

S300.3 Minimum Uniform Live Loads

Minimum uniform live loads shall be in accordance with the following.

Area	Live Load, psf (kN/m ²)
Ground Floor Slabs	
Shops, warehouses	250 (6.0)
Other structures	100 (4.8)
Suspended Floors	
Control Room	100 (4.8)

Storage Areas	Weight of stored material, but not less than 125 (6.0)
Other Concrete Floors	100 (4.8)
Grating Floors	60 (2.9)
Roofs	20 (1.0)
Stairs	100 (4.8)

S500 Building Code Required Special Inspections and Tests for Structures and Structural Components

This Section includes administrative and procedural requirements for compliance with the International Building Code (IBC), Chapter 17, Special Inspections and Tests.

The Owner will engage one or more qualified Special Inspectors and / or testing agencies to conduct structural tests and special inspections. The Special Inspectors and / or testing agencies shall not be in the employ of the Supplier.

Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve the Supplier of responsibility for compliance with other document requirements.

Specific quality-assurance and quality-control requirements for individual activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

Specified tests, inspections, and related actions do not limit Supplier's other quality-assurance and quality-control procedures that facilitate compliance with the other document requirements.

Requirements for the Supplier to provide quality-assurance and quality-control services required by the Owner, Owner, or Authority Having Jurisdiction are not limited by provisions of this Section.

S500.1 Fabricators Approved to Perform Work without Special Inspection

To be considered an Approved Fabricator that may perform work without Special Inspection under the provisions of IBC Chapter 17. The Supplier shall submit copies of certifications from the International Accreditation Service (IAS) or other recognized and acceptable accreditation organization. Acceptance as an Approved Fabricator is subject to approval by the Authority Having Jurisdiction.

If the Authority Having Jurisdiction does not accept the Supplier as an Approved Fabricator, Special Inspection shall be performed as required.

S500.2 Supplier's Responsibilities

The Supplier shall coordinate the inspection and testing services with the progress of the work. The Supplier shall provide sufficient notice to allow proper scheduling of all personnel. The Supplier shall provide safe access for performing inspection and on-site testing and shall ensure that all work requiring special inspection is inspected and/or tested prior to concealment.

The Supplier shall submit schedules to the Owner, Owner, and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.

The Supplier is responsible for providing the special inspector access to approved plans at the job site or fabrication shop as applicable.

The Supplier is responsible for retaining at the job site or fabrication shop as applicable, all special inspection records submitted by the Special Inspector and providing these records for review of the Authority Having Jurisdiction's inspector upon request.

Each Supplier shall submit the Supplier's Statement of Responsibility obtained from the Special Inspection agency to the Authority Having Jurisdiction and to the Owner prior to the commencement of.

The Supplier shall repair and / or replace work that does not meet the requirements of the specification documents.

Supplier shall engage an engineer to prepare repair and / or replacement procedures. The Supplier's Engineer shall be registered in the state in which the project is located. The Supplier's Engineer shall be acceptable to the Owner, Authority Having Jurisdiction, and Owner.

Procedures shall be submitted for review and acceptance by the Owner, Authority Having Jurisdiction, and Owner before proceeding with corrective action.

The Supplier shall be responsible for costs of:

- Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the Contract Documents and shop drawings / submittal data.

- Review of proposed repair and / or replacement procedures by the Owner and the inspectors and testing agencies.

- Repair or replacement of work that does not meet the requirements of the Contract Documents.

S500.3 Precedence

The Special Inspector's reports and testing agencies results shall have precedence over reports and test results provided by the Supplier.

V100 Noise Abatement

The near-field noise emissions for each equipment component furnished under these specifications shall not exceed a spatially-averaged free-field A-weighted sound pressure level of 85 dBA (referenced to 20 micropascals) for all equipment measured along the equipment envelope at a height of 5 feet (1.5 meters) above floor/ground level and any personnel platform during normal operation. The equipment envelope is defined as the perimeter line that completely encompasses the equipment package at a distance of 3 feet

(1 meter) horizontally from the equipment face. The near-field noise emissions include the contribution of all noise associated with the equipment component. Normal operation includes all operating conditions up to the equipment rated capacity exclusive of start-up, shut-down, and upset conditions.

