JOSEPH T. DUENAS
Chairman

JOHN M. BENAVENTE, P.E.
General Manager

Telephone Nos. (671) 648-3054/55 or Facsimile (671) 648-3165

Accountability · Impartiality · Competence · Openness · Value

INVITATION FOR MULTI-STEP BID (IFMSB) NO.: GPA-034-18

DESCRIPTION: Build, Operate & Transport Contract for 180MW of New Generation Capacity

SPECIAL REMINDERS TO PROSPECTIVE BIDDERS

Bidders are reminded to read the Sealed Bid Solicitation and Instructions, and General Terms and Conditions attached to the IFMSB to ascertain that all of the following requirements checked below are submitted in the bid envelope. **Bidders are required to submit one (1) original and six (6) bound copies plus one (1) electronic copy on a flash drive of their unpriced technical proposal (Envelope I) along with one (1) original and three (3) copies plus one (1) electronic copy on a flash drive of their separately sealed price proposal (Envelope II)**, including all addenda, if any, at the closing date and time.

(XX) BID GUARANTEE ($3,000,000.00 USD) May be in the form of;

Reference #11 on the General Terms and Conditions

a. Cashier's Check or Certified Check **(NOTE: Cashier's Check or Certified Check Refunds will be ONLY be made out to the name of the Bidder.)**

b. Wire Transfer to Guam Power Authority;

c. Letter of Credit or

d. Surety Bond – Valid only if accompanied by:

1 Current Certificate of Authority issued by the Insurance Commissioner;

2 Power of Attorney issued by the Surety to the Resident General Agent;

3 Power of Attorney issued by two (2) major officers of the Surety to whomever is signing on their behalf.

(XX) STATEMENT OF QUALIFICATION;

( ) SAMPLES;

( ) BROCHURES/DESCRIPTIVE LITERATURE; (Shall provide detailed literature on items offered)

(XX) AFFIDAVIT OF DISCLOSURE OF MAJOR SHAREHOLDERS;

(XX) NON-COLLUSION AFFIDAVIT;

(XX) NO GRATUITIES OR KICKBACKS AFFIDAVIT;

(XX) ETHICAL STANDARDS AFFIDAVIT;

(XX) WAGE DETERMINATION AFFIDAVIT;

(XX) RESTRICTIONS AGAINST SEX OFFENDERS AFFIDAVIT;

Note: The above Affidavits must comply with the following requirements:

a) The affidavit must be signed within 60 days of the date the bid is due;

b) Date of signature of the person authorized to sign the bid and the notary date must be the same.

c) First time affidavit **must** be an **original** – If copy, indicate Bid Number/Agency where original can be obtained.

(XX) OTHER REQUIREMENTS:

A Guam Business License and/or Contractor's License with proof of Employer Identification Number (EIN) is not required in order to provide a proposal for this engagement, but is a pre-condition for entering into a contract with the Authority. Bidders MUST comply with PL 26-111 dated June 18, 2002, PL 28-165 dated January 04, 2007 and Wage Determination under the Service Contract Act (www.wdol.gov). Additionally, upon award the successful bidder must provide to GPA the most recently issued Wage Determination by the US Dept. of Labor.

The reminder must be signed and returned in the bid envelope together with the bid. Failure to comply with the above requirements will mean a disqualification and rejection of the bid.

On this _____ day of _____ 2018, I,_____,

authorized representative of _____ acknowledge receipt of this

special reminder to prospective bidders with the above referenced IFB.

_____

Bidder Representative's Signature

INVITATION FOR MULTI_STEP BID

ISSUING OFFICE:

Guam Power Authority
Procurement Management Materials Supply
Gloria B. Nelson Public Service Building
688 Route 15, Mangilao, Guam 96913

10/1/18

JOHN M. BENAVENTE, P.E. **DATE**

General Manager

MULTI-STEP

DATE ISSUED: **10/01/2018**

BID INVITATION NO.: GPA-034-18

BID FOR: Build, Operate & Transfer Contract for 180MW of New Generation Capacity

SPECIFICATION: See Attached

DESTINATION: See Attached

REQUIRED COMPLETION DATE: See Attached

PRE-BID CONFERENCE: **9:00 A.M., Monday, November 05, 2018**

Meeting place will be at our GPA/GWA Procurement Office, Room 101, 1st Floor, Gloria B. Nelson Public Service Building, 688 Route 15, Fadian Mangilao.

***CUT-OFF DATE FOR RECEIPT OF QUESTIONS:** **5:00 P.M., Wednesday, December 19, 2018**

INSTRUCTIONS TO BIDDERS:

INDICATE WHETHER: _____ INDIVIDUAL _____ PARTNERSHIP _____ CORPORATION

INCORPORATED IN: _____

Technical Proposal (Unpriced) and Price Proposal (Sealed Separately) shall be submitted in duplicate and sealed to the issuing office above no later than **(Time)** **4:00 PM** **, Date:** **01/18/19**. Technical Proposals (Sealed) submitted after the time and date specified above shall be rejected. See attached General Terms and Conditions and Sealed Bid Solicitation for details.

The undersigned offers and agrees to furnish within the time specified, the articles and services at the price stated opposite the respective items listed on the schedule provided, unless otherwise specified by the bidder. In consideration to the expense of the Government in opening, tabulating, and evaluating this and other bids, and other considerations, the undersigned agrees that this bid remain firm and irrevocable for a period of not less than twelve (12) months after the Proposal submittal date.

NAME AND ADDRESS OF BIDDER:

SIGNATURE AND TITLE OF PERSON AUTHORIZED TO SIGN THIS BID:

AWARD: CONTRACT NO.: _____ AMOUNT: _____ DATE: _____

ITEM NO(S). AWARDED: _____

CONTRACTING OFFICER:

JOHN M. BENAVENTE, P.E. DATE
General Manager

NAME AND ADDRESS OF CONTRACTOR:

SIGNATURE AND TITLE OF PERSON

INVITATION FOR MULTI_STEP BID

GPA-034-18

BUILD, OPERATE & TRANSFER CONTRACT FOR 180MW OF NEW GENERATION CAPACITY

TECHNICAL SPECIFICATIONS

SEPTEMBER 2018

JENNIFER G. SABLAN, P.E.
STRATEGIC PLANNING AND OPERATIONS RESEARCH MANAGER

JOHN J. CRUZ JR., P.E.
ASSISTANT GENERAL MANAGER, ENGINEERING & TECHNICAL SERVICES

JOHN M. BENAVENTE, P.E.
GENERAL MANAGER

GUAM POWER AUTHORITY
P.O. BOX 2977
HAGATNA, GUAM 96932

INVITATION FOR MULTI-STEP BID

GPA-034-18

BUILD, OPERATE & TRANSFER CONTRACT FOR 180MW OF NEW GENERATION CAPACITY

Section A

Information for Bidders

SEPTEMBER 2018

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Appendices

1 General

1.1 Introduction

Guam, the largest island in Micronesia and an unincorporated and organized territory of the United States, is located in the Pacific Ocean about three-fourths of the way from Hawaii to the Philippines. Surrounded by coral reef, Guam sits on the edge of the Mariana Trench and its Challenger Deep, the deepest known place on earth. Guam has a tropical marine climate that is warm and humid with little seasonal temperature variation. The dry season runs from December to June, and the rainy season runs from July to November.

The Guam Power Authority (GPA) is a public corporation and an enterprise fund of the Government of Guam responsible for the territory's electricity supply. GPA was established in 1968 by means of The Guam Power Authority Act of 1968, under which Guam Code 12 Chapter 8 sets forth the legal definitions, empowerments and limitations for GPA. The Consolidated Commission on Utilities (CCU), a five-member elected board of directors, administers GPA and the Guam Public Utilities Commission (Guam PUC) regulates GPA.

GPA is a full service electric utility, which generates, transmits, and distributes electric energy from its various power generation resources to individual customers. Table 1.1 presents a summary of Guam generating resources as of the end of 2013.

Table 1.1: Guam Generating Resources

Name	Technology	Fuel	Net Capacity, MW	Year Installed	Ownership	Expiration of ECA	Planned for Retirement after Addition of the Project
Cabras 1	Boiler/STG	HS/LS RFO	62.5	1974	GPA (operated by TEMES)		62.5
Cabras 2	Boiler/STG	HS/LS RFO	59.2	1975	GPA (operated by TEMES)		59.2
Cabras 3	SSR	HS/LS RFO	37.7	1996	GPA (operated by KEW)		37.7
Cabras 4	SSR	HS/LS RFO	37.7	1996	GPA (operated by KEW)		37.7
Dededo CT 1	CTG	ULSD	22.0	1992	GPA		22
Dededo CT 2	CTG	ULSD	22.0	1994	GPA		22
Dededo Recip 1-4	MSR	ULSD	9.8	1972	GPA		9.8
Macheche CT	CTG	ULSD	19.0	1993	GPA		
Marbo CT	CTG	ULSD	16.0	1993	GPA		16
Manenggon	MSR	ULSD	10.4	1993	GPA		

Name	Technology	Fuel	Net Capacity, MW	Year Installed	Ownership	Expiration of ECA	Planned for Retirement after Addition of the Project
Recip 1 & 2							
Piti 7	CTG	ULSD	39.3	1997	TEMES/IPP	2017	
Piti 8	SSR	HS/LS RFO	43.2	1999	MEC/IPP	2019	
Piti 9	SSR	HS/LS RFO	43.2	1999	MEC/IPP	2019	
Talofofo Recip 1 & 2	MSR	ULSD	8.6	1994	GPA		
Tanguisson 1	Boiler/STG	HS RFO	24.8	1976	Pruvient/IPP	2017	24.8
Tanguisson 2	Boiler/STG	HS RFO	24.8	1976	Pruvient/IPP	2017	24.8
Tenjo Recip 1-6	MSR	ULSD	25.9	1994	GPA		
Yigo CT	CTG	ULSD	19.0	1993	GPA		
Total:			**525.1**				**316.5**

Source: GPA IRP 2013

As can be seen from the above table, as of 2013 GPA had installed net generating capacity of 525 MW, not considering renewables. Prior to 2015 GPA officially deactivated Dededo CT 1&2, Marbo CT, Dededo Recip 1-4 (Dededo Diesel Plant) and Tanguissan 1&2 primarily due to the adequacy of existing generation and the high operation and maintenance costs of these units. In 2015, a fire destroyed the Unit 3 and 4 slow speed diesels at the Cabras power plant. To mitigate the loss of the Unit 3 and 4 capacity, GPA entered into a lease agreement with Aggreko for a 40 MW high speed diesel plant. GPA also entered into a Performance Management Contract (PMC) for its northern combustion turbine plants and rehabilitated and recommissioned the Dededo CT 1&2 power plant.

The GPA generation system includes two independent power projects (IPPs) with a combined net capacity of 175.3 MW all constructed in the late 1990s. The Energy Conversion Agreement (ECA) for the Piti 7 Unit expired in 2017, and the ECA for Piti 8&9 expires in January 2019.

Most of the power plants owned by GPA are operated and maintained under PMCs including the PMC with TEMES for Cabras Units 1 and 2 steam cycle plant. Prior to the 2015 fire, Korean East-West Power (KEWP) held the PMC for Cabras slow speed Units 3 and 4 (combined net capacity of 75.4 MW; currently not operating). In 2016, GPA signed the PMC with TEMES for GPA's northern combustion turbine units.

The current peak system demand is 266 MW. Based on demand in recent years and the trend going forward, GPA anticipates system peak to be around 283 MW by 2021.

Guam has no fossil energy resources. Nearly all of its electricity is generated using petroleum products shipped in by tanker. GPA's steam cycle and slow speed diesel plants generate electricity using No. 6 residual fuel oil while the gas turbine and medium and high-speed diesel plants generate electricity using Ultra Low Sulfur Diesel (ULSD). Due to its use of residual fuel oil, GPA is in violation of the Environmental Protection Agency (EPA) rules regarding sulfur emissions. To comply with the EPA rules, GPA should either substantially modify most of its existing base load power plants or develop a new efficient base load facility with better environmental characteristics to replace the older existing power plants.

As part of its energy diversification strategy, GPA is developing renewable power. Guam renewable power sources currently include a 26.5 MW PV solar farm owned by NRG. GPA has approved over 1700 applications for installation of mainly roof top solar panels totaling over 18 MW of installed capacity; which shall allow for the sale of power to GPA under "net metering" arrangements. GPA is currently in the process of negotiating renewable energy purchase agreements for 120MW of solar PV systems combined with energy storage for ramp control. GPA is also procuring an additional 40 MW of solar PV on leased lands from the Department of Navy which will require energy storage for shifting energy production to meet GPA's peak demand at night. Guam has a target to generate 25% of the island's electricity from renewables by 2035. GPA is on track to have renewable energy account for 26% of total energy generated by 2020.

1.1.1 Project Rationale and Role in the Guam Electric Sector

The Guam electric sector is undergoing a fundamental transition driven by the need to grow and modernize its generation portfolio while capitalizing on the emergence of generation technologies which are more efficient, flexible, and environmentally friendly. Within the context of this transition, GPA is implementing an expansion plan with the overarching goal of providing its customers with reliable and affordable electricity while exercising environmentally responsible stewardship of Guam's economic and natural resources.

In 2013 GPA issued an Integrated Resource Plan (the "2013 IRP"), which is currently in the process of being updated (the 2013 IRP and its updates referred to herein as the "Expansion Plan"). As part of the Expansion Plan, GPA has decided to procure, on a Build-Own-Transfer ("BOT") basis, the development of a 180MW base load fully dispatchable power plant using fossil fuel fired technology, renewable power generation technologies with energy storage, or a hybrid (fossil fuel fired plus renewable technologies) with any fossil fuel components having the capability of operating on both ULSD and natural gas (as more thoroughly defined in Section 2 below, the "Project"). This Project, envisioned to be Guam´s primary source of efficient and flexible baseload supply for the future, is the lynchpin of GPA's Expansion Plan. Because of the variability of technologies allowed and distinct unit sizes, GPA will consider evaluating Proposals that are within plus/minus 10 % of the preferred capacity.

The principal rationale of the Project is to fulfill GPA's paramount objectives of: (i) increasing and modernizing Guam's generation portfolio to ensure reliable supply, (ii) bringing its generation into compliance with EPA emissions rules (existing and future), and (iii) responsibly unlocking the value of renewable penetration into the market.

The Project has been designed to meet the aforementioned needs by means of the following:

- Modernizing the generation portfolio by replacing many of Guam's older less efficient and flexible generation units with new higher performance, lower-emission technology.
- Serving a large portion of baseload demand with efficient technologies that ensure compliance with existing and future EPA emission requirements.
- Increasing the volume of reliable, competitively-priced electricity to serve GPA's growing customer base, including the electric power service requirements for the impending United States Department of Defense build-up and its impact on economic growth.
- Increasing the flexibility of the generation portfolio to enable the responsible installation of low-cost renewable energy and maximize the benefits thereof.

- Eliminating reliability issues (particularly customer outages due to instantaneous generation loss) associated with the increasing age of the Guam generation portfolio and the impact of the Cabras fire.

The PUC, through a series of meetings, hearings, and orders has confirmed its agreement with the rationale and importance of the Project for Guam and, through PUC Order dated October 27, 2016 and the PUC Supplemental Order dated April 27, 2017, has approved and granted all necessary authorizations to GPA to move forward with this Invitation For Multi-Step Bid (IFMSB) to procure the Project.

1.1.2 Applicability of Certain Requirements of the IFMSB Document

This IFMSB allows Bidders to offer different technologies such as fossil fuel fired technologies, renewable technologies with storage, or hybrid technologies provided that the Project can serve as a reliable base load fully dispatchable Facility capable of meeting the functional requirements specified in the IFMSB documents. Any sections of the IFMSB documents referencing Fuel or Fuel related concepts and defined terms such as Heat Rate, Guaranteed Heat Rate, Fuel Charge, etc... are only applicable to Proposals based on Facilities that operate on fossil fuel.

1.1.3 Bidder's (Project Company) Scope

The Project will consist of a base load fully dispatchable power generating Facility with capacity of approximately 180 MW (net) at site reference conditions specified in the Functional Technical Specification. The Project may utilize any technology that satisfies the requirement for the Project to be a base load fully dispatchable power generating Facility as well as the functional requirements specified in IFMSB Section C (Functional Technical Specification). The technology options that could be used for the Project include fossil fuel fired technologies, renewable technologies with storage, and hybrid (fossil fuel fired plus renewable and/or storage) technologies. The fossil fuel fired components of the Project will operate on Ultra Low Sulfur Diesel (ULSD) and potentially LNG-derived natural gas. As a result, the fossil fuel fired components of the Project must be designed to have dual fuel capabilities to burn both ULSD and natural gas. Bidders offering the entire Project or components of the Project based on fossil fuel fired technologies must design the Project facilities to have all the provisions required to burn Natural Gas if or when it becomes available. Bidders' Financial Proposal must quote the incremental Price associated with adding any necessary natural gas equipment and systems in the future. The Bidders will select the power generating technology for the Project, consistent with the requirements of this IFMSB. For a Project utilizing fossil fuel fired technology, the Project Company will be responsible for construction of a ULSD supply pipeline as part of the Project scope. The pipeline will be constructed in the existing pipeline right of way extending from the GPA Bulk Storage Facility pumping station near the Piti 7 and Piti 8&9 plants to the Project Site (defined in Section 2.1). The Project Company will be responsible for constructing the Project's water supply and wastewater discharge facilities.

The technical scope of the Project is described in more detail in IFMSB Section C (Functional Technical Specification).

The successful Bidder will be required to form and incorporate a Project Company in Guam in accordance with Guam law and will have to pay all the applicable fees, duties and any other costs applicable to such company. The Fuel for Project's utilizing fossil fuel technology will be

supplied by GPA. The Project Company will enter into an energy conversion agreement with GPA (the "ECA"), and will develop, finance, construct, own, and operate the Facility throughout the Term of the ECA. The Project Company will mobilize project or other financing sufficient to develop and construct the Facility using both equity and debt resources.

1.1.4 GPA Responsibilities

GPA will:

a) Acquire a Site (see definition in Section 2.1) close to GPA's Harmon substation and provide the use of such Site to the Project Company under a Land Lease Agreement ("LLA") for the Term of the ECA;

b) Specify the functional requirements for the Facility (with the assistance of its Project consultant);

c) Conduct a competitive bidding process and ensure that the process follows the requirements of Guam Procurement Law and internationally accepted competitive bidding practices for IPPs;

d) Obtain applicable easements for the Fuel supply lines and Electrical Interconnection Facilities; and

e) Supply Fuel to the Project during the operating period.

1.1.5 Schedule

The expected Phase 1 Commercial Operation Date is 20 months from Financial Close and the expected Phase 2 Commercial Operation Date is 30 months from Financial Close. Natural Gas Commercial Operation Date of the Facility will depend on the timing of development of the LNG infrastructure. Although the IFMSB will include Phases, GPA will have the option to obligate the Selected Bidder to eliminate the concept of Project phases and to commission the entire Facility at once. In that case, the Phase 1 Commercial Operation Date shall be disregarded and the Phase 2 Commercial Operation Date shall become the commercial operation date for the entire completed Facility.

1.1.6 Model Project Agreements

The model ECA, LLA, and other Projects Agreements attached to this IFMSB are based on project agreements used for past international private power projects that reached financial close; therefore, any material deviations (including exceptions resulting in shifting of risk allocation between the parties, Price increase and/or change of the Price structure resulting in altering the basis of evaluation) from the model Project Agreements included in the IFMSB may be a basis for bidder's proposal to be considered non-responsive.