Where the drive motors, variable frequency drives (VFDs), or mechanical drives for the equipment are also furnished under these specifications, the total combined near-field sound pressure level of the motor, VFD, or mechanical drive and the driven equipment measured as a single component, operating at design load, shall not exceed a spatially-averaged free-field A-weighted sound pressure level of 85 dBA (referenced to 20 micropascals) measured along the equipment envelope.

During off-normal operation such as start-up, shut-down, and upset conditions the equipment sound pressure level shall not exceed a maximum of 110 dBA at all locations along the equipment envelope, including platform areas, that are normally accessible by personnel.

Supplier shall identify any equipment which may not comply with the 85 dBA criteria and shall obtain Owner's written approval for each such deviation based on Supplier's predicted noise emissions level.

Compliance with the near-field noise emissions requirement shall be determined in accordance with industry standard ASME PTC-36. Compliance shall be based on not exceeding the allowable sound pressure level including background sound level corrections and excluding any correction for measurement uncertainties.

Attachments

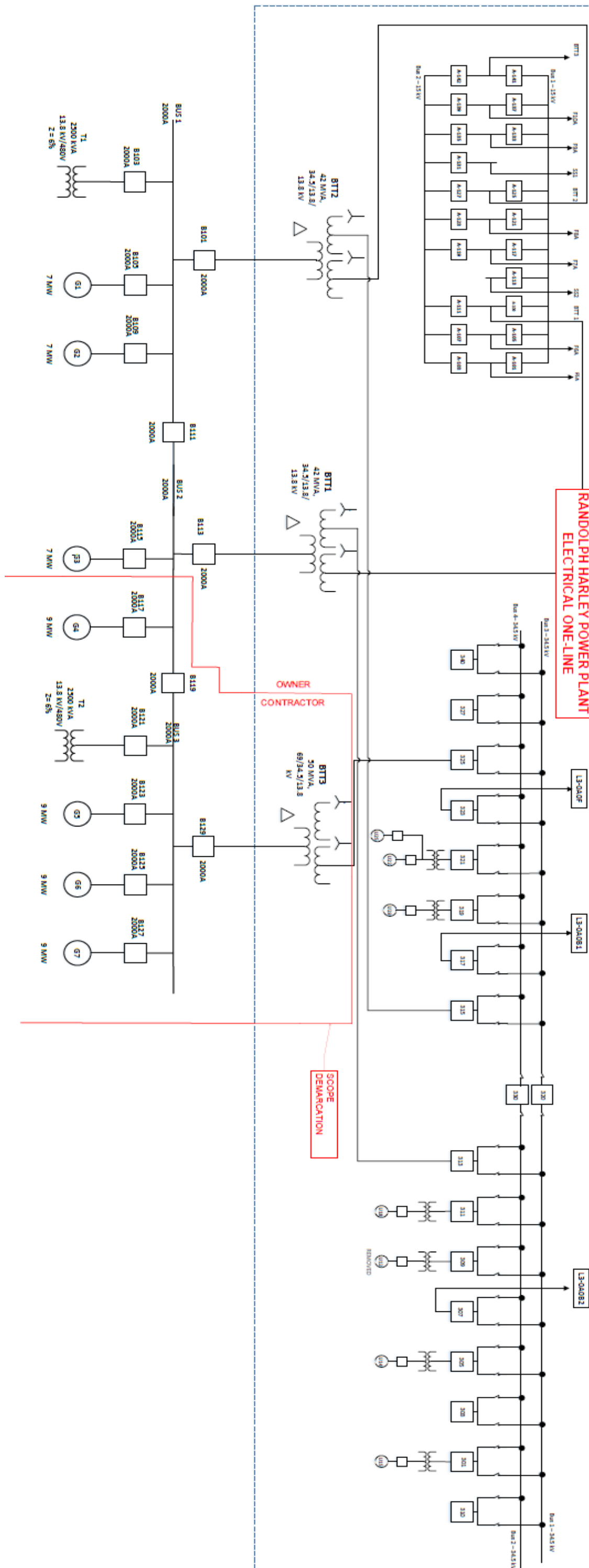
ATTACHMENT 1 Emissions Table

Design Emission Limitations to Secure Minor Source Permit

Fuel	LPG						
Engines	Number	1	4	1	4	1	4
Load	Percent	50		75		100	
Emissions							
NOx	ppmvd @15% O2	35		35		35	
	lbs/hour	5.35	21.4	7.77	31.1	10.20	40.8
	tpy	23.4	93.8	34.0	136.1	44.7	178.7
CO	ppmv @15% O2	30		30		30	
	lbs/hour	2.79	11.2	4.06	16.2	5.33	21.3
	tpy	12.24	48.9	17.77	71.1	23.32	93.3
VOC	ppmv @15% O2	3.5		3.5		3.5	
	lbs/hour	0.51	2.1	0.75	3.0	0.98	3.9
	tpy	2.25	9.0	3.27	13.1	4.29	17.2
PM10	mg/Nm3 @15% O2	20		20		20	