1.2 Bidding and Selection Process

This competitive bid is composed of a multi-step process. Step one, pre-qualification, has been completed and resulted in identification of the qualified Bidders (the "Qualified Bidders"). As part of step two, the Qualified Bidder recipients of this IFMSB, the qualified Bidders, are now invited to submit technical, commercial and financial proposals (Proposal). This IFMSB provides the

information considered necessary for experienced bidders (or bidder teams) to submit Proposals for the Project.

Based on its evaluation of submitted Proposals, GPA intends to select a first-ranked Bidder. GPA will then meet with the first-ranked Bidder to finalize the Project Agreements. It should be stressed that the proposed prices will not be negotiable. Any attempt by the Bidder to adjust the proposed price after bid submittal will be a basis for Bidders' disqualification. In the event that the Project Agreements are completed with the first-ranked Bidder, GPA may commence meetings with the second-ranked Bidder to complete the Project Agreements, and the next as may be required. Once the Project Agreements are finalized with a Bidder, the Notice of Award will be issued to, and the Project Agreements will be executed with, the successful Bidder.

Once the Project Agreements are completed, the successful Bidder will proceed with (i) finalizing the necessary financial agreements required to achieve Financial Close, (ii) procurement of all Government Authorizations necessary for the Project, and (iii) finalize funding and commence final design and engineering, procurement, and construction. It is expected that the Project Company will work closely, and on a timely basis, with the project lenders to ensure that the final version of the Project Agreements between the Project Company and GPA and other concerned parties will be acceptable to the lenders.

2 Definitions and Interpretation

2.1 Definitions

The following terms are capitalized in the text of the IFMSB document package. These capitalized terms have been precisely defined to have the meaning as set forth below to enable the reader of this IFMSB to have the clearest possible understanding of the terms and requirements of the IFMSB. All other capitalized terms in this document have the meaning as set forth in the ECA or other Project Agreements, as the case may be. Where there are differences in their respective meanings, the definitions in the aforementioned agreements will take precedence.

All units of measurement that are used in this IFMSB shall conform to the English System of Units unless explicitly stated otherwise.

1. **Actual Renewable Energy Production –** means, for a Project utilizing a hybrid technology consisting of fossil fuel fired and renewable components, the actual amount of renewable energy produced during any given Contract Year as measured by the renewable energy metering device at a point identified in the Bidder's proposal as the guarantee point for delivering the Guaranteed Amount of Renewable Energy.
2. **Availability** – means**:**

$$A = \frac{DC \bullet 8760 - \left(\sum SM_{cap} \bullet SMH + \sum FM_{cap} \bullet FMH + \sum EO_{cap} \bullet EOH \right)}{DC \bullet 8760}$$

Where:

A	-	Equivalent annual availability
DC	-	Dependable Capacity of the Facility per the ECA
SM_{cap}	-	capacity reduction and derating[1] during maintenance outage
SMH	-	Scheduled maintenance hours
FM_{cap}	-	capacity reduction and derating during forced outage
FMH	-	forced outage hours
EO_{cap}	-	capacity reduction and derating during scheduled outages
EOH	-	Scheduled outages hours

2 **Bid Date** - The date on which Proposals from the Bidders are due in response to the IFMSB.

3 **Bid Guarantee** - The unconditional bank guarantee in the amount of Three Million United States dollars (USD 3,000,000) submitted by a Bidder with its Proposal on the Bid Date to secure that Bidder's and the eventual Selected Bidder's obligations are met during the period between the Bid Date and Financial Close.

4 **Bidder(s)** - means that firm or group of firms that has submitted a Proposal to develop the Project, by itself, or with other firms forming a partnership, joint venture, corporation, or consortium, in response to the IFMSB issued by GPA.

5 **Black Start** - means the process of restoring an electric power station to operation without relying on the external transmission network.

6 **British Thermal Unit or Btu** – means the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

7 **Capacity Charge** - Has the meaning set forth in Section B, Article 4.3.

8 **Capacity Damages Amount** - The amount, expressed in US$ per MW, used to calculate liquidated damages payable to GPA for outages in excess of allowed outages in a given Contract Year, as explained in Article 9 of the ECA, equal to the product of (i) the Capacity Charge per MW per month prevailing during the relevant Contract Year, except that for Contract Years in which the Capacity Charge is less than $10,000 per MW per Month, such figure shall be $10,000 per MW, (ii) 12 months, and (iii) 1.5.

9 **Combustion Turbine Generator** - means turbine generator sets capable of firing ULSD and Natural.

[1] Derating means capacity reduction due to forced outage or maintenance of any auxiliary equipment

10 **Commercial Operation Period** - With respect to the Facility, the period of time commencing on the Phase 1 Commercial Operation Date and ending on (but including) the last day of the Term.

11 **Construction Start Date** - The date on which the Project Company issues a "notice to proceed" to its Construction Contractor.

12 **Contract Year** - A period of twelve consecutive months commencing on each consecutive anniversary of the Phase 1 Commercial Operation Date and ending as of the end of the day preceding the next anniversary of the Phase 1 Commercial Operation Date, except for the first Contract Year which shall start on the Phase 1 Commercial Operation Date.

13 **Contracted Facility Capacity** (Guaranteed Net Output)- The net electric power generating capacity of the Facility guaranteed to be provided to the Delivery Point on a continuous basis, adjusted to Site Reference Conditions, as set forth in Schedule 2 of the ECA and applicable to the Fuel being consumed by the Facility at any given time.

14 "**Contracted Phase 1 Capacity**" - The net electric power generating capacity of Phase 1 guaranteed to be provided to the Delivery Point on a continuous basis, adjusted to Site Reference Conditions as set forth in Schedule 2 and to the Fuel being consumed by the Facility at any given time, if applicable.

15 **Correction Curves –** This definition has the meaning set forth in Section D Envelope II, Form 15, Article 1.5, "Fuel Charge (FC)".

16 **Delivery Point** - The location of connection of the Electrical Interconnection Facilities to the 115 kV bus bar at the Facility's switchyard where GPA receives the Net Energy Output from the Project Company, as to be specified in the ECA, Schedule 3.

17 **Dependable Capacity** - At any given time, the measured amount of net capacity of the Facility, in kW (adjusted to Site Reference Conditions), at the Delivery Point of the Facility as determined by the most recent Dependable Capacity Test

18 **Diesel Engine Generator -** means engines of equal to or greater than 10 MW output at generator terminals capable of firing ULSD and Natural Gas.

19 **Direct Agreement –** means the Direct Agreement to be entered into between the GPA and the senior lenders to the Project.

20 **Dollars or USD or US$** - The lawful currency of the United States of America.

21 **Electrical Interconnection Facilities** - All facilities and equipment described in ECA, Schedule 3 in accordance with the GPA grid requirements, including, but not limited to: (i) the Delivery Point; (ii) telemetering (including revenue metering), telecommunication, and technical equipment required to receive signals from the Project Company and transmit such signals to GPA's dispatcher, the Power System Control Center (PSCC),; (iii) the lines and cables and associated equipment; (iv) the switching equipment, (v) the protective devices and safety equipment to be installed between the Delivery Point (exclusive of the metering devices) and the Grid System to enable the Grid System to receive the Net Energy Output from the Facility in accordance with the ECA.

22 **Energy Charge** – This definition has the same meaning as set forth in Section B, Article 4.4.

23 **Energy Conversion Agreement (ECA)** - The document which establishes the power sales and purchases obligations, terms and conditions between the Project Company and the power purchaser, GPA.

24 **Engineer** - The independent consulting engineering firm of international repute jointly selected by the Project Company and GPA to issue such certificates and make such determinations as are required in the Project Agreements, the costs of whose appointment and retention shall be shared equally by the Project Company and GPA.

25 **Facility** - Electric generation plant to be constructed by the Project Company at a leased site in Guam whether completed or at any stage of development and construction including, without limitation or regard to the level of development, the leased land, buildings, engineering and design documents, all power producing equipment and auxiliary equipment including a Black Start capability**,** Fuel handling and storage infrastructures, water intakes and discharges, water treatment and pumping facilities, solid waste disposal facilities, main and plant transformers, plant switchgear, and all other installations as described in the ECA, Schedule 1.

26 **Financial Close** - The date on which all conditions of the lenders and investors have been met, thereby allowing initial financing disbursements to take place.

27 **Fixed Capacity Charge (FCC)** – This definition has the same meaning as defined in Section B, 4.3.1.

28 **Fossil Fuel Fired Component** – means, for a hybrid plant, part of the Facility utilizing Diesel Engine Generators or Combustion Turbine Generators.

29 **Fossil Fuel Fired Net Energy** Output – means portion of the Net Energy Output generated by the Fossil Fuel Fired Component and equal, for any time interval, to the Net Energy Output minus Renewable Net Energy Output.

30 **Fuel** - Refers to the fuel used by the Facility, which will be initially ULSD. Natural Gas may be made available for the Facility in the future. All calorific values of the Fuel shall be expressed as the Higher Heating Value (HHV).

31 **Fuel Supplier** –GPA will supply Fuel pursuant to the ECA.

32 **Functional Specifications** - Section C of this IFMSB that specifies the functional requirements of the Facility.

33 **Million Btu, or MMBtu** - means 10^6 Btus.

34 **GigaWatt Hours (GWh)** - means10^6 kilowatt hours.

35 **Government Authorizations** - All formal permits, licenses, authorizations, consents, decrees, waivers, privileges, approvals, and filings required to be obtained from or provided by any Government institution, entity, or authority for the execution, delivery, and performance of the Project, the ECA, the LLA, Water Supply Agreement and Land Lease Agreement, including without limitation the construction, ownership, maintenance, and operation of the Facility as contemplated by the Project Agreements.

36 GPA – means the Guam Power Authority, an agency of the Government of Guam and Guam's electricity provider.

37 **Grid System** - The transmission facilities through which the Net Energy Output may be transmitted and distributed to users.

38 **Guaranteed Heat Rate (GHR)** - The Heat Rate as measured at the Site Reference Conditions guaranteed by the Project Company for Phase 1 or for Phase 2 at different loads with such loads being expressed as percentage of Dependable Capacity of the Facility.

39 **Guaranteed Net Output** – This definition has the same meaning as that for Contracted Facility Capacity.

40 **Guaranteed Amount of Renewable Energy** – means, for a Project utilizing hybrid technology consisting of fossil fuel fired and renewable components, the amount of energy guaranteed by the Project Company to be generated during each Contract Year by solar or wind power generating equipment installed as part of the Facility and equal to the amount of energy calculated at the end of each Contract Year based on the output of the performance model utilizing PVsyst or Wind software that was submitted by the Bidder with their Proposal and accepted by GPA, adjusted based on actual weather conditions during such Contract Year for factors such as irradiation, wind speed, temperature, and the degradation amount guaranteed by Bidder in its Proposal.

41 **GWA** – The Guam Waterworks Authority, an agency responsible for water supply and wastewater treatment,

42 **"Heat Rate"** expressed in Btu per kWh, means Facility's fuel energy consumption expressed in Btu (higher heating value) required to generate one kWh at the Delivery Point.

43 **IFMSB** - This Invitation for Bid document with all attachments thereto, and any Addenda as issued by GPA.

44 **Index** (I_o , I_n)- The index used for adjusting the Price. This index is: the US Bureau of Labor Statistics, Current Employment Statistics, transportation and public utilities, average hourly wages of production workers, EES 40000006. The date used will be for the preceding third month.

45 **Initial Dependable Capacity**- means, at the Phase 1 Commercial Operation Date, Phase 2 Commercial Operation Date, or Natural Gas Commercial Operation Date, as the case may be, the maximum capacity that the Facility demonstrated to be capable of delivering at the Delivery Point during the successfully completed Dependable Capacity Test used to establish the Phase 1 Commercial Operation Date, Phase 2 Commercial Operation Date, or Natural Gas Commercial Operation Date and the Contracted Facility Capacity for each Phase and each Fuel.

46 **kW** - Kilowatts.

47 **kWh** - Kilowatt-hours.

48 **Land Lease Agreement (LLA)** – The agreement between GPA and the Project Company which establishes the terms and conditions of GPA's long term lease of the Site to the Project Company.

49 **Lead Bidder** - means the member of a Consortium, who has been duly authorized by the other members of the Consortium to submit the Proposal and act on behalf of the Consortium until selection of the Selected Bidder and takeover of the Project Company.

50 **Lump Sum Payment** – means the lump sum payment in the amount of USD 50 million to be made by GPA to the Project Company upon Phase II Commercial Operation Date.

51 **Major Overhaul** - The repair and reconditioning of the Facility that is conducted on a specified hours basis for Diesel Engines and equivalent operating hours or equivalent starts for Combustion Turbines as defined by the manufacturer(s).

52 **MW** - Megawatts.

53 **MWh** - Megawatt-hours.

54 **Natural Gas**- means natural gas meeting the Fuel quality specifications contained in Section C.

55 **Natural Gas Commercial Operation Date** – that date on which that the standard requirements and the guaranteed values for Natural Gas operation are met for each unit as a whole and such tests and standard requirements are accepted by GPA.

56 **Natural Gas Commercial Operation Period** - With respect to the Facility, the period of time commencing on the Natural Gas Commercial Operation Date and ending on (but including) the last day of the Term.

57 **Natural Gas Commercial Operation Tests** - Tests which demonstrate that the standard requirements and the guaranteed values for operation on Natural Gas are met to achieve the Natural Gas Commercial Operation Date.

58 **Net Energy Output** - The energy output delivered by the Facility and accepted by GPA during a given period of time measured in kWh by the Metering System (adjusted to Site Reference Conditions) at the Delivery Point.

59 **New and Clean** - Combustion Turbine Generator, Diesel Engines Generator. solar PV module, or wind turbine that did not experience performance degradation.

60 **Notice of Award** - A written notification issued by GPA upon reaching an agreement on the draft of the Project Agreements between the parties which confirms that the Selected Bidder can proceed to Financial Close for the Project.

61 "**Notice to Proceed**" means the initial notice to the Construction Contractor to commence engineering, procurement or construction work pursuant to the Construction Contract.

62 **Notification of Selection** - A written notification issued by GPA upon successful completion of the clarification meetings, which confirms that the Bidder has been selected to finalize the Project Agreements.

63 **Non-recourse Financing** - Debt or other financing, the recourse for which shall be solely to the Project Company.

64 **Performance Bond** – means the security established in accordance with the ECA to secure the Project Company's obligations under the ECA during the construction period.

65 **Phase** – means either Phase 1 or Phase 2, or both, as the context indicates.

66 **Phase 1** – means all work as required to put the Simple Cycle Unit in case of a combined cycle Facility or the Facility full firm base load capacity in case of other technologies into commercial operation.

67 **Phase 2** – means all work as required to complete the rest of the Facility and put the entire Facility into commercial operation.

68 **Phase 1 Commercial Operation Date** – that date on which the standard requirements and the guaranteed values for operation of Phase 1 are met and accepted by GPA as set forth in the ECA and the Functional Specifications.

69 **Phase 2 Commercial Operation Date** – that date on which the standard requirements and the guaranteed values for operation of the Facility are met and accepted by GPA as set forth in the ECA and the Functional Specifications.

70 **Price -** The price of electricity charged by the Project Company to GPA and calculated in accordance with the formulas in ECA, Schedule 5.

71 **Project** - The development, design, engineering, financing, insurance, procurement, construction, start-up, testing, commissioning, completion, ownership, operation, and maintenance of the Facility and all activities incidental thereto.

72 **Project Agreements** - Collectively, the Energy Conversion Agreement, Land Lease Agreement, Direct Agreement, and Water Supply Agreement, which are entered into directly among GPA, GWA and the Project Company.

73 **Project Company** - The single purpose company incorporated in Guam for the purpose of owning and operating the Facility, and its permitted successors and assigns.

74 **Proposal** - Bidder's written offer based on the directions, covenants, terms and conditions as contained in the IFMSB for the development, financing, designing, procurement, building, owning, maintaining, and operating of the Project.

75 **Prudent Utility Practices** - Those practices, methods, techniques and standards, as changed from time to time, that are generally accepted internationally for use in electric utility industries (taking into account conditions in Guam), and commonly used in prudent engineering and operation to design, engineer, construct, test, operate, and maintain equipment lawfully, safely, and economically as applicable to power stations of the size, service, and type of this Facility.

76 **Qualified Bidder means** - A Bidder that was found to be qualified to submit a Proposal for the Project as a result of the pre-qualification process.

77 **Renewable Component** – means, for a hybrid plant, part of the Facility utilizing solar or wind power generation technology.

78 **Renewable Component Degradation Guarantee** – means the Bidder's guaranteed rate of degradation for the Renewable Component as provided in Table 15.1 of Section D.

79 **Renewable Net Energy Output** – means portion of the Net Energy Output generated by the Renewable Component.

80 **Required Commercial Operation Date** - With respect to the Phase 1, that date which is 20 months after Notice to Proceed, and with respect to Phase 2, that date which is 30 months after Notice to Proceed, or such later date as may apply in accordance with the provisions of the ECA.

81 **Required Financial Closing Date -** means March 23, 2020, as such date may be extended for up to ninety (90) Days in accordance with Clause 3.5 of the Energy Conversion Agreement.

82 Request for Qualifications (RFQ) - means the document issued by GPA prior to issuance of this IFMSB in specifying Bidder qualification requirements and used to evaluate qualifications of prospective Bidders interested in participating in the Project and develop a list of qualified Bidders.

83 Responsive Bidder -means the Bidder whose Envelope I Proposal is found to be responsive to the IFMSB requirements during the Proposal evaluation process.

84 **Responsiveness Test** – means the evaluation of responsiveness of Bidder's Envelope I Proposal as described in commercial Section B of this IFMSB.

85 **Selected Bidder** - The Bidder who has been selected under this tendering process (IFMSB) to develop the Project.

86 **Simple Cycle Unit**- The unit of the Facility formed by combustion turbine(s) or reciprocating engines and the supplementary equipment for generating electric power.

87 **Site** – The land on which the Facility is to be installed, which will be acquired by GPA and made available for lease to Bidders by means of the LLA, provided, however, that the applicable area to be leased shall be limited to the portion of land required for the applicable Facility which shall be no greater than 25 Acres.

88 **Site Reference Conditions** – For the fossil fuel fired components of the Facility, the physical and meteorological conditions at which the Facility would be operating under hypothetical representative circumstances. The Facility's actual outputs will be converted to these conditions in accordance with ECA.

89 **Startup** - The process of starting up a Unit or the Facility until its synchronization with the Grid System.,

90 **Term** - The period from the effective date of the ECA until twenty five (25) years after Phase 1 Commercial Operation Date, unless extended or terminated as pursuant to the ECA.

91 **Third Party Agreements -** means the Construction Agreement, O&M Agreement, and term sheets for financing.

92 **Threshold Capacity** - The net electric power generating capacity that is ninety (90%) percent of the Contracted Facility Capacity.

93 **Time Measurement Units:**

- Hour: A sixty-minute clock hour. One of the 24 hours in a Day.
- Day: A 24-hour period beginning and ending at 12:00 midnight Guam time.
- Month: A calendar month according to the Gregorian calendar.
- Year: A calendar year according to the Gregorian Calendar beginning at midnight December 31 in Guam.

94 **Typical Meteorological Year or TMY** – means a set of relevant meteorological conditions relevant to the performance of wind generation or PV solar generation technology, as the

case may be, which is proposed by a Bidder with a Renewable Component and is subject to potential adjustment, verification and/or approval by GPA.

95 **ULSD** - means ultra-low sulfur diesel fuel with maximum sulfur content of 15 ppm suitable for firing by Diesel Engine Generators or Combustion Turbine Generators.

96 **ULSD Commercial Operation Tests** - Tests which demonstrate that the standard requirements and the guaranteed values on ULSD are met to achieve the Commercial Operation Dates.

97 **Unit** – For fossil fuel fired components of a Facility, each individual Diesel Engine Generator or Combustion Turbine Generator with appropriate auxiliaries.

2.2 Interpretation

1 Words in the singular may be interpreted as referring to the plural and vice versa.

2 The word "including" is to be construed as being at all times followed by the words "without limitation", unless the context otherwise requires.

3 Qualifications of Bidders

GPA has evaluated the qualification information submitted by interested parties in response to the RFQ and has determined the Qualified Bidders.

For the purpose of preparation of the Proposal, the Bidder shall follow the formats and requirements of Section D of the IFMSB.

4 Applicable Law

Bidders should base their Proposals on the Laws of the United States of America and Laws of the Territory of Guam in effect thirty (30) days prior to the Bid Date. Bidders will be protected from Changes in Law which occur after the date that is 30 days prior to the Bid Date. Bidders remain responsible for obtaining their own legal counsel concerning the laws that may affect this Project, or any other matters pertaining to their Proposal.

5 Requirements for the Project

5.1 Financing

a) Arrangement for financing the development and construction of the Facility shall be the sole responsibility of the Selected Bidder. GPA will not be a party to the signing of any document related to financing of the Project apart from the ECA, LLA, consent, conditional assignment, and/or multi-lateral lending documents. Table 12.1 in Section 12 of this Section A to the IFMSB provides the assumptions and expectations concerning the schedule under which all parties will complete the Project Agreements, the time within which the Selected Bidder shall complete all the financing arrangements necessary to achieve Financial Close**,** and finally the time to place the Facility into commercial operation.

b) Financing will typically consist of equity and debt. At least 20% of the total funding, inclusive of contingencies, will be in the form of contributed equity with the remainder being provided through senior and/or subordinated debt. At least 35% of the equity

shall be provided by the Lead Bidder. Bidders will provide the Debt Service Coverage Ratio (DSCR) that is implicit in their financial plan for each year of the Term.

5.2 Project Description

The Project will include the following facilities as further described in Section C:

a) Complete base load fully dispatchable power generating facility constructed with new materials and equipment, having a net total power generation capacity of 180 MW at specified Site Conditions using either fossil fuel fired technology, renewable power generation technologies with energy storage, or a hybrid (fossil fuel fired plus renewable) technologies. As stated above, because of the variability of technologies allowed and distinct unit sizes, GPA will consider evaluating Proposals that are within plus/minus 10% of the preferred capacity. The fossil fuel fired component of the facility shall be capable of burning ULSD and shall have provisions for burning natural gas in the future. The Project will operate for a term of twenty-five years as a fully dispatchable Facility with Availability of 90% or more. The Bidders may offer any technology meeting the proven technology criteria specified in Section C. The size of the Facility's individual units shall be such that a trip of a single Unit will not result in a loss of 45 MW.

b) All required Site support facilities, including, but not limited to, the administration buildings, warehouses, workshops, Fuel delivery and back-up Fuel storage facilities, main and plant transformers, inverters, plant switchgear and metering required, Electrical Interconnection Facilities for connection to GPA's transmission system, and water systems.

c) All necessary Site infrastructure including roads, a potable water system, a sanitary sewer system, parking areas, lighting, telecommunications, fire protection system, security access control and security security fencing. Construction of housing for workers will be at the discretion of the Bidder. (Site utilities are addressed in Article 8.)

d) All necessary improvements to ensure unimpeded access to the Site which include, but are not limited to, access road between the Route 1 and the Site, improvements to the existing roads, bridges, culverts, relocation of utilities, and any other logistical support items that are required to implement the Project.

5.3 Site

The Facility Site shall be located within the parcel of land provided by GPA. The Site is located approximately 80 meters above the mean sea level. Bidders may utilize up to 25 acres of the GPA property for the Facility Site, but may be allowed to use additional area within the GPA property during the construction period. The Site will be leased to the Project Company by GPA under a Land Lease Agreement with a term commensurate with the term of the ECA.

The Bidder will be required to provide an estimate of the area required for the Facility and for construction facilities and provide a layout of the Site showing Bidder's use. The Selected Bidder will have to coordinate the location of electrical and water interconnections, Fuel delivery arrangements and routing with GPA and other concerned parties. The final Facility arrangement will be coordinated with GPA.

5.4 Fuel Supply

GPA will supply Fuel for the the Facility. The fossil fuel fired components of the Facility will be operated initially using ULSD. GPA may decide to make Natural Gas a primary Fuel if and when Natural Gas becomes available after which point ULSD will become the backup Fuel. Fuel supply arrangements are discussed further in Section C.

6 Power System Overview

6.1.1 The Existing Generation and Transmission System in Guam

The existing transmission system in Guam is depicted by the map provided in Appendix D. In addition, the IRP (see Appendix A) provides detailed information on the power system and power sector planning for Guam. The IRP describes Guam's reference demand forecast, existing generating plants, planned and committed plants, plans for plant decommissioning, and the territory's transmission system. The latest GPA's demand forecast is presented in Appendix E.

6.1.2 Dispatch Principles

a) GPA is responsible for dispatching the output of all the plants connected to the Grid System.

b) Dispatching instructions to the Facility will require desired levels of active and reactive power outputs and spinning reserve for the whole Facility. The Project Company will be responsible for determining how to distribute this output among its own generating units.

c) Dispatching to increase or decrease the level of generation of facilities within the Grid System normally occurs on an order-of-merit basis using previously established marginal costing procedures, except under emergency circumstances.

d) The Power System Control Center is scheduled to have the following additional facilities: SCADA, EMS, and optical fiber communication network linking all power plants, grid substations, and major offices of GPA.

e) The Facility operator will be responsible to notify the GPA's Power System Control Center to take the necessary measures when any equipment within the Facility exceeds the technical limits of the associated equipment, as presented in the Bidder's Proposal.

7 Logistics, Legal, and Labor Information

7.1 Logistics

a) The Project Company shall be responsible for all material and equipment shipments into Guam that need to be imported for the Project. The Bidder shall identify and verify the sufficiency of all existing port facilities and transportation networks, and identify, acknowledge and confirm its ability to comply with all customs requirements, immigration laws, labor laws, taxes, duties, fees, licenses and visa requirements.

b) The Site is located approximately 12 miles from the Port Authority of Guam. Existing roadways connect the Port Authority to the proximity of the Site.

c) Guam does not manufacture any major power plant components. However, building materials and equipment for construction are generally available within Guam.

d) When the local industry and local companies are qualified to supply material or perform the work requirements for the Project, the Bidder is encouraged to prioritize the subcontracting of such procurement and work to local companies.

e) Notwithstanding the information outlined above, the Bidders shall identify any existing or foreseeable obstacles or impediments to the execution of the Project, including but not limited to, the adequacy of the port facilities, requirements for customs clearance, transportation to the Site, and the availability of skilled and unskilled labor. Bidders must include these costs in their Proposals.

7.2 Permits and Licenses

a) The Bidder shall investigate requirements of all Government Authorizations necessary to implement and operate the Project. The Bidder shall assure itself of the procedures and time frames required to obtain such permits and licenses. It is emphasized that the burden and risk of identifying and obtaining all required permits and licenses rests solely with the Selected Bidder.

b) The Bidder must take into consideration the time required to obtain any necessary Government Authorizations and to submit the necessary documentation to concerned parties and Government agencies in due time. The Bidder must also take into consideration the time required to conduct the studies that are associated with obtaining such Government Authorizations. The Bidder's proposed schedule shall take these aspects into consideration as outlined in Section D.

7.3 Legal Matters

The applicable United States and Guam electricity, foreign investment, work, tax and customs duties laws must be taken into account in implementing this Project. Bidders shall conduct their own investigation to verify the requirements for the Project and the latest amendments to the requirements that apply to the Project. Note that the Bidder's Proposal must be based on the applicable laws of Guam and the United States in effect 30 days prior to the Bid Date.

7.4 Labor Information

a) Labor for construction and operation of the Facility may not be available locally. Select existing GPA plants are to be retired within one (1) year following the new power plant commissioning. The Project Company shall give existing GPA power facilities maintenance and operations employees who will be adversely affected or separated as a result of commissioning of the new power plant the right of first refusal for employment at the new power plant in positions for which they are qualified. For each case of hiring an existing GPA maintenance and/or operating employee the Project Company shall advise GPA about their plan for hiring such employee and allow a minimum of 6 months before beginning the employment period to allow GPA to adjust its' plant operation and maintenance activities. GPA may require assistance from the Project Company in finding a temporary labor pool for positions at their existing power plants that will be vacated.

b) Bidders shall be aware of the typical workweek (Monday through Friday) and all holidays and special seasons as are observed in Guam.

c) Bidders' Proposals shall provide a plan for staffing the Project Company as requested in Section D.

8 Site Utilities

The Selected Bidder shall, at its expense, arrange for, enter into contracts as required, develop, and maintain the utilities at the Site necessary to execute and operate the Project, as specified in Section C of this IFMSB, including but not limited to, the following matters:

8.1 Water

The Bidder will be responsible for arranging water supply for the Project for condenser cooling, cycle makeup, cleaning and other needs, as applicable. The options may include entering into a Water Supply Agreement with the GWA, using well water, or sea water, subject to obtaining appropriate environmental and other permits. The Project Company shall also construct at its cost and within the Site boundaries raw water storage with sufficient capacity to store enough water to satisfy lenders' requirements for supporting the Facility's continuous operation at the Contracted Facility Capacity in case of temporary raw water supply interruption.

8.2 Sanitary and Sewer Facilities

Sanitary sewer lines are not available at the Site. The Project Company shall provide for adequate sanitary facilities during Facility construction and Facility operation, and it shall comply with applicable U.S. EPA and Guam discharge requirements.

8.3 Telephone:

The Bidder shall be responsible for arranging telephone and related services at the Project Site.

8.4 Construction Power and Back-up Power

The Bidder shall provide all construction power at the Site, either through self-generation or from the existing GPA network. Construction power from the GPA network will be provided at the current applicable electricity rates.

8.5 Power for Facility Start-up.

High Voltage power for Facility start-ups, as needed, will be provided from the GPA substation used for evacuation of power generated by the Project via the Electrical Interconnection Facilities to be constructed by the Project Company. Start-up transformers and related equipment, as required, will be installed by the Project Company as part of the Facility. It is required that the Facility have Black Start capability.

8.6 Power Evacuation

The Project Company will have to construct the Electrical Interconnection Facilities connecting the Facility to the GPA Grid System and transfer care, custody, and control of those facilities to GPA after the Phase 1 Commercial Operation Date and the full ownership of those facilities upon Phase II Commercial Operation Date. GPA will own, operate, and maintain these Electrical Interconnection Facilities during the Term of the ECA.

9 Fuel

9.1 ULSD

GPA will supply ULSD for the Project from the GPA-owned and operated central storage facility located near the Cabras power station. The Project Company will be responsible for construction of the ULSD supply pipeline as part of the Project scope. The pipeline will be constructed within the existing pipeline right of way that begins at the fuel bulk storage facility pumping station near the Cabras Plants and extends to the Tanguisson Plant. After the Phase 1 Commercial Operation Date, care, custody and control of the pipeline will be turned over to GPA. Full ownership of the pipeline will be transferred to GPA upon Phase II Commercial Operation Date. GPA will own, operate, and maintain the pipeline during the Term of the ECA. ULSD properties are provided in IFMSB Section C, Functional Technical Specification.

9.1.1 ULSD Storage

GPA intends to convert its bulk storage facility from heavy fuel oil to ULSD. The current storage capacity of the existing central storage facility is 500,000 barrels**.** It should be noted that this storage facility will be used for the Project as well as for other GPA power plants. The Bidder shall provide additional on-Site ULSD storage with storage capacity sufficient to support thirty (30) days of Facility operation at full load. During the term of the ECA GPA will be allowed to access Bidder's on Site ULSD storage facilities to fuel GPA's tanker trucks at no charge.

9.2 Natural Gas

GPA may develop a LNG receiving facility to supply natural gas to the Project under a separate procurement process to be held in the future. GPA, via the selected LNG provider, will be responsible for development of the LNG delivery, storage and regasification facilities including construction of a gas supply pipeline to deliver natural gas from the LNG terminal to the Project Site. The terminal (interface) point between GPA and the Project will be at the Site boundary. The Project Company shall make all provisions necessary to allow for the construction of the required Natural Gas facilities within the Site. The Project Company shall allocate sufficient space for the Natural Gas backup metering station to be located inside the fence. Gas handling facilities, including filtering, metering, pressure reducing equipment and heaters, will be constructed and operated by the Project Company within the Site boundary. Gas pressure at the interface point is expected to be approximately 60 bars. Natural Gas properties are provided in IFMSB Section C, Functional Technical Specification.

9.3 Fuel Price

Under the terms of the ECA, GPA will supply Fuel to the Project Company at no cost, provided that the quantity of Fuel consumed by the Project does not exceed the Fuel consumption calculated based on the Guaranteed Heat Rate and actual dispatch. The Project Company will reimburse GPA for the cost of any Fuel consumed in excess of the quantities calculated based on the Guaranteed Heat Rate and actual dispatch. The cost of excess Fuel will be equal to the price of Fuel paid by GPA to their ULSD and/or Natural Gas suppliers (as applicable) plus operating and maintenance expenses associated with receipt, storage, and delivery of the excess quantities of Fuel to the Site.

10 Hybrid Technology Requirements

As part of its Proposal, any Bidder utilizing solar or wind energy as part of a hybrid facility with fossil fuel fired generation will be required to submit a 12 month energy production forecast for a Typical Meteorological Year (TMY) based on a bankable resource assessment and using PVsyst or WindSim software as applicable. The TMY will be subject to evaluation, adjustment, and acceptance by GPA. This TMY annual output will constitute an output guarantee for TMY conditions and will be adjusted based on actual weather conditions for each Contract Year to determine compliance with the Guaranteed Amount of Renewable Energy. The adjustment factors will include irradiation, wind speed, ambient temperature, and the degradation amount guaranteed by Bidder in its Proposal.

Subject to its evaluation, potential adjustment, and acceptance, GPA will use the TMY output adjusted by the annual degradation guarantee (included in the Bidder's Proposal) as an input to GPA's Proposal evaluation model. The renewable energy output will be assumed to displace fuel consumption in the Proposal evaluation model. During the Term of the ECA, the Project Company will be responsible for the Fuel costs resulting from any positive difference between the Guaranteed Amount of Renewable Energy and the Actual Renewable Energy Production.

11 Environmental Requirements

The Bidder shall meet all the applicable environmental requirements of the Guam EPA and U.S. EPA and obtain environmental permits required for construction and operation of the Facility. Guam EPA permitting and compliance requirements can be found at the http://epa.guam.gov website. U.S. EPA requirements are specified in the CFR Title 40, Protection of Environment which is available from the website https://www.ecfr.gov/cgi-bin/text-idx?gp=&SID=3fd3e483e9690934bccc0bcc570a96f3&mc=true&tpl=/ecfrbrowse/Title40/40tab_02.tpl. The Bidder shall meet all the applicable environmental requirements and include all associated environmental costs in the proposed Price.

12 GPA Project Schedule

The anticipated development schedule of the Project through Financial Close and the required Project construction and commissioning activities leading to the Commercial Operation Dates are presented in Table Table 12.1 . The durations shown are the maximum expected durations and reduction of such duration is encouraged. Bidder liquidated damage obligations resulting from delays in meeting this schedule are set forth in the ECA.

The Project Company's schedule shall reflect sub-activities in a Critical Path Method (CPM) network format to support the attainment of each of the milestone dates identified below, and shall include details of the Facility construction as outlined in Section D.

Table 12.1: Procurement and Development Milestones

Milestones	Durations	Cumulative Duration	Expected Completion
IFB Issued to Potential Bidders			10/1/2018
Pre-Bid Meeting with Bidders	30	30	11/5/2018

Bid Date - Proposals (Envelopes I and II) submitted to GPA.	82	112	1/18/2019
Complete Evaluation of Envelope I; Invite Responsive Bidders to Envelope II Opening	44	156	3/4/2019
Conduct Envelope II Public Bid Opening Meeting	1	157	3/5/2019
Complete Evaluation of Envelope II; Invite the First-Ranked Bidder to Clarification Meeting	46	203	4/19/2019
Conduct Clarification Meeting(s) with First-Ranked Bidder and other top-ranked Bidders as required and selection of the Selected Bidder.	49	252	6/7/2019
Complete Negotiations of ECA with the Selected Bidder.	71	323	8/16/2019
Obtain CCU and PUC approval	56	379	10/11/2019
Sign the ECA with the Selected Bidder.	1	380	10/14/2019
IPP achieves financial close and starts construction.	180	560	4/10/2020

13 Project and Third Party Agreements

This IFMSB includes a draft ECA and LLA and attachments thereto, some of which will be completed subsequently based on this IFMSB and the Bidder's Proposal.

Upon selection of the Selected Bidder, the draft ECA and LLA will be finalized between the Selected Bidder and GPA along with any other Project Agreements, as applicable. In the event that Project lenders have comments to the Project Agreements that are reasonable, essential, and do not constitute material deviations from the drafts included in this IFMSB, corresponding adjustments shall be considered by GPA for inclusion in the final agreements. Material deviations mean any changes that result in increasing the Price; or limiting the liabilities or responsibilities of the Project Company, or the rights of GPA. Comments which constitute material deviations may render the Proposal to be Non-Responsive and may result in rejection of Bidder's Proposal. The Selected Bidder must subsequently also proceed to prepare the Third Party Agreements.

Appendix A: GPA Integrated Resource Plan 2013

Available on GPA website

http://www.guampowerauthority.com/gpa_authority/strategicplanning/2012IRP.php

Appendix B: PUC Filing and Revised Integrated Resource Plan

Available on GPA website

http://www.guampowerauthority.com/gpa_authority/strategicplanning/2012IRP.php

Appendix C: PUC Order from April 27, 2017

BEFORE THE GUAM PUBLIC UTILITIES COMMISSION

IN THE MATTER OF:	)	GPA Docket 15-05
	)	
The Petition of the Guam Power Authority for Approval of Procurement of New Generation Combined Cycle Units and to Proceed with Implementation of the Integrated Resource Plan (IRP).	)	**ORDER**

INTRODUCTION

1. This matter comes before the Guam Public Utilities Commission ["PUC"] upon the Petition of Guam Power Authority ["GPA"] for Approval of Procurement of New Generation Combined Cycle Units and to proceed with implementation of the Integrated Resource Plan (IRP).[1]

2. GPA requests: (1) approval to procure 180 megawatts of dual fired Combined Cycle generation plant; (2) approval to procure new engineering and technical consulting services to include procurement, contracting, construction and commissioning support for up to a 180MW combined cycle power plant located in the Harmon area (to be funded by the 2014 bond funds); and (3) authorization to retire the Cabras 1 & 2 Steam Plants no later than July 1, 2021.[2]

BACKGROUND

3. On August 21, 2015, PUC Consultant Lummus issued its Report: Review of GPA Petition to Acquire up to 180MW of New Combined Cycle Capacity, in Docket 15-05.[3] Lummus found, *inter alia,* that GPA had not justified the addition of new generation by demonstrating that additional generation resources were needed to meet the existing load.[4]

4. On August 31, 2015, GPA experienced a major failure of the Cabras Nos. 3 & 4 Power Plants when an explosion and fire occurred.[5] The explosion resulted in the loss of 78MW of base load capacity.[6]

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[1] GPA Petition for Approval of Procurement of New Generation Combined Cycle Units, GPA Docket 15-05, filed July 14, 2016.