	lbs/hour	1.49	6.0	2.16	8.7	2.84	11.4
	tpy	6.53	26.1	9.47	37.9	12.44	49.8
SO2	Permit Limit Sulfur Wt%	0.0175		0.0175		0.0175	
	lbs/hour	0.59	2.4	0.86	3.4	1.13	4.5
	tpy	2.59	10.4	3.76	15.0	4.94	19.7

ATTACHMENT 3
RANDOLPH HARLEY POWER PLANT
ELECTRICAL ONE-LINE



Attachment 4 - Bid Submittals

Reference Document	Submittal Item
	Project Drawings and Documentation
1	Proposed Site General Arrangement Drawings
2	Execution Plan
3	Design Basis
4	Preliminary Equipment List
5	System Descriptions
6	Proposed Inspection and Test Plan
7	List of Exclusions, Exceptions and/or Clarifications
8	Process Flow Diagrams
9	Major Equipment BOQ and Unit Rates
	LPG/ULSD Generator
10	Fuel consumption curves.
11	Engine performance curves.
12	Diesel generator preliminary arrangement drawings indicating overall dimensions, estimated weights, component locations, and external connection information.
13	One-line diagram.
14	Preliminary description of the control system and communication with St. Thomas Distribution Operations
	Low/Medium Voltage Switching Devices
15	Drawings indicating the switchgear layout and one-line diagram showing equipment provided.
	Generator Breaker
16	Descriptive literature of breaker.
	Power Transformers
17	Descriptive literature of all equipment proposed.
	Packaged Uninterruptible Power Supply (UPS) System
18	Descriptive literature of UPS and oneline diagram showing all the major components
	Battery Energy Storage
19	Descriptive literature of batteries and oneline diagram
	Protective Relaying Panels
20	Descriptive literature of protective relay panels. (if any)
	Electric Actuators
21	Descriptive literature of proposed electric actuators.

Attachment 5 - Schedule of Submittals

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
	Project Drawings and Documentation; provided at the following intervals (Fossil and BESS):			.
	60% Design Review	30	After	Contract Date
	90% Design Review	60	After	Contract Date
	Issued for Construction	7	Before	Commencement of Construction Activities
	Conformed to Construction Records	30	After	Completion of Construction Activities
1	General Arrangement Drawings	---	---	See Above
2	Project Execution Plan	---	---	See Above
3	Project Design Basis Document	---	---	See Above
4	Geotechnical Report	---	---	See Above
5	Design Drawings	---	---	See Above
6	Underground Utility Drawings	---	---	See Above
7	Equipment and Material Specifications	---	---	See Above
8	Life Safety Plan	---	---	See Above
9	P&IDs	---	---	See Above
10	Wiring Diagrams	---	---	See Above
11	Single Line Diagrams	---	---	See Above
12	Logic Diagrams	---	---	See Above
13	Valve List	---	---	See Above
14	Pipeline List	---	---	See Above
15	Equipment List	---	---	See Above
16	Specialty Component List	---	---	See Above
17	Electrical Load List	---	---	See Above
18	Cable List	---	---	See Above
19	Control System I/O List	---	---	See Above
20	VIWAPA St. Thomas Point List	---	---	See Above
21	Graphic Displays	---	---	See Above
22	Instrument List	---	---	See Above
	Earthwork			
23	Plasticity test results	1	After	Test
24	Gradation test results	1	After	Test
25	Maximum density test results	1	After	Test
26	Field density and water content test results			Submit on the day performed
	Clearing and Grubbing			.
27	Method of Disposal	30	Before	Mobilization
	Oil Water Separators			.
28	Equipment arrangement drawings including: Dimensions from tank centerline to all pipe nozzles, manways, etc.; Lifting lugs; Hold down slab; Inlet and outlet pipe sizes; Invert elevations; flotation calculations.	30	After	Contract Date
29	Wiring and elementary diagrams showing all external control/instrumentation connections.	30	After	Contract Date
	Aggregate Surfacing			.
30	Initial plasticity test results, gradation test results and maximum density test results for all materials required to do the work.	30	Before	Start of work
31	Field density and field water content results.			Daily
	Fencing			.
32	Catalog cuts, installation procedures, and technical data to ensure compliance with these specifications	30	After	Contract Date

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
33	Complete detail drawings and specifications for the fence, gates, and accessories	30	After	Contract Date
	Concrete Reinforcement			.
34	Reinforcing steel material certification: Billet steel bars		Upon	Delivery
35	Reinforcing steel material certification: Low alloy steel bars		Upon	Delivery
36	Reinforcing steel material certification: Epoxy coatings		Upon	Delivery
37	Tensile tests	14	After	Tests
38	Chemical analysis of bars to be welded		Upon	Delivery
39	Mechanical splice specifications, data, instructions, and inspection criteria	30	After	Contract Date
	Cast-In-Place Concrete			.
40	Concrete Mix Designs	30	Before	Concrete placement
41	Concrete placement plan for special structures	30	Before	Concrete placement
42	Results of testing and test reports.	7	After	Tests
43	Repair methods and materials.	14	Before	Repair activity
44	Description of curing materials and methods, and water curing plan for water retaining structures. Include procedures for walls and flatwork.	30	Before	Beginning work
45	Mass concrete placement, curing, and protection plan. Include temperature monitoring procedure.	30	Before	Beginning work
46	Hot weather procedures for placement, protection, curing, and temperature monitoring of concrete. Include procedures for adverse weather and equipment failures.	30	Before	Concrete placement begins
47	Water stop data and specifications.	30	After	Contract Date
48	Joint filler data and specifications.	30	After	Contract Date
49	Joint sealant data and specifications.	30	After	Contract Date
50	Bonding adhesive data and specifications.	30	After	Contract Date
51	Anchoring adhesive system data and specifications.	30	After	Contract Date
52	Plastic anchor bolt sleeve data and specifications.	30	After	Contract Date
53	Floor sealer data and specifications.	30	After	Contract Date
	Grouting			.
55	Grout material data and specifications	30	Before	Beginning work
56	Field test data	1	After	Test
	Masonry			.
57	Color samples	30	After	Contract Date
58	Facing brick sample panels	30	After	Contract Date
59	Two units of each glazed block color	60	After	Contract Date
60	Three units of each tile color	60	After	Contract Date
61	Pigmented masonry cement colors	30	After	Contract Date
	Miscellaneous Metals			.
62	Structural Steel Material Certification			Upon request
63	High Strength Bolts Material Certification			Upon request
64	Direct Tension Indicators Material Certification			Upon request
65	Structural Steel Fabrication and Erection Drawings	30	After	Receipt of IFC Drawings
66	Grating Fabrication and Erection Drawings	45	After	Receipt of IFC Drawings
67	Anchor Rod Fabrication Drawings	30	After	Receipt of IFC Drawings
68	Railing Fabrication and Erection Drawings	45	After	Receipt of IFC Drawings
	Pipe Supports Designed by Supplier			.
69	Drawings showing manufacturer, model, dimensions, weights, and materials of construction	30	After	Contract Date
	Fuel Oil Pumps			.
70	Certified characteristic curves for each pump showing capacity, power, efficiency, and required suction pressure as ordinates and differential pressure as the abscissa	45	After	Contract Date
71	Detailed outline drawing of each pump, including weights	45	After	Contract Date
	Air Compressors and Dryers			.
72	Certified performance curves	45	After	Contract Date