[2] Id.

[3] Lummus Consultants INT'L Report: Review of GPA Petition to Acquire up to 180MW New Combined Cycle Capacity in Docket 15-05, submitted on August 21, 2015.

[4] Id.

[5] GPA Petition for Approval of Procurement of the Temporary Power Generation Services, GPA Docket 15-18, filed September 17, 2015.

[6] Id.

5. In its Order dated October 29, 2015, the PUC noted that GPA had not submitted any response in the docket to the August 21, 2015 Lummus Report. The Ordering Provisions required GPA to provide numerous items of information to justify a request for new generation.[7]

6. In its proposed plan, GPA was required: (1) to include an evaluation of whether Cabras 3 and/or 4 could be returned to service, and if so, when; (2) to provide a Third Party Condition Assessment of the Cabras 1 & 2 plants and Life Extension Study; (3) to base its plan for new generation on the Independent Power Producer Model; (4) to provide an analysis of the customer rate impacts from the decision to procure the proposed new generation capacity; and (5) to consider a more gradual replacement of the base load generating assets.[8]

7. Approximately nine months later, GPA filed its "REVISED PETITION FOR CONTRACT REVIEW AND GPA RESPONSE TO PUC ORDER."[9] Along with its Petition, GPA filed extensive documentation addressing the questions raised by Lummus regarding generation and the Integrated Resource Plan. GPA's responses are detailed and comprehensive.

8. In addition, GPA filed an Update by the Consolidated Commission on Utilities on the Integrated Resource Plan, dated May 24, 2016.[10]

9. The key recommendations of the IRP are to procure up to 180MW combined cycle units, obtain an Engineering, Procurement, and Construction Management (EPCM) contract, to retire the Cabras plants, and to convert MEC 8 & 9 to ULSD under the IPP capitalization model.[11] There is an analysis of the potential rate impact on the ratepayers, and a discussion of the demand side management program.

10. On October 4, 5, and 6, 2016, the Administrative Law Judge conducted public hearings on GPA's new generation request in Agana, Dededo, and Agat respectively. The purpose of the hearings was to solicit public comment and testimony. All of the testimony supported the procurement by GPA of at least some new combined cycle generation capacity.

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[7] PUC Order, New Generation Combined Cycle Units, GPA Docket 15-05, dated October 29, 2015, at p. 5.
[8] Id.
[9] GPA Revised Petition for Contract Review and GPA Response to PUC Order, GPA Docket 15-05, filed July 14, 2016.
[10] CCU UPDATE, INTEGRATED RESOURCE PLAN, dated May 24, 2016.
[11] Id.

11. The ALJ filed his Report herein dated October 21, 2016. The PUC adopts the Report and the recommendations contained therein.[12]

DETERMINATIONS

GPA HAS JUSTIFIED THE NEED TO PROCURE NEW GENERATION CAPACITY:

12. The loss of Cabras Plant Nos. 3 & 4 has resulted in the reduction of base load by 78MW. Cabras No. 4 is inoperable; no final determination has been made on the future of Cabras No. 3. GPA's IRP does not rely upon the continued use of Cabras No. 3. There is a reasonable assumption that Cabras No. 3 will not be available to GPA as a base load unit in the foreseeable future.

13. In a Life Extension Study on the Condition of GPA's present generators, including the base loads, GPA's consultant Leidos characterizes the condition of Cabras 3 & 4, even before the explosion, as "poor." It is reasonable to question whether, given the damage to Cabras 3 caused by the explosion, it would make sense to invest insurance settlement proceeds in restoring such plant rather than investing in new plants.

14. According to its CCU updated IRP, dated May 24, 2016, GPA's current plan is to retire the Cabras No. 1 & 2 Steam Plant (132MW) no later than July 1, 2021.

15. The PUC need not, at present approve a specific retirement date for the Cabras Nos. 1 & 2 plants. However, the age of such plants, and their present condition, suggest that their useful life will not likely extend beyond the projected five year period.

16. Consultant Leidos indicates that the Cabras 1 & 2 plants have been in operation for over 40 years. It concludes: "Based on our review, the current condition of the Cabras Plant and the current applicable environmental regulations in place, Leidos is of the opinion that **the Cabras Plant is at the end of its useful life."**

17. According to Leidos, the maintenance costs for Cabras No. 1 & 2, on top of the normal O&M costs, will total nearly $10 million per unit from 2017 through 2021. After 2021, the plant would require continued investments of approximately $2M per unit annually on top of routine O&M costs.

18. Thus, assuming that the Cabras No. 1 & 2 plants are not available after 2021, there would be a total base load loss (including Cabras 3 & 4) of 200MW of capacity.

[12] ALJ Report, GPA Docket 15-05, dated October 21, 2016.

19. The Energy and Peak Forecast (Base) indicates that the present system peak of 258MW could increase to 291.7MW by 2035. The potential increase in energy demand also may justify procurement of new base load units.

20. GPA has also sought to justify its new generation based on the need to comply with USEPA regulations regarding the RICE MACT and EGU MACT Rules. GPA further contends that its new generation plans will be in compliance with the USEPA Regulations. GPA has agreed to present any proposed consent decree with USEPA in advance of entering into such decree. PUC can more fully review GPA's compliance plans when formally presented to the PUC.

21. It is evident that GPA will need to replace base load generation; it has established the need to procure additional generation capacity.

GIVEN THAT THERE IS AN INCREASED NEED FOR BASE LOAD CAPACITY, GPA HAS OFFERED SUFFICIENT JUSTIFICATION TO PROCURE A NEW GENERATION COMBINED CYCLE PLANT OF 180MW:

22. GPA's Petition and its IRP generally request approval for procurement of "up to 180MW" of combined cycle generation.

23. An argument could be made that GPA does not need a 180MW plant operation, but that some lesser generation capacity plant(s) would suffice.

24. In his testimony, Jeff Voacolo of Micronesia Renewable Energy Inc. indicates his belief that a smaller plant, perhaps 60MW or 100MW, would be sufficient. There could be substantial developments regarding renewable energy, such as advancements in battery storage that would make renewable energy a more viable alternative within the next few years.

25. GPA also has standby/reserve generation capacity of 168MW; this is primarily comprised of combustion turbine units and fast track generators. GPA has, in recent months, expended a considerable amount of funds to bring certain generators back online (Macheche CT, $2.7M; Yigo CT, $2.3M; Expenditure Repairs for the Dededo CT 1 & 2 from 2017 through 2022 are estimated to be $17M to operate and repair said plants).

26. It could also be argued that GPA could possibly reduce the size of its new combined cycle generation plant based upon the availability of the additional standby reserves.

27. A reduction from 180MW to, for example, 160MW or 140MW, would have a considerable impact upon rates that ratepayers will ultimately have to pay.

28. GPA has admitted that, with smaller plants, it may be able to function with a smaller reserve capacity, which could reduce the need for the full 180MW.

29. Leidos, GPA's own consultant, basically finds that GPA failed to properly maintain the base loads or the combustion turbines. Leidos finds that all such plants are in poor condition. However, MEC 8 & 9, which are privately operated by an IPP, are found to be in "good" condition, Had the GPA plants been properly maintained, Leidos indicates they could have been used for another 20 years.

30. The basic reason why GPA needs 180 MW of new generation capacity appears to be that it failed to properly maintain and service its existing plants.

31. Nevertheless, given the present situation, GPA's position that there is a need for 180MW of new capacity is within the bounds of reason and not contrary to logic. It may be arguable whether GPA needs 180MW, or whether a lesser amount would do. However, as GM Benavente pointed out, the responsibility for keeping the lights on is placed upon his shoulders. When GPA retires the Cabras 1 & 2 plants, it will have lost up to 200 total megawatts. It is not unreasonable to suggest that GPA should be able to procure 180MW to replace the 200MW lost.

32. Furthermore, at this stage of the process, GPA is only requesting procurement authorization for "up to 180MW". PUC will have a further opportunity for review, upon submission by GPA, of the actual procurement, and upon review of the final award, to determine the appropriate amount of megawatts needed for the combined cycle plant.

33. At present, there has been no showing that renewable energy is reliable or stable enough to provide reliable base load generation for Guam. GPA presently estimates that it would cost $320M to provide full time, effective and reliable solar power from the Dan Dan Plant through battery storage. That situation could change in the future. Renewable energy could become viable as a 24/7 base load option before the end of the useful life of any combined cycle units purchased. However, it is pure speculation to suggest when renewable energy will be a viable alternative to base load fossil fuel generation.

34. Also, if renewable energy did become reliable and available during the 30 year IPP Contract, GPA could use the combined cycle units as peaking units and possibly retire the other peaking units.

GPA SHOULD BE AUTHORIZED TO PROCURE ENGINEERING, PROCUREMENT, AND CONSTRUCTION CONTRACTOR SUPPORT FOR A NEW COMBINED CYCLE PLANT:

35. GPA is seeking PUC approval for its engineering, procurement, and construction management contractor (EPCM). The purpose of such contractor would be to assist GPA in the development of the procurement for new generation and the construction of a plant with characteristics best suited to GPA's needs.

36. In this Docket, GPA previously made a request in May 2015 to expend 2014 Bond Funds, in the amount of $750,000, for procurement of engineering and technical consulting services relative to the 180MW combined cycle power plant.

37. However, in its May 28, 2015 Order, the PUC denied GPA's request for an EPCM, on the ground that a proposed 180MW combined cycle plant had not yet been approved by the PUC.

38. Since the PUC is approving the procurement of a new combined cycle plant, GPA's request for $750,000 for the specified engineering and technical consulting services should also be approved.

39. The process of procurement for the combined cycle plant, as well as various proposed aspects of GPA's IRP plan, will require expert consulting services. It stands to reason that GPA needs the services of a highly specialized consultant to carry out a project of this scope and magnitude.

40. The requested engineering and technical consulting services will be funded from the 2014 bonds. Previously, the PUC held in GPA Docket 13-14 that it was appropriate to fund projects that relate to GPA's new generation facilities and fuel conversion from the LNG Initial Start Up Budget.

41. In 2014 GPA Bond Issuance, there were funds originally allocated for "LNG Initial Start Up" in the amount $3M.

42. GM Benavente confirmed at the Public Hearing on October 4 that there are still remaining funds from the $3M that can be used to cover the $750,000 expense for the EPCM.

43. GPA should be authorized to expend $750,000 for engineering and consulting services relative to the new combined cycle plant, such funds to be paid from the 2014 Bond Funds allocation for LNG Initial Start Up. Such expenditure is reasonable, prudent and necessary.

GPA'S PROCUREMENT WILL CAUSE A RATE IMPACT UPON THE RATEPAYERS:

44. A major concern with regard to GPA's proposal to procure 180MW of combined cycle plant is the potential impact of such procurement upon the ratepayers of Guam.

45. In its May 24, 2016 Update to the IRP, GPA has provide "estimates" as to rate impact from its proposed procurement. It has developed both "High and Low Capital of Cost Estimates" for insurance settlements of $100M Proceeds and $150M Proceeds (FOR THE Cabras 3 & 4 Claim).

46. At present whether there will be a settlement or the amount of such proceeds is unknown. If there is a settlement relative to the Cabras 3 & 4 Claim, the proceeds derived, or a portion thereof, could be applied to new generation costs. Under the "High Capital Cost Estimate", with a $100M insurance settlement, GPA anticipates that there would be an impact on the total ratepayer bill, between 2024 and 2026, in the amount of 6.8%. The impact on Base Rates for that three year period would be 19.7%.

47. This "estimate" is rough and not necessarily accurate. With so many variables regarding the claim settlement, it is very difficult to predict how much cash will be available for the new generation costs.

48. Whether settlement funds will in any manor be tied to the repair of the Cabras 3 is also unknown.

49. Furthermore, GPA's cost estimates of rate impact with the procurement of a 180MW plant is, in part, based upon Bond "restructuring" plans, and plans for issuance of a new 30 year bond. Neither of these options has yet been approved by the PUC.

50. However, GPA did give a reasonable explanation of how the cost for the procurement would be paid at the Public Hearing on October 4, 2016. GPA indicated that the "New Resource Cost" for the IPP partner for construction of the 180MW combined cycle plant would be roughly $424M. This is the cost paid by the IPP for the new generation.

51. GPA would be reimbursing such cost to the IPP through payments for the power produced over a 30 year period. Chairman Duenas estimated that the price for the power purchased from the IPP over the 30 year period would be $.0438 per KWH. This cost compares favorably with the current purchase rate for power produced for GPA from MEC 8 & 9, which is $.0485 per KWH.

52. GPA will not have to pay the "New Resources Cost" upfront, but will make payments on such amount over the 30 year period for purchase of energy production.

53. There will be additional costs for "New Resource Land, Interconnection and Fuel Piping Costs" in the amount of $93,562,000. These include a Transmission Line cost in the amount of $60,203,000, Fuel Piping in the amount of $21,218,000 and Land Purchase Price in the amount of $12,141,000. These costs all involve location of the proposed site for the plant in Harmon.

54. GPA is hopeful that insurance settlement proceeds from the Cabras 3 & 4 explosion will assist in paying off the costs in the amount of $93,562,000.

55. As a part of GPA's plan, there are also "Life Extension Costs" to support Cabras 1 & 2 over the next five years, as well as continuing PMC costs and O & M costs for the combustion turbines and fast track generators. The total cost over the five year period is estimated to be in the range of $83M. GPA intends to pay these costs primarily through revenue funds.

56. At present it does appear that GPA has a plan to minimize the rate impact upon ratepayers from the procurement of the 180MW combined cycle plant. Both GM Benavente and Chairman Duenas stated that there are cost cutting and savings initiatives which will result from the addition of this new plant that can minimize the rate impact upon GPA customers. GPA has promised to minimize such rate impact by any means available.

CONDITIONS SHOULD BE IMPOSED UPON GPA'S PROCURMENT AUTHORIZATION FOR THE COMBINED CYCLE PLANT AND THE IRP:

57. This Order only addresses the issues specifically referenced herein. It does not authorize aspects of the IRP that are not specifically addressed. However, other issues, including the appropriate date for the retirement of the Cabras 1 & 2 plants, and approval of other aspects of the IRP, can be deferred to a later time.

58. Any plan for proceeding ahead with LNG at the present time is disapproved. GPA has not demonstrated that such plan is economically viable.

59. In its IRP, GPA has referred to a number of plans by which GPA would participate in the funding and/or ownership of certain aspects of the proposed plant. Those references include "IPP Model with GPA financing", "Issuance of New 30 Year Bonds", "Finance and Lease of Equipment to IPP", and "Restructure/Refund" of GPA bonds. None of these plans have been justified to date. They are not approved at the present time.

ORDERING PROVISIONS

After review of the record herein, GPA's Petition for Approval of Procurement of New Generation Combined Cycle Units and to Proceed with Implementation of the Integrated Resource Plan (IRP), and the ALJ Report, for good cause shown, on motion duly made, seconded and carried by the undersigned Commissioners, the Guam Public Utilities Commission **HEREBY ORDERS** that:

1. GPA is authorized to procure a combined cycle plant of up to 180MW. Before such procurement is issued by GPA, it should be first reviewed and approved by the PUC.

2. GPA's plan for up to 180MW of new combined cycle generation capacity shall be based upon the Independent Power Producer (IPP) Model as a Build Operate Transfer (BOT), similar to MEC 8 & 9, rather than upon ownership by GPA.

3. GPA is authorized to procure an Engineering Procurement and Construction Management contractor for a new combined cycle plant, and is authorized to expend $750,000 for such engineering and consulting services, to be paid from the 2014 bond fund allocation for LNG Initial Startup.

4. GPA plans for bond financing, restructuring, or financing/leasing for the IPP are disapproved at the present time.

5. GPA's procurement authorization for the new combined cycle plant is conditioned upon the restrictions and limitations set forth in the DETERMINATIONS section of this Order.

6. The PUC reserves the right to further consider the issue of whether 180MW should be the proposed capacity of the new plant, or whether a lesser capacity would suffice, upon GPA's submission of the procurement for approval. This issue may be further reviewed upon submission of the final proposed procurement award to the PUC.

7. GPA shall retire Cabras 1 & 2 upon commission of the new generation combined cycle plants.

8. The PUC retains jurisdiction herein to make any further review of any and all aspects of the IRP.

7. When GPA submits the new generation procurement to PUC for approval, it shall also provide a fully updated and comprehensive rate impact study.

8. GPA is ordered to pay the Commission's regulatory fees and expenses, including, without limitation, consulting and counsel fees and the fees and expenses of conducting the hearing proceedings. Assessment of PUC's regulatory fees and expenses is authorized pursuant to 12 GCA §§12103(b) and 12125(b), and Rule 40 of the Rules of Practice and Procedure before the Public Utilities Commission.

Order
New Generation
Combined Cycle Units
GPA Docket 15-05
October 27, 2016

Dated this 27th day of October, 2016.