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
73	Drawings indicating major dimensions of compressors and all accessory equipment including dismantling, dimension connections, and direction of rotation	30	After	Contract Date
	Steel Pipe			
74	Copies of Certified Test and Inspection Reports including material test reports	30	After	Contract Date
75	Pipe wall thickness calculations in accordance with the applicable code for pipe wall thickness sized by the Supplier (Pipe Bends)	30	After	Contract Date
76	ASME pipe data report forms	30	After	Contract Date
77	Coating and surface preparation specification	30	After	Contract Date
	Piping Expansion Joints - Rubber			
78	Drawings showing manufacturer, model, dimensions, weights, and materials of construction	30	After	Contract Date
	Backflow Preventers			
79	Drawings showing manufacturer, model, dimensions, weights, and materials of construction	30	After	Contract Date
	Strainers			
80	Drawings showing manufacturer, model, dimensions, weights, and materials of construction	30	After	Contract Date
	Traps			
81	Drawings showing manufacturer, model, dimensions, weights, and materials of construction	30	After	Contract Date
	Valves 2 Inches and Smaller			
82	Drawings of overall dimensions, weld end details, direction of flow, manufacture specification and sizing sheets, and weights of valves, actuators, and all accessories	30	After	Contract Date
83	Wiring and elementary diagrams showing all external control/instrumentation connections.	30	After	Contract Date
	Valves 2-1/2 Inches (50 mm) and Larger			
84	Drawings of overall dimensions, weld end details, direction of flow, manufacture specification and sizing sheets, and weights of valves, actuators, and all accessories	30	After	Contract Date
85	Wiring and elementary diagrams showing all external control/instrumentation connections	30	After	Contract Date
	Insulation and Lagging			
86	Drawings detailing types and thicknesses of insulation for pipelines, auxiliary equipment items, and flatwork areas	30	After	Contract Date
	LPG/ULSD Generator			
87	Mechanical and structural outline and assembly drawings	30	After	Contract Date
88	Electrical one-line diagrams	30	After	Contract Date
89	Foundation design details	30	After	Contract Date
90	Detailed schematic drawings of all electrical and control wiring	30	After	Contract Date
91	Instrument and service air requirements	30	After	Contract Date
92	Mechanical piping and instrument diagrams	30	After	Contract Date
93	Engine performance curves	30	After	Contract Date
94	Pump characteristic curves	30	After	Contract Date
95	Fuel consumption curves	30	After	Contract Date
96	Atmospheric temperature power correction curves	30	After	Contract Date
97	Atmospheric temperature heat rate correction curves	60	After	Contract Date
98	Voltage magnitude and frequency curves during the starting sequence of adding the specified load blocks	45	After	Contract Date
99	Generator loss curves	45	After	Contract Date
100	Voltage dip and speed deviation curves versus time	45	After	Contract Date
101	Reactive capability versus kilowatt load curves	45	After	Contract Date
102	Thermal damage curve illustrating volts/hertz versus time for the generator	45	After	Contract Date

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
103	Generator voltage decay curve with loss of exciter	14	After	Test or Inspection
104	Generator "V" curves	30	After	Contract Date
105	Zero power factor rated current saturation curve	30	After	Contract Date
106	No-load saturation curve	30	After	Contract Date
107	Synchronous impedance curve	60	After	Contract Date
108	Current transformer ratio correction factor and excitation curves	45	After	Contract Date
109	Generator design parameters	60	After	Contract Date
110	Direct axis sub transient reactance, X_d'' , in percent (machine base)	60	After	Contract Date
111	Direct axis transient reactance, X_d' , in percent (machine base)	60	After	Contract Date
112	Armature X/R ratio	60	After	Contract Date
113	Zero sequence reactance, X_0 , in percent (machine base)	60	After	Contract Date
114	Negative sequence reactance, X_2 , in percent (machine base)	60	After	Contract Date
115	Control panel internal arrangement drawings	30	After	Contract Date
116	Control panel layout drawings	30	After	Contract Date
117	Control panel internal wiring diagrams	60	After	Contract Date
118	Control panel external connection diagrams	60	After	Contract Date
119	Panel component cut sheets	30	After	Contract Date
	Power Transformers			
120	Copies of Certified Test and Inspection Reports	7	After	Testing/Inspection
121	Leak Test Procedure	30	Before	Test
122	Factory Acceptance Test Procedure	30	Before	Test
123	Outline Drawing Containing the Following Information Required for Transformer Foundation Design(Not to Exceed Information as a Minimum) : Oil Volume. Dimensions of Rad/COPS Tanks for Oil Containment Design. Overall Transformer Dimensions Including all Auxiliary Equipment, Base Dimensions and Top of Oil Tank. Clearance Requirements from Buildings or Fire Walls. Horizontal & Vertical Location of Center of Gravity	1	Before	60% Design Review
124	Detailed Outline Drawing, Including the Following: Location of Major Auxiliary Equipment Iso-Phase Flange Details Certified Data for Items listed in Item 510.	1	Before	90% Design Review
125	Bushing & Arrester Outline Drawings	1	Before	90% Design Review
126	Wiring Diagrams & Elementary Diagrams	1	Before	90% Design Review
127	Nameplate Drawings	1	Before	60% Design Review
128	Short-Circuit Withstand Type Data	1	Before	90% Design Review
129	Design Data & Transformer Performance Curves Including: No Load Overexcitation Capability(% vs. time) Full Load Overexcitation Capability(% vs. time) MVA Capability vs. Average Ambient Temperature I ² t Damage Curves	1	Before	90% Design Review
130	Auxiliary Power requirements	1	Before	90% Design Review
131	Current transformer datasheet	1	Before	90% Design Review
	Low and Medium Voltage Switching Devices			
132	Copies of Certified Test and Inspection Reports	7	After	Testing/Inspection
133	Outline Drawings, including height, length, width, vertical and horizontal center of gravity, and weight of each MV Switchgear Lineup.	1	Before	60% Design Review
134	Typical Elementary & Wiring Diagrams for Each MV Breaker or Controller Compartment or Assembly	1	Before	60% Design Review
135	Detailed One-Line and Three-Line Metering and Relaying Diagrams	1	Before	60% Design Review

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
136	Network Architecture drawing (showing network communications and equipment redundancy, if applicable). (MV ONLY)	1	Before	60% Design Review
137	Component Data on All Electrical and Control Devices Being Provided, Including Electrical Ratings.	1	Before	90% Design Review
138	Relay Instruction and Service Manual, including relay and breaker curve information (for time overcurrent's, molded case circuit breaker, and all solid-state protective device provided)	1	Before	90% Design Review
139	Current transformer datasheet	1	Before	90% Design Review
140	List of relays showing firmware revision of each relay furnished	1	Before	90% Design Review
141	Communications network point register, (if applicable)	1	Before	90% Design Review
142	List showing manufacturer, model number, description, function for each communication device furnished.	1	Before	90% Design Review
	AC/DC Panelboards			
143	Bill of material, including quantity, description, and part number.	21	Before	Delivery
144	Outline drawings and breaker arrangement	21	Before	Delivery
145	Panelboard directories	21	Before	Delivery
	AC Welding Receptacles			
146	Manufacturer's catalog sheets.	21	Before	Delivery
	Dry Type Transformers			
147	Manufacturer's catalog sheets showing manufacturer's data including transformer impedances, noise level in decibels and amount of heat rejected at 50% and 100% load.	21	Before	Delivery
148	Outline drawing including overall height, length, width, center of gravity location, and weight.	21	Before	Delivery
	Generator Breaker			
149	Outline Drawings including bolt holes sizes and locations; locations, magnitudes, and directions of dead loads, live loads, wind loads, seismic loads and any other occasional load. Loads shall be listed separately.	1	Before	60% Design Review
150	One-Line Diagram	1	Before	60% Design Review
151	Elementary and Wiring diagrams	1	Before	60% Design Review
152	CT & VT Three-Line Diagram	1	Before	60% Design Review
153	Circuit Breaker Performance Data and Nameplate Information	1	Before	90% Design Review
154	Bill of Material, Including Quantity, Description, and Part Number	1	Before	90% Design Review
155	VT Nameplate Data	1	Before	90% Design Review
156	Current transformer ratio correction factor and excitation curve with internal resistance (at stated temperature reference) of the CT stated on the secondary excitation characteristic curve.	1	Before	90% Design Review
157	Voltage Transformer(s) Test Results	1	Before	90% Design Review
	Packaged Uninterruptible Power Supply (UPS) System			
158	Outline Drawing, Including Height, Length, Width, Vertical and Horizontal Center of Gravity, Weight, Mounting Requirements, and Conduit Entry Data for All UPS Cabinets, Battery compartment/Rack and UPS Panel boards.	1	Before	60% Design Review
159	UPS system One-Line Diagram indicating equipment ratings, Tags and other key details	1	Before	60% Design Review
160	Elementary Schematic & Wiring Diagrams Indicating All External Terminal Points.	1	Before	60% Design Review
161	Battery Cell Data Sheets (Dimensions, Weight, Float , and Charging Voltages, etc.	1	Before	90% Design Review
162	IEEE Battery Sizing Calculation Sheets for Capacity	1	Before	90% Design Review
163	Manufacturer's Battery Selection Calculations (such as output from a computer program)	1	Before	90% Design Review
	Protective Relaying Panels			