Jeffrey C. Johnson
Chairman

Joseph M. McDonald
Commissioner

Rowena E. Perez
Commissioner

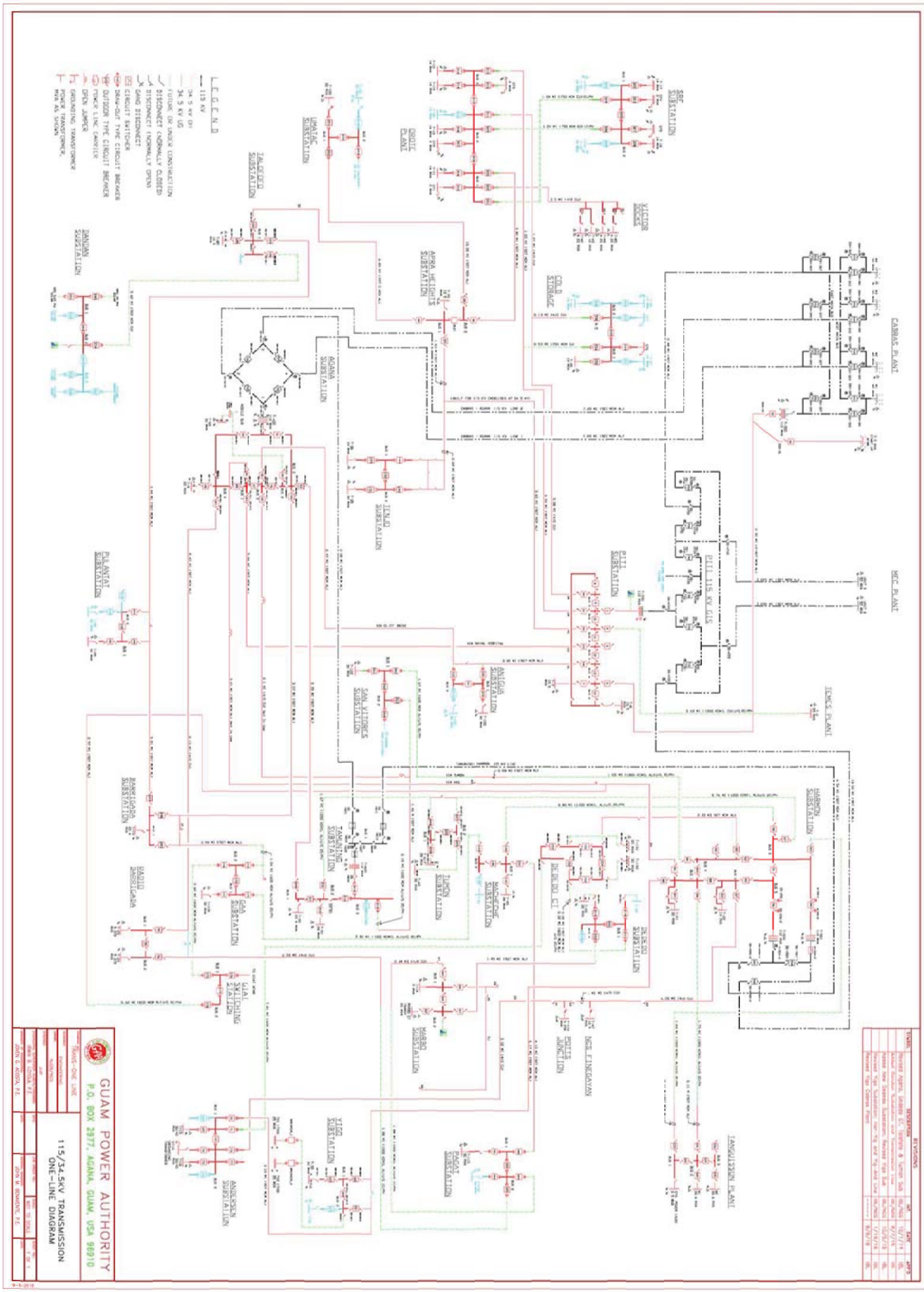
Peter Montinola
Commissioner

Michael A. Pangelinan
Commissioner

Andrew L. Niven
Commissioner

Filomena M. Cantoria
Commissioner

Appendix D: GPA Power Network One Line Diagram


GUAM POWER AUTHORITY
P.O. BOX 2977, AGANA, GUAM, USA 96910
115/34.5KV TRANSMISSION
ONE-LINE DIAGRAM
LEGEND
CABRAS PLANT
MEC PLANT
TEMES PLANT
TANGUISSON PLANT
PITI 115 KV GIS
PITI SUBSTATION
AGANA SUBSTATION
APRA HEIGHTS SUBSTATION
HARMON SUBSTATION
DEDEDO CT
YIGO SUBSTATION
ANDERSEN SUBSTATION
MARBO SUBSTATION
PAGAT SUBSTATION
BARRIGADA SUBSTATION
PULANTAT SUBSTATION
TALOFOFO SUBSTATION
DANDAN SUBSTATION
UMATAC SUBSTATION
OROTE PLANT
SRF SUBSTATION
VICTOR DOCKS
COLD STORAGE
TENJO SUBSTATION
SAN VITORES SUBSTATION
TAMUNING SUBSTATION
TUMON SUBSTATION
MACHECHE SUBSTATION
GAA SUBSTATION
RADIO BARRIGADA
GUAI SWITCHING STATION
POTTS JUNCTION
NCS FINEGAYAN
DEDEDO SUBSTATION

Appendix E: Demand Forecast

Table E.1: Demand Forecast

Year	Peak Load, MW
2019	*271*
2020	276
2021	282
2022	282
2023	286
2024	292
2025	294
2026	293
2027	302
2028	302
2029	300
2030	310
2031	307
2032	305
2033	309
2034	311
2035	314
2036	312
2037	315
2038	313
2039	319
2040	320
2041	325
2042	327
2043	329
2044	331
2045	333
2046	336
2047	338
2048	340

Year	Peak Load, MW
2049	342
2050	344

Appendix F: Fuel Price Forecast

Table F.1: Fuel Price Forecast

Year	ULSD USD/MMBtu	LNG with Regas USD/MMBtu
2016	9.39	12.72
2017	10.87	13.14
2018	12.50	13.72
2019	15.10	14.45
2020	17.11	15.03
2021	18.43	15.51
2022	19.45	15.97
2023	20.47	16.40
2024	21.52	16.85
2025	22.64	17.24
2026	23.81	17.65
2027	25.07	18.08
2028	26.16	18.54
2029	27.33	19.03
2030	28.51	19.54
2031	29.83	20.09
2032	31.18	20.67
2033	32.63	21.29
2034	34.15	21.96
2035	35.81	22.65
2036	37.49	23.31
2037	39.14	23.96
2038	40.94	24.61
2039	42.88	25.25
2040	44.90	25.89
2041	46.64	26.54
2042	48.49	27.19
2043	50.35	27.83
2044	52.20	28.48

Year	ULSD USD/MMBtu	LNG with Regas USD/MMBtu
2045	54.06	29.13
2046	55.91	29.77
2047	57.77	30.42
2048	59.62	31.07
2049	61.48	31.71
2050	63.33	32.36

INVITATION FOR MULTI-STEP BID

GPA-034-18

BUILD, OPERATE & TRANSFER CONTRACT FOR 180MW OF NEW GENERATION CAPACITY

Section B: Instructions to Bidders

SEPTEMBER 2018

Table of Contents

Appendices

List of Tables

List of Equations

1 General

1.1 Description of the Evaluation Process

GPA will select the will select the Proposal which has the lowest cost and is fully responsive to, and meets the requirements and criteria set forth in, this IFMSB according to the following process. (See Article 7.1 for an overview of the selection process after the evaluation is complete.)

a) GPA invited potential Bidders with experience in similar projects and size to submit qualification information by April 5, 2018 and then evaluated the information and determined a list of Qualified Bidders. GPA has made this IFMSB available only to the Qualified Bidders and now requests technical, commercial and financial Proposals, and final price proposals in response to this IFMSB.

b) Proposals from respondents who submit a Proposal for technology options different from the options allowed under this IFMSB will not be considered by GPA.

c) GPA will use a two-envelope evaluation process to select the lowest responsive and responsible Bidder. Envelope I shall only contain Bidder information and the technical, commercial, and financing aspects of the Proposal, whereas Envelope II shall contain the Bidder's final price proposal.

d) GPA will evaluate only Proposals received from Qualified Bidders and will determine the Responsive Bidders based solely on the Envelope I Proposal submittal, using the responsiveness requirements contained in Article 6.4 and Responsiveness Test included in Appendix A herein.

e) GPA will only open and evaluate Envelope II Proposals from Qualified and Responsive Bidders. Qualified Bidders found to be non-Responsive will be formally notified and their Proposal Securities will be returned.

f) GPA will rank the Responsive Bidders based solely on the evaluation of the Envelope II price Proposals, based on the Price evaluation criteria contained in Article 6.4.2 herein.

1.2 Cost of Preparing Proposals and Project Agreements

Bidders shall bear all costs associated with the preparation and submission of their Proposals and their tasks and responsibilities for finalization and execution of the agreements comprising the Security Package. GPA will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the evaluation process, or subsequent bankability of the Project, except as provided by the Project Agreements as executed by the parties. GPA will bear the costs of its tasks and responsibilities for proposal evaluation and for finalization and execution of the agreements comprising the Security Package as defined in the ECA.

Bidders shall be deemed to have carefully examined all the terms, conditions and specifications of this IFMSB and to have fully informed themselves as to all the conditions affecting development of the Project. Failure to do so is at Bidder's sole risk, and no claim will be considered at any time for any reimbursement of any expenses incurred as a result of any misunderstanding with regard to the conditions imposed by this IFMSB.

1.3 SITE INVESTIGATION

a) The Bidder is advised to visit and examine the Site and the surrounding areas and obtain or verify all information it deems necessary for the preparation of the Proposal.

b) The Bidder shall submit a written request to GPA at least seven (7) calendar days in advance of such inspection of the Site. GPA will grant the Bidder or its agents written permission to enter upon the premises for such purpose. The Bidder or its agents will only be granted permission on the express condition that the Bidder agrees to follow all instructions of GPA and to release and indemnify GPA and its agents from and against all liability in respect thereof and to be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which, but for the exercise of such permission, would not have arisen.

c) A Bidder's failure or inability to fully investigate the Site or its subsurface conditions shall not be grounds for the Bidder to subsequently alter its Proposal nor shall it relieve the Bidder from any responsibility for appropriately estimating the difficulty or costs of successfully completing the Project. Furthermore, the Price will not be allowed to be adjusted after the Proposal submission due to any reason whatsoever.

2 Invitation for Bid

2.1 Clarifications and Amendments

2.1.1 Clarifications

Any prospective Bidder desiring an explanation or interpretation of this IFMSB must make a request in writing to the GPA Procurement Office at the mailing address or the email address listed below, referencing the Invitation for Multi-Step Bid No. GPA-034-18.

ATTENTION: JOHN M. BENAVENTE, P.E.
GENERAL MANAGER
GUAM POWER AUTHORITY
POST OFFICE BOX 2977
HAGATNA, GUAM 96932-2977

ATTENTION: JAMIE LYNN C. PANGELINAN
SUPPLY MANAGEMENT ADMINISTRATOR
EMAIL: jpangelinan@gpagwa.com
PHONE: (671) 646-3054/55
FAX: (671) 648-3165.

All inquiries must be received by GPA Procurement no later than 30 days before the deadline for the submission of Proposals. Any oral explanations or instructions given by GPA to prospective Bidders will not be binding. GPA will promptly furnish any information given to a prospective Bidder concerning this IFMSB to all parties recorded by the Procurement Office as having received the IFMSB. This information may be provided as an amendment to the IFMSB if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.

2.1.2 Amendments

a) GPA may issue addenda in writing to all Bidders to whom this IFMSB has been provided at any time prior to the date of opening of Proposals which may delete, modify, or extend any part of this IFMSB. Any amendment, modification or addendum issued by the Guam Power Authority, prior to the opening of the proposals of this IFMSB, for the purpose of changing the intent of the technical or commercial requirements, clarifying the meaning or changing any of the provisions of this IFMSB, shall be binding to the same extent as if written in the originally issued IFMSB documents. Any addendum issued will be made available to all Bidders via mail, fax, e-mail or posting to the GPA Website. The Bidders shall acknowledge receipt of the amendment by a signature on one copy, which is to be returned to GPA at the mailing address, email address, or FAX number above. A Bidder's late receipt of any addendum or failure to acknowledge the receipt of any Addendum shall not relieve the Bidder from being bound by such addendum.

b) Unless the clarification or amendment to this IFMSB is in the formal manner described in Articles 2.1.1 and 2.1.2 above, no representation or explanation to Bidders as to the meaning of this IFMSB or concerning the Project shall be considered valid or binding on GPA. Bidders are cautioned that no employee of Government of Guam, GPA, GWA, or of their consultants is authorized to explain or interpret this IFMSB, and that any interpretation or explanation, if not given in writing by GPA, must not be relied upon.

c) To afford Bidders sufficient time in which to take a clarification or amendment into account in preparing their Proposals, GPA may, at its discretion, extend the deadline for the submission of Proposals, in accordance with Article 5.2.

3 Preparation of Proposal

3.1 Language of Proposal

The Proposal and all related correspondence and documents shall be written in the English language. Supporting documents and printed literature furnished by a Bidder with the Proposal may be in any other language provided they are accompanied by an appropriate translation of pertinent passages into the English language. Supporting materials which are not translated may not be considered. For the purpose of interpretation and evaluation of the Proposal, the English language translation shall prevail.

3.2 Proposal Structure and Content

3.2.1 General

Proposals shall be prepared by Bidders using the same organization and format that is outlined in this Section and Section D. This format includes the use of a two (2) "Envelope" selection process:

In Envelope I, Bidder information and the technical, commercial and financial proposal will be submitted. Those Qualified Bidders that are deemed responsive to the IFMSB will have their Envelope II opened and evaluated for final selection.

The contents of each envelope of the Proposal are outlined in Article 3.2.2 below, and the formats of the specific forms used are presented in Section D, entitled "Bidder's Proposal and Supportive Data." Also, see Article 5.1 for instructions on the contents of each volume for "Envelope I" and "Envelope II. Complete information must be provided by each potential Bidder in the Proposal, according to the format set forth in Section D. If necessary, additional sheets may be attached to each response. Failure of a Bidder to submit the complete information as requested by GPA may lead to rejection of their Proposal in its entirety.

3.2.2 Content of Proposal

3.2.2.1 Contents of Envelope I

Form 1 – Proposal Letter

Attachment 1A – Form of Bank Guarantee

Attachment 1B – Proposal Opening Form

Form 2 – Affidavit by the Bidder

Attachment 2A – Certificate from Parent Company

Attachment 2B – Tax Statement

Attachment 2C - Litigation Pending

Form 3 - Bidder's Organization

Attachment 3A - Letter from Team Member

Form 4 - Financial Capability

Attachment 4A - Certificate of Availability of Bank Guarantee

Form 5 – Project Data Sheets

Form 6 – Project Financing Plan

Form 7 - Financial Data in Support of Project

Form 8 - Technical Data and Submittals

Form 9 - Additional Supporting Data

Form 10 - Exceptions to the IFMSB Documents

Form 11 - Bidder's Project Schedule

Form 12 - Bidder's Staffing Plan

Form 13 – Mandatory Forms Required In Accordance With Guam Procurement Law

Form 14 – RESERVED

3.2.2.2 Contents of Envelope II:

Bid Price (Section D, Form 15)

Form 15.1 Schedule of Commercial Operation Period

Form 15.2 Proposed Fixed Capacity Charge

Form 15.3 Fixed Operations & Maintenance Charge

Form 15.4 Variable O&M Cost Charge

Form 15.5 Fuel Charges Guaranteed Heat Rates

Form 15. 6 Supplemental Charge

Form 15.6.1 Startup Charges

Form 15.6.2 Synchronous Condenser O&M Charges

Form 15.7 Evaluated Present Value (unofficial results)

3.2.3 Additional General Instructions

Each Qualified Bidder must submit a Responsive Proposal, which is a Proposal that conforms to all the terms, conditions, and specifications of this IFMSB without material deviation or reservation, as described in Article 3.2.3 herein. Failure to comply with this instruction may result in the rejection of the Bidder's Proposal.

Additional instructions for Proposal preparation are:

a) Proposal Letter and Bid Guarantee: The Bidder shall complete the Proposal Letter as required in Section D, Form 1. The Bidder shall also provide the Bid Guarantee in the form shown in Attachment 1A of that Section, which will provide security for the Proposal from each Bidder.

b) Technical Specifications and Data: The Bidder shall submit its proposed technical design that meets the requirements set forth in Section C. The critical elements of the technical specifications which must be specified in the Bidder's Proposal include:

   i) Fully dispatchable net plant output at the Delivery Point of **180 MW** at Reference Site Conditions. Due to the variability of technologies allowed and distinct unit sizes,

GPA will consider evaluating proposals that are within plus10% of the upper limit of the preferred capacity range.

ii) The Electrical Interconnection Facilities between the Facility and GPA's **115 kV Harmon substation,** including any necessary modifications/expansion of such GPA substation, shall be designed and constructed by the Project Company in compliance with the technical requirements specified by GPA.

iii) A fully dispatchable plant with target Availability of 90% or more.

iv) For fossil fuel fired components, new and clean dual fuel ULSD and Natural Gas units of similar design that have been in reliable commercial operation for at least three (3) continuous years as of the Bid Date.

v) The proposed fossil fueled power generating technology shall be capable of operating on ULSD and Natural Gas with the capacity of individual units selected in such a way that a loss of the largest unit would not result in a loss of more than 45 MW.

vi) PV solar modules, if proposed, must be provided by suppliers listed as Tier 1 on Bloomberg's global module supplier list.

vii) In the case of renewable generation and storage components, all equipment shall be new and clean and of a technology and design that have been in reliable commercial operation for at least two (2) continuous years as of the Bid Date.

viii) Compliance with applicable environmental requirements of the Guam EPA and U.S. EPA.

ix) The Facility being able to operate in parallel with other generating sources. A study of the electrical system shall be performed by the Selected Bidder to assure such compatibility.

x) A communication system that is compatible with GPA's system.

xi) Fault levels that are stated in the technical specifications.

xii) Provisions which are made for SCADA system per GPA's requirement and in accordance with the System Grid Code

xiii) A Facility that fits well within the Site boundaries and that includes the full scope of work regarding support facilities. (The specific layout and area requirements of the Facility will be coordinated with GPA during document completion, as described in **Section C**.

xiv) A plant Site that is at Harmon as specified herein.

xv) Design and construction of the ULSD supply pipeline between the Site boundary and the interface point identified by GPA at the GPA's ULSD storage facility[1], of Natural Gas supply pipeline between the Site boundary and the interface point identified by GPA, of water supply line(s), and of any effluent water discharges to sites beyond the Facility boundary that are coordinated with appropriate Guam

entities and authorities and are in compliance with applicable environmental regulations.

xvi) The ownership of ULSD supply pipeline, equipment and facilities modified by the Project Company at the GPA ULSD storage facility, and the Natural Gas pipeline shall be transferred to GPA upon Phase 2 Commercial Operation Date. Care, custody, and control of those facilities will be transferred to GPA upon the Phase 1 Commercial Operation Date. After transfer of care, custody, and control, GPA will operate and maintain the existing GPA ULSD storage facility and ULSD and Natural Gas pipelines.

xvii) Design and construction of Fuel storage, handling and treatment facilities within the Site boundaries, as required to support reliable operation of the Facility.

xviii) Heightened cyber-security requirements due to Guam being a location of a U.S. military base.

c) Financial Data: The Bidder is required to submit the financial information as requested in Section D, Form 7, entitled "Financial Data in Support of Project."

d) The Bidder must submit a Proposal which meets the codes and standards for design, workmanship, materials and equipment as stated in the Functional Specifications. The Bidder may propose codes and standards from other standard international organizations provided it demonstrates to the satisfaction of GPA that these codes and standards meet or exceed the requirements of the designated codes and standards in the Functional Specifications. The Bidder shall submit all the technical data requested in Section D, Form 8, entitled "Technical Data and Submittals".

e) Additional Supporting Data: The Proposal shall address the specific items requested in Section D, Form 9, entitled "Additional Supporting Data".

f) Exceptions to the IFMSB Documents: The Bidder shall address all of its specific exceptions to the IFMSB technical, commercial, and financial conditions and to the draft Project Agreements in accordance with Section D, Form 10, entitled "Exceptions to the IFMSB Documents". Exceptions appearing elsewhere in the Bidder's Proposal will not be considered in the evaluation. Bidders will not be entitled to the benefit of exceptions not included in Section D, Form 10, if any, or at later stages, including without limitation during the finalization of the Project Agreements, and the Project execution and implementation.

g) The Bidder's Project Schedule: The Proposal shall contain the Bidder's detailed schedule for the development and construction phases of the Project as requested in Section D, Form 11, entitled "Bidder's Project Schedule."

h) The Bidder's Project Staffing Plan: The Proposal shall contain the Bidder's tentative detailed manloading charts with resumes of its key personnel and proposed home office and field staffing for the development phase and construction phase of the Project, as requested in Section D, Form 12, entitled "Bidder's Staffing Plan."

i) Price: The Bidder shall submit its Price (in Envelope II) in accordance with the instructions of Article 4 herein, and in the format in Section D, Envelope II, Form 15 "Proposed Price". Additional back-up sheets and calculations may be submitted in Envelope II as necessary to explain the Bidder's Price.

The Bidder must prepare its Proposal by filling in all blank spaces and submitting documents in the formats required by Section D. No changes shall be made in phraseology, and items shall not be added, unless specifically requested. Exceptions are to be listed in Section D, Form 10 as specifically provided for this purpose, and as explained in Article 3.2.3 above.

A Proposal that is illegible or that contains omissions, erasures, alterations, additions, items not called for, or irregularities may be rejected. Exceptions may be made in those cases where it is necessary to correct errors made by the Bidder, in which case, such corrections shall be initialed by the person or persons signing the Proposal.