Submittal No.	Submittal Item	Submittal Dates		
		Calendar Days		Event
164	Outline drawings including overall height, length, width, center of gravity location, weight and mounting requirements.	1	Before	60% Design Review
165	Schematic diagrams	1	Before	60% Design Review
166	Connection and wiring diagrams	1	Before	90% Design Review
167	Relay installation and wiring information	1	Before	90% Design Review
168	Nameplate drawings	1	Before	90% Design Review
	Conductors and Accessories			
169	Data Sheets of each cable type, including dimensions	1	Before	90% Design Review
170	Production Test Reports	21	Before	Delivery
171	Qualification Test Reports for MV Power Cable	21	Before	Delivery
172	IEEE 1202 Vertical Tray Flame Test Reports	21	Before	Delivery
	Control Design and Equipment (PLC or other)			
173	PLC power, communications, and grounding wiring diagrams	1	Before	90% Design Review
174	PLC equipment location and arrangement drawings	1	Before	60% Design Review
175	PLC I/O wiring diagrams	1	Before	90% Design Review
176	PLC program printouts for review	1	Before	90% Design Review
177	PLC external hardwired I/O list	1	Before	90% Design Review
178	Recommended VIW APA Operations graphic displays	1	Before	90% Design Review
179	Complete set of hardcopy printout of all graphic displays for local control	21	Before	Delivery
180	PLC system operation and maintenance instruction manuals	21	Before	Delivery
181	Operator interface system operation and maintenance instruction manuals	21	Before	Delivery
182	Final PLC program printouts	21	Before	Delivery
	Control Consoles			
183	Console outline dimension Drawings	1	Before	60% Design Review
184	Console internal arrangement Drawings	1	Before	90% Design Review
185	Console and subpanel device layout Drawings	1	Before	90% Design Review
186	Console internal wiring diagrams	1	Before	90% Design Review
187	Console external connection wiring diagrams	1	Before	90% Design Review
	Instrumentation			
188	Outline drawing showing all dimensions including process connection sizes, tag number/description and model/serial number.	1	Before	90% Design Review
189	Flow element calculation sheet showing beta ratio and differential pressure drop/loss if applicable.	1	Before	90% Design Review
190	Flow element overall and component dimension/material drawing if applicable.	1	Before	90% Design Review
191	Calibration Certification/Report if applicable.	1	Before	90% Design Review
	Low Voltage Induction Motors			
192	Motor dimensional drawings	1	Before	90% Design Review
193	Motor nameplate data/Data Sheets	1	Before	90% Design Review
	Electric Actuators			
194	Actuator outline diagrams	1	Before	90% Design Review
195	Wiring diagrams	1	Before	90% Design Review
196	Data Sheets	1	Before	90% Design Review
	Instrumentation General Requirements			
197	Instrument factory calibration sheets	21	Before	Delivery
198	ISA-format datasheets for all Instruments	1	Before	90% Design Review
	Training			
199	Operator training material	20	Before	Commencement of Training



ATTACHMENT 6 RANDOLPH HARLEY BTT3 SPECIFICATION

VIRGIN ISLANDS WATER & POWER AUTHORITY TRANSMISSION & DISTRIBUTION DIVISION

RANDOLPH HARLEY POWER PLANT – BTT3 POWER TRANSFORMER SPECIFICATION

MVA: 50/50/50MVA, OA/FA1/FA2

KV: HV – 69 (HO-H1-H2-H3)
LV - 34.5 (XO-X1-X2-X3)
TERT. -13.8 (Y1-Y2-Y3)

PHASES: 3
FREQ: 60
STANDARD: ANSI C57.12
TAP CHANGER: NLTC @ HV SIDE & LV SIDE

PHASE RELATION: YNyn0 (d1) (Primary winding still unsure), YNyn0(d1),
YNd1 Wye (Primary Winding still unsure), Wye, Delta

Temp Rise: 65/65/80 Deg. Celsius

Standard accessories as per ANSI std.

**ATTACHMENT 7
RANDOLPH HARLEY
GENERATOR BUILDING FLOOR PLAN
(OPTION 1)**



PROPOSAL FORMS

Bid Forms

The Offeror must complete and submit the attached bidding sheets with their proposal.

Generation Option 1 – RICE Plant

Total Lump Sum Bid Price*: (See Excel Price Sheet Attachment)

\$ _____

(Offeror must fill in the amount in words)

\$ _____ (Offeror must fill in the amount in figures)

*Pricing to match Overall Project Cost from VIWAPA St. Thomas Randolph Harley Expansion: RICE Plant Pricing Sheet

Equipment Shipping Date: _____ (Date 100% of Randolph Harley: RICE Plant equipment/materials ready to ship)

Construction Completion Date: _____

Generation Option 2 – Combustion Turbine Generator – Simple Cycle

Total Lump Sum Bid Price*:(See Excel Price Sheet Attachment)

\$ _____

(Offeror must fill in the amount in words)

\$ _____ (Offeror must fill in the amount in figures)

*Pricing to match Overall Project Cost from VIWAPA St. Thomas Randolph Harley Expansion: Combustion Turbine Generator – Simple Cycle Pricing Sheet

Equipment Shipping Date: _____ (Date 100% of Randolph Harley Expansion: Combustion Turbine Generator – Simple Cycle equipment/materials ready to ship)

Construction Completion Date: _____

Generation Option 3 – Combustion Turbine Generator – Combined Cycle

Total Lump Sum Bid Price*:(See Excel Price Sheet Attachment)

\$ _____

(Offeror must fill in the amount in words)

\$ _____ (Offeror must fill in the amount in figures)

*Pricing to match Overall Project Cost from VIWAPA St. Thomas Randolph Harley Expansion: Combustion Turbine Generator – Combined Cycle Pricing Sheet

Equipment Shipping Date: _____ (Date 100% of Randolph Harley Expansion: Combustion Turbine Generator – Combined Cycle equipment/materials ready to ship)

Construction Completion Date: _____

ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Price.

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____
(Insert addendum (a) numbers and initial)

Acceptance

This offer shall be open to acceptance for ninety (90) days from the date of bid opening.

Contract Duration

If this Bid is accepted, we will complete the Work in _____ (_____) calendar days from Notice to Proceed.

Principals Involved

(If Offeror is a partnership, fill in the following blanks)

Name of Partners

Residence of Partners

(If Offeror is a corporation, fill in the following blanks)

Organized under the laws of the State of _____

Name and address of President _____

Name and address of Vice-President _____

Name and address of Secretary _____

Name and address of Treasurer _____

Bid Form Signature(s):

(Name of Offeror) Dated

(Address of Offeror) (City, State, Zip)

(Telephone)

BY: _____
(Signature)

(Title)

Where Offeror is a corporation:

Attest: _____
(Secretary)

AFFIX CORPORATE SEAL

QUESTIONNAIRE

(Mandatory)The undersigned guarantees the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

1. How many years has your organization been in business as a General Contractor, Sub- Contractor?
(Circle one)._____Years
2. Within the past five years, how many Construction projects equal to or greater than this project has your organization completed? _____
3. Have you ever failed to complete work per Contract Specifications or within the time limits of a Contract awarded to you, if so, where and why?

4. Name three individuals or corporations for which you have performed related work and to which you refer.

5. Have you personally inspected the site of the proposed work? _____
Describe any anticipated problems with the site and your proposed solutions.

6. Will you sublet any part of this work?_____If so, give details.

7. What equipment do you own that is available for the work?

8. What equipment will you purchase for the proposed work?

9. What equipment will you rent for the proposed work?

10. Have you included any exceptions with your proposal?

11. Have you included a Preliminary Project Schedule with your proposal?_____

12. Have you included the professional resume of your intended Project Manager with your proposal?

13. State the true, exact, correct, and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name of the President and Secretary. If a partnership, state the names of all partners. If trade name, state the names of the individuals who do business under the trade name. It is necessary that this information be furnished.)

(Correct Name of Offeror)

The business is a Sole Proprietorship, Partnership, or Corporation. (Circle one)

a) The address of principle place of business is _____

b) The names of the corporate officers, or partners, or individuals doing business under a trade name are as follows:

(Offeror's Signature)

END OF FORM



VIWAPA GENERAL CONTRACT TERMS/ FEDERAL REQUIREMENTS

&

EXHIBIT A: BASIC INSURANCE REQUIREMENTS

EXHIBIT B: HUD-CDBG GENERAL PROVISIONS

EXHIBIT C: DAVIS BACON REQUIRMENTS

EXHIBIT D: DIRECTORY OF SMALL & WOMEN'S BUSINESSES