4 Facility Sizing and Price

4.1 Facility Sizing

The IFMSB requires the Contracted Facility Capacity to be 180 MW as defined in the Functional Specifications, Section C. Because of the variability of technologies allowed and distinct unit sizes, GPA will consider evaluating Proposals that are within plus/minus 10% of the of the preferred capacity. Bidders may offer any net Facility capacity within the specified limits. The total amount of the land area of the Facility must meet the requirements of Section C, Article 5.

4.2 Summary of Price Structure

Schedule 5 to the ECA will be based on the information provided in this Article 4.2, Article 4.6, and the Proposal accepted by GPA.

The Price charges are stated in three parts for each of Phase 1 and Phase 2 as applicable:

a) Capacity Charge, consisting of the Fixed Capacity Charge (FCC) plus the Fixed Operations and Maintenance Charge (FOMC);

b) Energy Charge, consisting of the Fuel Charge (FC), if any, plus the Variable Operations and Maintenance Charge (VOMC); and

c) Supplemental Charges (SC). These include charges not included in Capacity or Energy Charges.

Each of these charges is explained in detail in this Section 4.2. The Capacity Charge and Energy Charge parts of the Price may undergo adjustments as explained in Articles 4.3, 4.4, and 4.6.

4.2.1 GPA Price Payment

4.2.1.1 Payment for Test Energy

Prior to the Phase 1 Commercial Operation Date, GPA shall not pay for energy delivered to GPA during testing and Commissioning.

4.2.1.2 Payment During Operation

Upon meeting the Phase 1 Commercial Operation Date, GPA will pay the Price as defined in Envelope II.

4.2.1.3 Other Payment Information

The Price will be specified for each Contract Year of the Commercial Operation Period except for the Price associated with Phase 1 which shall only be considered for the first Contract Year. All payments shall be made in accordance with the terms defined in the ECA. These terms shall include provisions for the Joint Coordinating Committee to establish the technical and administrative details for invoicing, which will implement the concepts and equations in Articles 4.3 through 4.5 of this Instructions to Bidders.

4.2.1.4 Method of Price Calculation

The Bidder must warrant that the proposed Price submitted per Section D, Form 15 has been calculated in conformance with the previous guidelines, is based on the requirements of the IFMSB, and includes the following specific items:

4.2.1.5 Costs Included in Price

a) All costs, without exception, required to deliver the specified electric energy, taking into consideration auxiliary loads, the degradation of equipment in output and heat rate, and based on the amount of electrical energy, peak load, ambient conditions, and other operating conditions defined in Section C.

b) The cost of first fill of the on-Site storage for ULSD.

c) The cost of first fill for on-site water storage.

d) The cost of ULSD and Natural Gas used to generate electric energy.

e) The inclusion of all costs and expenses that may be incurred in connection with the development of the Site, including consideration of without limitation, the topography and ground subsurface conditions, potential water and air pollution conditions, surface and subsurface geology, and the nature and quantity of surface and subsurface materials to be encountered, such as chemical contamination or other hazardous material, archaeological or historical artifacts and/or sites, etc[2].

f) Cost, if any, of constructing additional facilities required to start operating on Natural Gas when it becomes available.

g) All applicable insurance costs, taxes, fees, and custom duties.

h) Price whose components are to be adjusted as appropriate, for Indices which will remain in constant, Bid Date values.

i) The use of hedged interest rates since no adjustment to the Price will be made after the Bid Date for variations in interest rates.

j) The use of hedged currency rates during construction with respect to any exposure due to difference in currencies between the Construction Contractor and the Bidder.

k) A Price that complies with and is subject to the terms and conditions contained in the draft Energy Conversion Agreement.

l) All other costs not specifically listed above that have been or may be incurred by the Project Company and have to be recovered via a Price.

m) A Price that is based on a Contract Year (for evaluation as well for ECA purposes), in which the applicable Commercial Operation Date may or may not coincide with a calendar year or fiscal year.

[2] No adjustment to the Price during the Term shall be made for Bidder's incorrect evaluation of soil or subsurface conditions, environmental mitigation measures, or any oversight by Bidder in considering all risks associated with the Facility.

4.2.2 Credits Included in Price

The Bidder shall consider in their proposed Price credits associated with GPA Lump Sum Payment.

4.2.3 Other Price Requirements

Each Bidder shall provide a proposed Capacity Charge for each year of the Commercial Operation Period, including a Capacity Charge for Phase 1.

The following other items are required to be included in the proposed Price:

a) An equity commitment of at least 20% with a maximum debt to equity ratio of 80% to 20%.

b) Debt Service Coverage Ratios (DSCR) calculated for each year of the Term.

c) A Price that is consistent with Form 7 of Section D, Financial Data in Support of Project, and Form 11 of Section D, Bidder's Project Schedule, Envelope 1.

d) A Price that complies with the specific requirements of the IFMSB.

4.3 Capacity Charge

Each Bidder shall provide a proposed Capacity Charge for each year of the Commercial Operation Period, including a Capacity Charge for Phase 1.

The Capacity Charge component of the Price will be subdivided into two parts: (1) the Fixed Capacity Charge and (2) the Fixed Operations and Maintenance Charge, for each kW of Dependable Capacity.

The Capacity Charge should reflect, by way of example and not limitation, the Bidder's fixed cost of developing, constructing, financing, and operating the Facility, and it should provide the Bidder with sufficient cash flow to cover such items as the amortization of debt, interest on such debt, fixed Facility operating and maintenance costs, insurance costs, administrative costs, all applicable Facility taxes, and a return on investor equity.

4.3.1 Fixed Capacity Charge

4.3.1.1 General

The FCC shall include, without limitation, all costs of debt service, distribution of dividends and return of investor equity. The FCC should be stated for each period in US$/kW/month as described below. The Bidder shall specify the FCC for each Contract Year (and Phase) of the Commercial Operation Period based on Contracted Capacity (as applicable for each Phase) of the Facility operating on ULSD. For the periods when the Facility operates on Natural Gas, FCC will be adjusted as shown in Equation 4.2 below.

4.3.1.2 FCC Equation

Equations 4.1 and 4.2 set out the application of the FCC as applied to the Dependable Capacity of the Facility.

Equation 4.1: Fixed Capacity Charge on ULSD

Fixed Capacity Charge (US$) = $FCC_n \times DC_n$

Where:

$FCCF_n$ = The FCC (US$/kW/month) for the n-th period of payment proposed at Bid Date

DC_n = Dependable Capacity (kW) in n-th period

Equation 4.2: Fixed Capacity Charge on Natural Gas

Fixed Capacity Charge (US$) = $FCC_n \times DC_n \times \left(\frac{CC_{ULSD}}{CC_{NG}}\right)$

Where:

$FCCF_n$ = The FCC (US$/kW/month) for the n-th period of payment proposed at Bid Date

DC_n = Dependable Capacity (kW) in n-th period

CC_{ULSD} = Contracted Capacity (for the applicable Phase) on ULSD

CC_{NG} = Contracted Capacity (for the applicable Phase) on Natural Gas

4.3.1.3 Price Restrictions

a) The FCC shall not be adjusted by more than 10% (plus or minus) from any one Contract Year to the next Contract Year, provided, however, that it may be adjusted by up to 20% (plus or minus) from Contract Year 1 to Contract Year 2 (from Phase 1 operation to Phase 2 operation).

b) A ratio of a maximum Fixed Capacity Charge to the minimum FCC over the Term [(excluding Contract Year 1)] shall not exceed 1.50.

4.3.1.4 Commercial Operation Date

Bidders shall propose a Phase 1 Commercial Operation Date and Phase 2 Commercial Operation Date that are no later than their respective Required Commercial Operation Dates specified in Section A of the IFMSB. No positive consideration will be given to Proposals offering earlier Commercial Operation Dates during Proposal evaluation.

4.3.2 Fixed Operation and Maintenance Charge (FOMC)

Each Bidder shall provide a proposed Fixed Operations and Maintenance Charge for each Phase of the Commercial Operation Period for operation on ULSD. FOMC Payments will be adjusted on a Contract Year basis thereafter to account for inflation. For the periods when the Facility burns Natural Gas, FCC will be further adjusted as shown in Equation 4.4 below.

4.3.2.1 General

FOMC shall include fixed charges related to Facility operation and maintenance as well as the Project Company management. Such costs include, but are not limited to:

- The costs of salaries and labor including directors' incentives (if any), rent or lease of home office and site, office supplies, and equipment, etc.
- The costs of the O&M Contract and/or costs of salaries of personnel to operate and maintain the Facility, tools, etc.
- Insurance costs
- Operating taxes
- Land Lease rent
- Financial costs of operations (other than debt servicing).

4.3.2.2 Fixed Operation and Maintenance Charge (FOMC) Equation

The FOMC shall be adjusted annually for inflation by comparing the Index on the Bid Date to the Index at the time that the adjustments are being made.

Equation 4.3: Fixed O&M Charge on ULSD

Fixed O&M Charge (US$) = $FOMC_n$ x DC_n

Where:

$$FOMC_n = \left(\frac{I_n}{I_o} \times FOMC_e\right)$$

Where,

DC_n	=	Dependable Capacity (kW) in the n-th period.
$FOMC_n$	=	Fixed O&M component defined above for the n-th period of payment (US$/kW/Month)
$FOMC_o$	=	Fixed O&M as of the Bid Date (US$/kW/Month)
I_n , I_0	=	Index prevailing at the n-th period of payment and on Bid Date respectively.

Equation 4.4: Fixed O&M Charge on Natural Gas

Fixed O&M Charge (US$) = FOMCn x DCn x $\left(\frac{CC_{ULSD}}{CC_{NG}}\right)$

Where:

$FOMC_n = \left(\frac{I_n}{I_o} \times FOMC_o\right)$

Where,

DC_n	=	Dependable Capacity (kW) in the n-th period.
$FOMC_n$	=	Fixed O&M component defined above for the n-th period of payment (US$/kW/Month)
$FOMC_{oe}$	=	Fixed O&M component as of the Bid Date (US$/kW/Month)
I_n , I_0	=	Index prevailing at the n-th period of payment and on Bid Date respectively.
CC_{ULSD} =		Contracted Capacity (for the applicable Phase) on ULSD
CC_{NG} = Natural Gas		Contracted Capacity (for the applicable Phase) on

4.4 Energy charge

The Energy Charge component of the Price will be subdivided into three parts and charged for each kWh of Net Energy Output:

- the Variable Operations and Maintenance Charge
- the Fuel Charge (if any)
- the Water Charge

4.4.1 Variable O&M Charge

The Bidder shall provide a proposed VOMC for each Phase to GPA in US$/kWh which shall be applied commencing on the Phase 1 Commercial Operation Date and be payable until the end of the Term on a monthly basis.

The VOMC shall reflect the Bidder's varying costs of operating the Facility net of Fuel. Such expenditures include chemicals, consumables, water, maintenance, etc. Bidders shall not include items that are already included in the FCC or FOMC.

The VOMC shall be adjusted annually for inflation by comparing the Index on the Bid Date to the Index at the time that the adjustments are being made.

The calculation for the Variable O&M Charge will be as follows:

Equation 4.5: Variable O&M Charge

Variable O&M Charge (US$) = $VOMC_n$ x E_n

Where:

$$VOMC_n = \left(\frac{I_n}{I_o} \times VOMC \right)$$

Where:

E_n = Net Energy Output (kWh) in the n-th period.

$VOMC_n$ = Variable O&M component defined above for the n-th period of payment (US$/kWh)

$VOMC_o$ = Escalatable Variable O&M component as of the Bid Date (US$/kWh)

I_n, I_0 = Index, prevailing at n-th period of payment and on Bid Date respectively.

4.4.2 Fuel Charge

The Fuel Charge has two possible components, (1) ULSD Fuel Charge and (2) the Natural Gas Fuel Charge.

4.4.2.1 ULSD Fuel Charge

Guaranteed Heat Rate

The Bidder shall propose a Guaranteed Heat Rate (GHR) for each Phase at Site Reference Conditions (SRC) and various loads (percentages of the Facility Dependable Capacity) as defined in **Section C** of this IFMSB for using ULSD Fuel. Since the Facility will consist of multiple Units, it is expected that the dispatch requests for reduction of the Facility output will be met by unloading and shutting the Units one by one so that the remaining Units will operate at loads close to 100%. Because of that, the GHR shall not show significant increase within a relatively wide Facility load range. The GHR is not expected to exceed the 100% load GHR by more than 8% at any point between 100% load and 50% load and by more than 17% at any point between 50% load and 25% loads. Additionally, the Bidders shall submit heat rate correction curves to account for changes in ambient temperature, as specified in Section D, Envelope II.

For evaluation purposes, an "all-in" unit cost of ULSD will be used as stated in Section D, Envelope II "Present Value".

The Guaranteed Heat Rate shall not be corrected for degradation at any time during the ECA Term. Bidders must therefore account for heat rate degradation when establishing their proposed Guaranteed Heat Rate.

When GPA receives bills for Fuel supply and transportation for the Facility, the Joint Coordinating Committee shall meet to assign the startups, shutdowns, take or pay obligations, and other operational events between the parties in order to allocate monthly fuel costs. Fuel consumption provided by the Bidders in Section D Envelope II tables will be used for calculating fuel consumption for startups and shutdowns. "Hot Start" fuel consumption will be used to calculate not only fuel consumption for this type of startups, but also for calculating fuel

consumption during shutdowns. The Project Company shall be responsible for the quantity of ULSD (expressed in MMBtus) assigned to it for start-ups, shut downs, load limitations and/or Guaranteed Heat Rate compliance.

The total cost of the ULSD for the Project Company shall be as follows:

Equation 4.6: ULSD Fuel Charge

$$FC_n = PCFR_n \times FP_n$$

Where:

$$PCFR_n = TFC_n - GPAF_n - GPAFO_n$$

Where:

$$GPAF_n \text{ (in MMBtu)} = \sum_{m=1}^{M} [GHR_m \times (E_m - E_{ren}) \times Kt_m] \times [MMBtu / 10^6 Btu] \text{ and}$$

Where:

FC_n	=	Fuel Charge in n-th billing period
n	=	Monthly billing period
$GPAF_n$	=	GPA Fuel consumption in n-th billing period
$PCFR_n$	=	Project Company Fuel Responsibility in n-th billing period
TFC_n	=	Total Fuel consumed at the Facility in n-th billing period expressed in MMBtu
$GPAFO_n$	=	GPA Fuel Other is for Fuel consumed for start-ups and shut downs in the n-th billing period which are the responsibility of GPA
FP_n	=	Fuel Price in n-th billing period (US$/MMBtu)
m	=	Dispatch metering interval (30 minutes, typically)
M	=	Total number of intervals (m) during a billing period (n), which will vary from month to month depending on the actual dispatch that period.
GHRm	=	Guaranteed Heat Rate (Btu/kWh) for the applicable Phase, corrected for actual load conditions existing during interval m for the Fossil Fuel Fired Component that are due to GPA's Dispatch Instructions and, for a hybrid Facility, also due to the ambient conditions defining generating capacity of the Renewable Component. For load conditions that are less than per GPA's Dispatch Instructions due to inability of Facility to meet GPA load requirements up to Dependable Capacity, GHRm shall be the Guaranteed Heat Rate for the load per the Dispatch Instructions.
E_m	=	Net Energy Output during the m-th interval (kWh)
E_{ren}	=	Renewable Net Energy Output in the m-th interval (kWh)
Kt_m	=	GHR Correction factor for average ambient temperature during the m-th interval (based on data provided in Section D, Form 15, Table 15.7)

When the Fuel Charge calculated in accordance with Equation 4.6 above results in a positive number, such amount will be deducted from the amount otherwise payable by GPA for the n-th billing period.

4.4.2.2 Natural Gas Fuel Charge (when it becomes available)

Guaranteed Heat Rate

a) The Bidder shall propose a Guaranteed Heat Rate (GHR) for each Phase at Site Reference Conditions (SRC) and various loads (percentages of the Facility Dependable Capacity) as defined in Section C of this IFMSB, using Natural Gas. Additionally, the Bidders shall submit heat rate correction curves to account for changes in ambient temperature, as specified in Section D, Envelope II.

b) For evaluation purposes, an "all-in" unit cost of fuel will be used as stated in Section D, Envelope II "Present Value".

c) The Guaranteed Heat Rate shall not be corrected for degradation at any time during the ECA Term. Bidders must therefore account for heat rate degradation when establishing their proposed Guaranteed Heat Rate.

d) When GPA receives bills for Fuel supply and transportation for the Facility, the Joint Coordinating Committee shall meet to assign the startups, shutdowns, take or pay obligations, and other operational events between the parties in order to allocate monthly fuel costs. Fuel consumption provided by the Bidders in Section D Envelope II tables will be used for calculating fuel consumption for startups and shutdowns. "Hot Start" fuel consumption will be used to calculate not only fuel consumption for this type of startups, but also for calculating fuel consumption during shutdowns. The Project Company shall be responsible for the quantity of Fuel (expressed in MMBtus) assigned to it for start-ups, shut downs, load limitations and/or Guaranteed Heat Rate compliance.

The total cost of the Fuel for the Project Company shall be as follows:

Equation 4.7: Natural Gas Fuel Charge

$$FC_n = PCFR_n \times FP_n$$

Where:

$$PCFR_n = TFC_n - GPAF_n - GPAFO_n$$

Where:

$$NF_n \text{ (in MMBtu)} = \sum_{m=1}^{M} [GHR_m \times (E_m - E_{ren}) \times Kt_m] \times [MMBtu / 10^6 Btu]$$

Where:

FC_n	=	Fuel Charge in n-th billing period
n	=	Monthly billing period
$GPAF_n$	=	GPA Fuel consumption in n-th billing period, MMBtu
$PCFR_n$	=	Project Company Fuel Responsibility in n-th billing period, MMBtu
TFC_n	=	Total Fuel consumed at the Facility in n-th billing period expressed in MMBtu
$GPAFO_n$	=	GPA Fuel Other is for Fuel consumed for start-ups and shut downs in the n-th billing period which are the responsibility of GPA, MMBtu
FP_n	=	Fuel Price in n-th billing period (Dinar/MMBtu)
m	=	Dispatch metering interval (30 minutes, typically)
M	=	Total number of intervals (m) during a billing period (n), which will vary from month to month depending on the actual dispatch that period.
GHR_m	=	Guaranteed Heat Rate (KJ/kWh) for the applicable Phase, corrected for actual load conditions existing during interval m for the Fossil Fuel Fired Component that are due to GPA's Dispatch Instructions and, for a hybrid Facility, also due to the ambient conditions defining generating capacity of the Renewable Component.. For load conditions that are less than per GPA Dispatch Instructions due to inability of Facility to meet GPA load requirements up to Dependable Capacity, GHR_m shall be the Guaranteed Heat Rate for the load per the Dispatch Instructions.
E_m	=	Net Energy Output by Base Bid Facility during the m-th interval (kWh)
E_{ren}	=	Renewable Net Energy Output in the m-th interval (kWh)
Kt_m	=	GHR Correction factor for Base Bid Facility for average ambient temperature during the m-th interval (based on data provided in Section D, Envelope II, Form 15.

When the Fuel Charge calculated in accordance with Equation 4.6 above results in a positive number, such amount will be deducted from the amount otherwise payable by GPA for the n-th billing period.

4.5 Supplemental charges

Two types of Supplemental Charges (SC) are envisioned. These charges cover the costs of start-ups and shut-downs in excess of 360 starts per Unit per Contract Year, O&M charges for operating of synchronous condenser, and allowable charges resulting from Change in Law. These SC are described below.

4.5.1 Facility Start & Stop Charges

GPA will compensate the Project Company for costs of start-ups in excess of 360 starts per Unit year**.** Any start-up or shut down due to reasons not attributable to GPA's request shall be to the Project Company's account. Start-ups following Scheduled Outages, Maintenance Outages, and Forced Outages shall not receive any adjustment under SC.

4.5.2 Synchronous Condenser O&M Charges

GPA will compensate the Project Company for costs of operating and maintaining the synchronous condenser based on the fixed hourly rate and VAR production rate specified in the ECA based on the rates proposed by the winning Bidder.

4.5.3 Change in Law Charges

The SC may also include any costs due to Change in Law as specified in Article 17 of the ECA.

4.6 Currencies and Indices Used in Calculation of Price

The Energy Conversion Agreement provides for the calculation of the Capacity Charge and Energy Charge to be made in U.S. Dollars.

As provided in Article 4.3 above, certain components of the Price will be adjusted during the Term for increases or decreases in costs due to escalation or de-escalation of prices (generally referred to as inflation or deflation) by Index.

4.7 Proposal Validity

All Proposals shall remain valid and open for acceptance by GPA for a period of twelve (12) months from the date of submission of the Proposals. Any Proposal offering less than the stipulated Proposal validity of twelve (12) months shall be rejected.

Prior to expiration of the original Proposal validity period, GPA may request of any of the top three ranked Bidders two (2) extensions in the period of validity not to exceed a specified period of up to two (2) months each, for a total maximum extension of four (4) months from the original Proposal validity expiry date. The request and the responses for any extensions to the original validity date shall be made in writing. The Bidders may NOT refuse the request. The Bidders will not be permitted to modify their Proposals, and will be required to extend the validity of their Bid Guarantee accordingly, such that the Bid Guarantee shall remain in effect for one month beyond the end of each extension period. The provisions of Article 4.8.below regarding release and forfeiture of Bid Guarantee shall continue to apply during the extended period of Proposal validity.

The Proposal validity for the bidder selected as a Selected Bidder shall be extended until Financial Close is achieved.

4.8 Bid Guarantee

1 Each Bidder shall furnish, as part of the submission of its Proposal, one Bid Guarantee in the amount of **Three Million United States Dollars (USD 3,000,000)** This Bid Guarantee will be provided with the Proposal, as specified in Article 3.2.2.1.

2 The Bid Guarantee shall be in the form of a Bank Guarantee issued by a bank acceptable to GPA. The Bank Guarantee shall be in the form, contained in Section D, Attachment 1a,

entitled "Form of Bid Bank Guarantee", or another form acceptable to GPA. The Bid Guarantee shall be valid for seventeen (17) months from the Bid Date.

3 The Bid Guarantee shall be forfeited without any notice, demand, or other legal process if any of the following conditions occur:

a) Bidder withdraws its Proposal during the period of Proposal validity;

b) if during the Proposal validity period, it is discovered that there was no form of commitment from an EPC contractor for the Project;

c) if the Bidder deviates from the terms of its Proposal or requests an adjustment of the Price after the clarifications meetings; or

d) in the case of a successful Bidder, it fails within the specified time limits to:

i) Execute the Project Agreements,

ii) Reach Financial Close due to delays caused by the inaction of, or fault of the Bidder including abandonment or failure to diligently pursue development, permitting, and financing, or

iii) Furnish the required Performance Bond.

4 The Bid Guarantee shall be returned to Bidders if they withdraw their Proposal before the deadline for submission of Proposals. If any Bidder's Proposal is determined to be non-Responsive to the IFMSB requirements, the Bid Guarantee will also be returned. All Responsive Bidders' Envelope II Proposals will be evaluated and ranked and the validity of their Proposals will be extended, if necessary, pursuant to Article 7.2.1a). The Bid Guarantee of all Responsive Bidders will remain in effect and will be returned pursuant to the provisions of Articles 7.1, 7.2 and 7.3.

4.9 Pre-Bid Meeting & Questions

The Bidder or his official representative is advised to attend a Pre-Bid Meeting which will be held in Guam on **November 5, 2018**. GPA will notify the Bidders by separate letter of the time and location of the Pre-Bid Meeting. Each Bidder may send two (or more) representatives, as will be specified in the letter of invitation, based on the capacity of the location selected for the meeting. GPA may also arrange for a visit to the Site for all Bidders in conjunction with the Pre-Bid Meeting.

The purpose of the Pre-Bid Meeting will be to address general questions that the Bidders may have concerning this IFMSB, the selection process, and the Project. Bidders are therefore requested to submit any questions in writing to reach GPA not later than thirty (30) days after the IFMSB is issued. Questions that are appropriate for discussion will be addressed during the Pre-Bid Meeting.

After the Pre-Bid Meeting, GPA will prepare and send to all Bidders written responses to all the questions submitted. Furthermore, GPA will provide in writing to all Bidders any additional Project information or modifications of this IFMSB which result from the Pre-Bid meeting and the questions submitted by Bidders. This information may prompt further questions from Bidders and responses from GPA. The bid period is sufficient to allow for such clarifications. The Bidders are encouraged to submit their questions in lots as early as possible. No questions raised within the 30-day period prior to the Bid Date will be answered by GPA. GPA will provide the final responses to clarification questions no later than two (2) weeks prior to the Bid Date.

4.10 Format and Signing of Proposal

1 The Bidder shall prepare one (1) original in English plus six (6) copies of the documents comprising the Proposal as described in these Instructions to Bidders, Article 3.2. One original of the completed Proposal is to be clearly marked "ORIGINAL OF PROPOSAL," and all other completed copies are to be clearly marked "COPY OF PROPOSAL." In the event of any discrepancy between the original and any copy, the original shall prevail.

2 If the Proposal consists of more than one volume, the Bidder must clearly number the volumes constituting "the Proposal" and provide an indexed table of contents for each volume.

3 The Proposal shall be typed or written in indelible ink, each sheet shall be stamped and initialed by a person or persons duly authorized to sign for the Bidder, and the Proposal Letter shall be signed by a person or persons duly authorized to bind the Bidder to the Proposal. All pages of the Proposal where entries or amendments have been made shall be initialed by the person or persons signing the Proposal.

4 The complete Proposal as outlined in Article 3.2 shall be without alterations, interlineations, or erasures, except as necessary to accord with instructions issued by GPA or to correct errors made by Bidder. All such corrections shall be initialed by the person or persons signing the Proposal.

5 Bidders may form a joint venture or consortium for the purpose of submitting a Proposal. If they elect to do so, they must comply with the following requirements:

   a) One of the partners shall be nominated as the Lead Bidder. This authorization shall be evidenced by submitting a power of attorney, effective for the duration of the Proposal validity, signed by legally authorized signatories of all the partners;

   b) The Lead Bidder shall be authorized to receive instructions for and on behalf of any and all partners of the joint venture or consortium, shall submit the Bid Guarantee on behalf of the joint venture or consortium, and shall be authorized to execute the Project Agreements on behalf of the Project Company; and

   c) A copy of the agreement entered into by the joint venture or consortium partners shall be submitted with the Proposal.

6 No partner may participate in the submission of more than one Proposal. No joint ventures or consortia, nor any changes to joint ventures or consortia will be permitted without the prior approval of GPA.

5 Submission of Proposals

5.1 Sealing and Marking of Proposal

5.1.1 Envelope Submittal

Proposals consisting of one (1) original plus six (6) copies must be submitted to GPA in sealed envelopes or boxes pursuant to the deadline specified in this Article 5.2 below.

5.1.2 Envelope Packaging

5.1.2.1 Envelope I

The required Forms for Envelope I, as set forth in Article 3.2.2.1 of this Section B, may be organized in multiple standard binders which must be clearly labeled with the particular Form(s) included in the binder. Envelope I binders may be packaged into one or more boxes which must be labeled as defined in this Section 5. Bidders are required to submit:

a) one (1) original plus six (6) copies plus one electronic copy on flash drive to GPA at:

JOHN M. BENAVENTE, P.E.
GENERAL MANAGER
GUAM POWER AUTHORITY
POST OFFICE BOX 2977
HAGATNA, GUAM 96932-2977

ATTENTION: SUPPLY MANAGEMENT ADMINISTRATOR
EMAIL: jpangelinan@gpagwa.com
PHONE: (671) 646-3054/55
FAX: (671) 648-3165

5.1.2.2 Envelope II

The required Forms for Envelope II, as defined in Article 3.2.2.2 of this Section B, must be organized in a single standard binder which must be clearly labeled with the particular Form(s) included in the binder. The Envelope II binder must be packaged into a **single box** which must be labeled as defined in this Section 5 . Bidder's are required to submit:

a) one (1) original plus three (3) copies plus one electronic copy on flash drive to GPA at:

JOHN M. BENAVENTE, P.E.
GENERAL MANAGER
GUAM POWER AUTHORITY
POST OFFICE BOX 2977
HAGATNA, GUAM 96932-2977

ATTENTION: SUPPLY MANAGEMENT ADMINISTRATOR
EMAIL: jpangelinan@gpagwa.com
PHONE: (671) 646-3054/55
FAX: (671) 648-3165

5.1.3 Labeling

The boxes containing the Proposals must be also labeled addressed as follows:

b) The box must indicate the name and address of the Bidder to enable the Proposal to be returned unopened in case it is declared late or otherwise unacceptable.

c) Each box shall be sealed.

Below the address given in Article 5.1.2 above, the following must be written in bold letters:

GUAM INDEPENDENT POWER PROJECT
GPA Bid No. GPA-034-18
"BUILD, OPERATE & TRANSFER CONTRACT FOR 180MW OF NEW GENERATION CAPACITY"
"DO NOT OPEN UNTIL 1200 HOURS, [INSERT BID DATE]"
"ENVELOPE [INSERT ENVELOPE NUMBER]"
"DO NOT OPEN WITH ENVELOPE I" (for Envelope II only)

If the box is not sealed and marked as instructed above, GPA will assume no responsibility for the misplacement or premature opening of the Proposal submitted.

5.2 Deadline for Submission of Proposal

1 All Proposals must be received at GPA's offices prior to 1600 hours local time in Guam on **January 18, 2019**. Proposal submission must be made by either of the following methods:

a) Hand-delivery of the one (1) original plus six (6) copies to GPA at the address given in the Article 5.1.2 of this Instructions to Bidders.

b) By prepaid, registered, or certified mail or by overnight courier to GPA at the address given in Article 5.1.2 of this Instructions to Bidders.

2 Proposals submitted by facsimile, electronic mail, telex, or telegram will NOT be accepted.

3 GPA may, at its discretion, extend the deadlines for submission of Proposals by issuing amendments in accordance with these Instructions to Bidders, Article 2.1.

5.3 Late Proposals

Any Proposal received after the specified date and time for the submission of Proposals will be rejected no matter what the reason of delay may be and will be returned unopened. It is the sole responsibility of Bidders to comply with Article 5.2 above.

5.4 Modifications and Withdrawal of Proposal

1 Bidder may modify or withdraw its Proposal after Proposal submission, provided that the modification or notice of withdrawal is received in writing by GPA prior to the prescribed deadline for submission of Proposals.

2 Bidder's modification or notice of withdrawal shall be prepared, sealed, marked and delivered in accordance with the provisions of these Instructions to Bidders, Article 5.1 for the submission of Proposals, with envelopes additionally marked "MODIFICATION" or "WITHDRAWAL" as appropriate.

3 No Proposal may be modified subsequent to the deadline for submission of Proposals.

4 Withdrawal of a Proposal during the interval between the deadline for submission of Proposals and the expiration of the period of Proposal validity specified by Bidder in the Proposal Letter will result in the forfeiture of the Bid Guarantee.

6 Proposal Opening and Evaluation

6.1 Proposal Opening

1 GPA will open the Envelope I Proposals, including submissions made pursuant to these Instructions to Bidders, Articles 5.1 to 5.4 in Guam in front of two or more procurement officials on the time and date specified in Volume 1 of the IFMSB. The Bidders' representatives who are present at that session shall sign a register as evidence of their attendance.

2 Proposals for which a notice of withdrawal has been submitted pursuant to Article 5.4 of these Instructions to Bidders , will not be opened.

3 At the Envelope I Proposal opening, GPA will examine Proposals to determine whether the requisite Proposal Securities have been furnished in accordance to Section D, Form 1, Attachment 1A and whether the documents have been properly signed.

4 There will be no public opening of the contents of Envelope I.

5 GPA will secure unopened the Envelope II Proposals, including submissions made pursuant to these Instructions to Bidders, Articles 5.1 to 5.4, until opening of Envelope II in open session, at the time and date specified by GPA. GPA will give at least one week notice to Bidders of the Envelope II Proposal opening session.

6 At the Envelope II Proposal opening session, GPA will announce the Present Value for each qualified and responsive Bidder. The Bidders' representatives who are present at that session shall sign a register as evidence of their attendance.

6.2 Confidentiality

1 Any effort by a Bidder to influence GPA, any representative of the Government of Guam or the Government of the United States of America, or the Consultant in the process of examination, clarification, and evaluation of Proposals, or in decisions concerning award of the Project, shall result in the rejection of Bidder's Proposal.

2 GPA will return neither the original nor the copies of any Proposal submitted by a Bidder, other than late Proposals per Article 5.3.

6.3 Clarification of Proposals

During the examination and evaluation of Proposals, GPA may, at its discretion, ask the Bidders for clarification of their Proposals. Request for clarifications and responses shall be in writing, and no change in the Price or substance of the Proposal shall be sought, offered, or permitted.

6.4 Evaluation of Proposals

1 The evaluation of Proposals from Qualified Bidders will take place as follows. The first stage, Determination of Responsiveness, considers only Envelope I of the Proposals, and the evaluation results in a determination of the Responsive Bidders. During this stage of the evaluation, Envelope II of the Proposals remains unopened and secured by GPA. The second stage considers only Envelope II of the Proposals, and it determines the final ranking of the Responsive Bidders based on a 25-year Present Value of GPA system costs assuming incorporation of the Facility as set forth in Bidder's Proposal.

2 The purpose of the first stage of evaluation is for GPA to determine whether each Proposal is substantially Responsive to the requirements of this IFMSB based on a review of the information provided in Envelope I of the Bidder's Proposal in accordance with the Responsiveness Test as contained in Appendix A of this Section.

3 The purpose of the second stage of evaluation is for GPA to determine the lowest Present Value cost to GPA based on the Price offered by the Bidders. Only the Prices (Envelope II) of those Qualified Bidders whose Envelope I submissions are deemed to be substantially Responsive will be considered in the second stage of evaluation.

6.4.1 Determination of Responsiveness:

a) A substantially Responsive Proposal (Envelope I) is one which provides the requested Bidder information, and conforms to the commercial terms and conditions, and the technical specifications of this IFMSB without material deviation or reservation. **The Bidder shall fill out the Responsiveness Test Form (Appendix A) and submit with the Proposal.** Should the Bidder information provided in Envelope I deviate materially from the qualification information provided in response to the Request for Qualifications document and upon which GPA based its qualification of the Qualified Bidders, GPA may in its sole discretion determine such Bidder is no longer qualified. Further, to the extent a Qualified Bidder changes the membership of its consortium that was determined to be a Qualified Bidder, GPA reserves the right to approve or reject such changes. Regarding the commercial terms and conditions, and the technical specifications, a material deviation or reservation is one which affects in any substantial way the scope, quality, or performance of the Project, or which limits in a substantial way, inconsistent with these IFMSB documents, GPA's rights, or the Bidder's obligations under the Project Agreements, and the rectification of which deviation or reservation would affect unfairly the competitive position of other Bidders presenting substantially Responsive Proposals.

b) If a Proposal is not substantially Responsive to the requirements of this IFMSB, it will be rejected. Such determination is solely at GPA's discretion.

i) GPA will reject all Proposals which do not meet the following terms and conditions of the IFMSB document:

- Bidder fails to submit Bid Guarantee (Responsiveness Test, Item 1.1.a).

- Bidder fails to submit Major Shareholder Disclosure, Non-Collusion, No Gratuities or Kickbacks, Ethical Standards, and Declaration Re-Compliance with U.S. DOL Wage Determination Affidavits (Responsiveness Test, Item 1.13).
- Bidder organization meets IFMSB criteria (Responsiveness Test, Item 2.0)
- Acceptable Bid Guarantee (Responsiveness Test, Item 3.0)
- Complete and acceptable Financial Plan (Responsiveness Test, Item 4.0)
- No material modifications requested to the Draft Project Agreements (Responsiveness Test, Item 9.0). Material modifications include without limitation any changes that result in increasing the price; or limiting the liabilities or responsibilities of the Bidder.
- Complete and acceptable Plant Design (Responsiveness Test, Item 5.0) and Section B, Article 3.2.3.
- Complete Project Schedule with date-certain Phase 1 and Phase 2 Commercial Operation Dates which occur no later than the respective Required Commercial Operation Dates (Responsiveness Test, Item 5.0).

ii) GPA will review and evaluate for completeness, level of commitment, and soundness of approach all of the remaining items listed in the Responsiveness Test and in Section B, Article 3.2. If necessary, GPA will request written Clarification to any of the items listed in the Responsiveness Test during its Envelope I evaluation.

c) Once the Envelope I Proposals have been evaluated, Bidders will be notified promptly by GPA whether or not their Envelope I Proposals have been determined to be substantially Responsive. Bidders of Proposals determined to be Responsive will be invited by GPA to the opening of Envelope II Proposals as specified in Article 6.1.

6.4.2 Evaluation of Envelope II:

a) GPA will open, evaluate, and rank only those Envelope II Proposals from Qualified Bidders determined to be Responsive to the requirements of the IFMSB in accordance with this Article 6.4, Par. 4.

b) Calculation of Present Value (PV) of Utility Costs and Correction of Errors: The (PV) shall be calculated by GPA in accordance with the example in Section D, Forms 15 and the Price data presented in the tables by Bidders in Section D, Envelope II, Forms 15. The Proposals will also be checked for any arithmetic errors in computation and summation. The Bidders will be informed in writing of any arithmetic adjustments made, should GPA wish to consider that Proposal further.

c) GPA will evaluate and validate the PV scores and rank them from the lowest amount to the highest amount. The lowest PV score supported by the required financial data shall be deemed the best. Those Envelope II Proposals not complying substantially with the instructions for Form 15 will be deemed non-Responsive and will not be ranked.

d) In the unlikely event that the PV scores of two or more Bidderss are equal or very close, GPA will invite these Bidders to provide further clarifications in writing, before selecting the first-ranked Bidder.

7 Selection

7.1 Selection and Award Cycle

1 Subject to Paragraph 2 below, GPA will invite that Qualified Bidder whose Proposal has been determined to be substantially Responsive to the IFMSB; and who is ranked first pursuant to Article 6.4.2 of these Instructions to Bidders to finalize the Project Agreements.

2 Bidders are advised that the following cycle of events has been established by GPA for the selection of the successful Selected Bidder and implementation of the Project:

- A clarification meeting will be held with the first-ranked Bidder to clarify any inconsistencies in the Bidder's Proposal. If unable to reach agreement with the first-ranked Bidder, and if GPA deems it necessary, GPA may invite the second-ranked Bidder to a clarification meeting. (This process may continue sequentially with subsequently ranked Bidders.)
- Upon completing a successful clarification meeting(s), GPA will issue a "Notification of Selection" to that Bidder and inform the other Bidders of their status.
- GPA will invite the first-ranked Bidder to meetings to complete the Project Agreements. (See these Instructions to Bidders, Article 7.2.2). In the event that the Project Agreements cannot be completed, the second-ranked Bidder will be invited to meet with GPA to complete the Project Agreements.
- Upon completion of the Envelope II evaluation, a successful clarification meeting, and ranking of the Bidders, GPA will return the Bid Guarantee to all Bidders ranked lower than third.
- The top ranked Bidder shall provide comments on Project Agreements from the Lenders prior to the commencement of meetings to complete the Project Agreements. Reasonable comments from Lenders will, as applicable, be included in the Project Agreements, provided such comments do not result in material deviations from the draft Project Agreements included in the IFMSB. Material deviations include without limitation any changes that result in increasing the Price; or limiting the liabilities or responsibilities of the Project Company, or the rights of GPA.
- Upon resolution of the comments and reaching an agreement on the draft Project Agreements, a "Notice of Award" will be given by GPA to the successful Bidder. Upon acceptance of the award and extension of its Bid Guarantee as may be required to ensure such Bid Guarantee remains in effect until the Performance Bond is provided, the successful Bidder will become the Selected Bidder.
- The Selected Bidder will proceed with Financial Close activities including completion of Project development and permitting, and GPA will proceed to obtain **authorization from the PUC to sign the project documents and agreements, including the direct agreements between the Project Company and the concerned Guam entities.**
- The Selected Bidder shall provide a draft of Third Party Agreements (limited to the Construction Agreement, O&M Agreement, and Term Sheets for financing).
- Upon Financial Close, all Proposal Securities that have still been retained by GPA will be returned to Bidders, except to the Selected Bidder. Upon Financial Close, the Selected Bidder will be required to provide the necessary Performance Bond in accordance with

the Instructions to Bidders, in Article 7.3, after which its Bid Guarantee will be returned by GPA to the Selected Bidder.

3 If over the long-term the Selected Bidder cannot achieve Financial Close by the Required Financial Closing Date under the ECA, GPA may elect to invite the second-ranked Bidder to participate as the Selected Bidder to complete the Project Agreements. If for whatever reason the Project Agreements are not completed with the second-ranker Bidder, then meetings will be held with the third-ranked Bidder, as necessary. GPA has right to continue down the ranking as necessary and meet with successive Bidders, however, once GPA has terminated efforts to complete the Project Agreements with a Bidder, that Bidder's PV score will be deleted from the official ranking.

4 Notwithstanding the above, GPA reserves the right to accept or reject any Proposal, to waive minor informalities in any of the Proposals received, and to annul the IFMSB process and subsequently reject all Proposals at any time prior to the final award of the Project. GPA may do this without thereby incurring any liability to the affected Bidders or any obligation to inform the affected Bidders of the grounds for GPA's action.

7.2 Clarifications and Finalization

7.2.1 Clarification Meeting(s)

a) Within the period indicated in Section A, Table 12.1, GPA will notify the successful first-ranked Bidder that its Proposal has been accepted for clarification and finalization. The first-ranked Bidder will also be advised of the date, time and place at which detailed clarification meeting(s) will be held between GPA and the Bidder. GPA may request that all the Responsive Bidders extend their Proposal validity in accordance with these Instructions to Bidders, outlined in Article4.7. The second and third-ranked Bidders will remain on standby, ready to begin clarification meetings should the first-ranked Bidder not meet the IFMSB obligations, execute the Project Agreements, and post the Performance Bond. GPA will notify all non-Responsive Bidders, and those Responsive Bidders ranked lower than third, of their status and discharge or return their Proposal Securities in accordance with Article 7.1.

b) At the first clarification meeting, GPA will confirm the terms of the first-ranked Bidder's Proposal and the overall scope of work for the Project. GPA may also seek clarification of any terms which are unclear, and additional clarification meetings may be held as necessary. GPA may proceed to the second-ranked Bidder if:

i) It decides, in its sole discretion, that the the Project Agreements will not be completed with the first-ranked Bidder within the time frame indicated;

ii) It discovers that the first-ranked Bidder has made a material misrepresentation;

iii) The first-ranked Bidder deviates from the terms of its Proposal; or

iv) The first-ranked Bidder fails to provide or maintain security as required.

7.2.2 Meetings to Complete Project Agreements

a) At the conclusion of the clarification meeting(s) and issuance of the Notification of Selection, GPA will invite the first-ranked Bidder to participate in meetings to finalize the Project Agreements. GPA and Bidder will intend to limit clarifications and discussions of the Project Agreements to those issues that are truly essential for the final Project

financing. The results of each such meeting will be documented in the meeting minutes signed by the parties to be later incorporated in the Project Agreements. The Project Agreements are expected to be executed within the period indicated in Section A, Table 11.1. If finalization and execution of the Project Agreements are not completed within this time period, GPA may elect to begin the clarification and meeting process with the next highest ranked Bidder.

b) Upon achieving Financial Close and the Selected Bidder's furnishing of the Performance Bond in accordance with the provisions of these Instructions to Bidders, Article 7.3, GPA will promptly inform the remaining highest ranked Bidders that their Proposals have been unsuccessful and discharge or return their Proposal Securities.

7.3 Performance Bond and Operational Security Requirements

1 At Financial Close, the Project Company shall furnish to GPA the Performance Bond in the amount of seventy-five million United States Dollars (US$75,000,000) in accordance with Article 9.6 of the ECA. After providing this Performance Bond, the Bid Guarantee will be returned to the Selected Bidder. The Performance Bond shall terminate 12 months after Phase 2 Commercial Operation Date.

2 If GPA determines that the successful Bidder has made any false representation, has failed to comply with the requirements of these Instructions to Bidders, has failed to achieve Financial Close on schedule, or has breached the provisions of any Project Agreements before the Performance Bondis posted, GPA shall be entitled to annul the award and to retain or draw upon the Bid Guarantee and any interest accumulated thereon.

7.4 Bidder's Responsibilities

The Bidder is expected to carefully examine all instructions, conditions, forms, terms, specifications, Addenda, and drawings in the IFMSB. It is also responsible for acquainting itself with all conditions which might in any way affect the cost or the performance of the Project. Failure to do so, and/or failure to comply with the requirements of Proposal submission, will be at Bidder's own risk, and no relief will be given for errors or omissions by Bidder.

Appendix A: Responsiveness Test

This Appendix A is the procedure to determine responsiveness of Proposals pursuant to Section B, Article 6.4 and will be used by GPA for that purpose.

Table A.1: Responsiveness Test

No	Parameter	IFMSB Section D Form	YES	NO	Bidder Proposal Reference
ENVELOPE I					
1.1	Proposal Letter	Form 1			
1.1a	Bid Guarantee	Attachment 1A			
1.2	Affidavit by the Bidder	Form 2			
1.3	Bidder's Organization	Form 3			
1.4	Financial Capability	Form 4			
1.5	Project Data Sheets	Form 5			
1.6	Project Financing Plan	Form 6			
1.7	Financial Data in Support of Project	Form 7			
1.8	Technical Data and Submittals	Form 8			
1.9	Additional Supportive Data	Form 9			
1.10	Exceptions to IFMSB Documents	Form 10			
1.11	Bidder's Project Schedule	Form 11			
1.12	Bidder's Staffing Plan	Form 12			
1.13	Bidder's Affidavits	Form 13			
ENVELOPE II					
1.14	Proposed Price	Forms 15			**DO NOT OPEN**
2.0	BIDDER DATA				
2.1	Organization has been Qualified				
2.2	Lead Bidder is identified and meets requirements to provide at least 35% of equity?				

No	Parameter	IFMSB Section D Form	YES	NO	Bidder Proposal Reference
2.3	Members of consortia or joint ventures have executed document nominating Lead Bidder and the key person(s) authorized to execute documents on behalf of the Bidder?				
3.0	Is the Bid Guarantee acceptable? (No material change in the form provided in IFMSB, conforms to validity date required and the amount of security, from an acceptable bank))				
4.0	FINANCIAL DATA				
4.1	Has financial data been submitted which verifies Facility financiability?				
4.2	There is evidence of positive financial commitments or underwritings[3] from reputable financing institution provided				
4.3	The financing structure meets 80:20 debt: equity ratio				
4.4	The Minimum Debt Service coverage ratio is at least 1.20 for all applicable years of the Term				
4.5	There is a representation of adequate interest rate protection (hedging) Form 7B-7				
5.0	TECHNICAL DATA				
5.1	Has technical data been submitted which demonstrates compliance with the Functional Specifications?				

[3] In principle, non-binding letters of commitment from reputable lenders or underwriters will be accepted as evidence of a financial commitment at this stage of the procurement process.

No	Parameter	IFMSB Section D Form	YES	NO	Bidder Proposal Reference
5.2	The proposed Contracted Facility Capacity at the Phase 2 Commercial Operation Date is 180 MW plus/minus 10% net and the Contracted Phase 1 Capacity at the Phase 1 Commercial Operation Date is no lower than the capacity of the Simple Cycle Unit for combined cycle or the full Facility capacity for other technologies ?				
5.3	There is confirmation that degradation of capacity is included in the Guaranteed Heat Rate, Contracted Phase 1 Capacity, and Contracted Facility Capacity in the Proposal.				
5.4	Preliminary designs and descriptions are provided.				
5.5	Experience references for major Facility components are provided.				
5.6	There is confirmation that environmental standards will be met.				
5.7	Any exceptions taken are acceptable.				
5.8	Safety standards are met.				
5.9	The scope is complete.				
5.10	The Site interfaces are properly defined.				
5.11	Evidence is provided showing major Facility components are well proven equipment.				
5.12	Bidder has stated that the Facility will be designed to provide a 30-year operating life and has provided satisfactory details as to how this will be achieved.				
5.13	Bidder's design provides at least 30 days of ULSD storage capacity for the Facility.				
6.0	ADDITIONAL DATA				
6.1	Proposal includes an insurance plan for the Facility.				

No	Parameter	IFMSB Section D Form	YES	NO	Bidder Proposal Reference
6.2	Bidder has proposed contractor with sufficient experience. Or, alternately, Bidder has provided commitment to engage a construction contractor with acceptable qualifications.				
6.3	Bidder has provided sufficient qualifications for an O&M Contract or for self-operation.				
6.4	Bidder has named an internationally known financial advisor or arranger.				
6.5	Bidder has named an internationally known legal advisor.				
6.6	Any assumptions made by Bidder in preparation of the Proposal are acceptable.				
7.0	Bidder has submitted a complete Project Schedule which confirms date certain Commercial Operation Dates for each Phase.				
8.0	Bidder has not taken an exception to the IFMSB which constitutes a material modification.				
9.0	Bidder has not requested an exception to the draft Project Agreements which is considered material in nature.				
10.0	Bidder has proposed key personnel with acceptable experience.				

INVITATION FOR MULTI STEP BID

GPA-034-18

BUILD, OPERATE and TRANSFER (BOT) CONTRACT for 180 MW of NEW GENERATION CAPACITY

Section C: Functional Technical Specifications

Table of Contents

Appendices

PREAMBLE

Project Company shall perform or cause to be performed all work and services and provide all materials, equipment, machinery, tools, labor, utilities, chemicals, transportation, administration and incidentals (the "Work") as may be necessary or appropriate to carry out the functions and purposes indicated in this Agreement including the development, financing, construction, and operation of the Facility designed to meet the performance criteria and all other conditions set forth in this Agreement, whether or not such Work is specifically mentioned or indicated in the Functional Specifications or elsewhere in the Agreement.

The Functional Specifications set forth the minimum criteria for efficiency, reliability, operability, maintainability, quality of equipment, materials, and systems. Where the Functional Specifications are different from the applicable industry codes and standards or applicable standards and Laws in effect, as of September 14, 2018, the more stringent shall apply. Where the Functional Specifications describe portions of the Work in general terms, but not in complete detail, it is understood that, subject to Project Company meeting the requirements of the Agreement and the Functional Specifications; (i) Prudent Utility Practices are to prevail, (ii) only new materials and workmanship of the first quality are to be used, and (iii) such Work shall be fit for the intended purpose.

1 DESCRIPTION OF PROJECT

1.1 Project Description

Guam Power Authority (GPA) is seeking an Independent Power Producer (IPP), hereafter referred to as the Project Company, to develop a green-field power generating plant on the island of Guam. The Project Company will operate under an Energy Conversion Agreement (ECA) with GPA for a 25-year period, with an optional five (5) year extension. The plant site will be located near the existing Harmon Substation. The Project shall provide 180 MW (net at the Point of Interconnection) of base loaded generation to meet GPA electrical demand. Because of the variability of technologies allowed and unit sizes, GPA will consider evaluating proposals that are within 10 % over or under the preferred range. The size of the Facility's individual units shall be such that a trip of a single Unit will not result in a loss of 45MW.

The optimum output size will be verified with PICES (Probabilistic Investigation of Capacity and Energy Shortages) analysis. See Appendix H. GPA will provide a table that demonstrates need for particular sized units and reliability characteristics (availability) will need certain capacity to meet GPA 1 day in 4.5 years loss of load expectation. GPA can provide the program and a manual as well as the model case.

The project includes a 115 kV substation and transmission lines to the GPA system. The plant is intended to be utilized in various operating conditions that include, but are not limited to: 1) higher output levels serving evening peak load, and 2) lower output levels (down to 20 MW) during periods of lower load and higher variable renewable generation where the plant still needs to be able to supply adequate system support and short circuit MVA levels. Synchronous

condenser capability is required to provide adequate inertia to maintain short circuit MVA levels during lower real power output operating conditions and to provide reactive power to the system as required. The facility shall be capable of providing the full Dependable Capacity at any given time regardless of the weather conditions. The facility shall be capable of withstanding and to continue operating during all naturally occurring events. The generation technology is to be determined by the Project Company Bidder and may include fossil fuel fired technologies, renewable technologies with storage, or a hybrid between fossil fuel fired and renewable technologies. Fuel fired technology components of the Project will be required to be dual fuel capable, utilizing Ultra Low Sulfur Diesel (ULSD) and natural gas. The natural gas will be delivered to Guam as Liquefied Natural Gas (LNG), and will be regasified prior to pipeline delivery to the facility. The Project Company shall be fully responsible for the financing of the Project, and the design, supply, delivery, erection, commissioning, operation, and maintenance of the complete Facility for the agreed Term. Particulars of the plant performance requirements are given elsewhere in this specification. The Project Company shall coordinate plans and activities with GPA during the design, construction, commissioning, and operation of the Project. GPA is interested in bringing additional power generating capacity on line as early as possible. Where practical this includes partial commissioning of the new generating units. Project Company shall provide their plans for partial commissioning.

1.2 Scope of Supply

The Project Company shall provide a complete Facility of 180 net MW Contracted Facility Capacity (Because of the variability of technologies allowed and unit sizes, GPA will consider evaluating proposals that are within plus/minus10 % of the preferred capacity) with all support facilities required for commercial operation. The scope of the Project shall include, but not be limited to the following:

1.2.1 Engineering

The Project Company shall be responsible for the complete engineering and design services for the procurement, construction, and commissioning of the new generation Facility. The Project Company shall provide survey, geotechnical investigation, engineering, design, drawings, specifications and datasheets, databases, construction specifications, commissioning, testing, and operation and maintenance (O&M) procedures, and equipment information that describes all components of the new generation facility and related infrastructure.

1.2.2 Procurement

The Project Company shall be responsible for all aspects of the procurement of equipment, materials, labor, and services for the new fuel supply and plant. Procurement service will include, but not be limited to, purchasing, subcontracting, expediting, inspections, shipping and field services. The Project Company shall comply with Guam Procurement Law to ensure that the Project reflects positively on GPA, the Project Company, contractors and suppliers.

1.2.3 Construction

The Project Company shall be responsible for complete construction of the Facility, including substation, transmission line and interconnections to the Grid System, fuel supply infrastructure if proposing fuel fired plant and water supply infrastructure. The Project Company shall develop a construction plan detailing construction procedure, site safety, site security, subcontractor

administration, and start-up and commissioning procedures. The construction plan shall address any interfaces required as defined in this IFB document, including water, sewage, site access, site runoff, and emergency response. The Project Company shall submit the Construction Plan for review and comment no later than three (3) months prior to commencement of construction. The Project Company may use part of the property outside the plant footprint (estimated at 25 acres) during construction if the existing vegetation barrier around plant is not damaged.

1.2.4 Operation and Maintenance

The Project Company shall be responsible for operation and maintenance of the Facility during the Term of the Project.

1.2.5 Detailed Project Scope

A. Scope of Services

The Project Company Services for the project will comprise, but not necessarily be limited to the following:

- Design and procurement
- Construction testing and pre-commissioning
- Commissioning and functional testing
- Performance Tests and Reliability Tests
- Operation and maintenance of the Facility during the Term of the Project
- Other services as specified or necessary to complete the Project
- Temporary construction works and facilities
- Provision of documentation
- Operators' living quarters and facilities, if required

B. Scope of Supply for Fossil Fuel Fired Component

Facility Fossil fuel fired components will comprise but not necessarily be limited to the following:

- Multiple Reciprocating Engine Generators or multiple Combustion Turbine Generators which will be designed, supplied, constructed, and operated in such a manner that the maximum net power output of the Facility lost during an outage of a single Unit is less than 45 MW and would not cause system frequency upsets outside the acceptable range defined in GPA Grid and Reliability standards, and which will be capable of operating on ULSD and Natural Gas
- Steam turbine(s) for the case where the Project Company offers combined cycle technology
- Synchronous Condenser or capability to operate generators in Synchronous Condenser mode must be provided to facilitate Short Circuit MVA requirements and provide system reactive power.

- Raw water system
- Service water system
- Water and waste water treatment plants
- Closed loop water cooling system, as required
- ULSD Fuel on-site system including storage and conditioning plant
- Fuel transfer facility at the plant site for loading trucks to transport fuel oil to other GPA plants.
- ULSD supply system including modifications to the GPA bulk storage facilities and constructing of USLD underground pipeline to the Site
- On-site Natural Gas system including LNG metering, compression, and natural gas supply line to the Site's regulation and metering
- Auxiliary steam boiler with all auxiliary equipment, as required
- Generator step-up, startup, station, and auxiliary power transformers; and associated protection and control equipment as required
- Generator circuit breakers and/or MV metalclad switchgear as required
- Station electrical distribution system
- DC equipment, batteries, and UPS systems
- Power, control and instrument cabling
- Earthing (grounding) and lightning protection
- Emergency generator plant (for auxiliaries, etc.), if required
- Black start diesel-generator
- Emergency lighting system
- Cathodic protection, as required
- Lighting and small power services
- Compressed air system
- Cranes and lifting gear
- Maintenance tools and equipment for workshops, stores, and laboratories
- Fire detection and protection system
- Firefighting systems
- Chemical storage tanks
- Chemical feed systems, if needed
- Water storage tanks (e.g. raw water, dedicated fire water, service water, potable water, etc.) as required. There shall be 7 days of water storage for cycle makeup and cooling tower makeup if cooling tower is required.

- Main metering systems for fuel, electrical energy export, and electrical energy import
- Backup metering systems for fuel, electrical energy export, and electrical energy import
- Control system for combustion turbine and steam turbine generator units
- Local control equipment for auxiliary plants
- Plant control system
- Security provisions compliant with NERC CIPS and US Navy
- Telecommunication systems within Facility, connection to public network, and connection to GPA private telecommunication networks [GPA to confirm]
- Load dispatch control interface facilities
- Foundations for all plant and buildings
- Civil and structural and building works associated with the plant buildings including, but not limited to:
    - Main structures to house any Reciprocating Engine Generators and Combustion Turbine Generators, Steam Turbine Generators, Heat Recovery Steam Generators as required
    - Control room, electrical room, administration building
    - Fire protection pump house
    - Maintenance workshop and stores
    - Gatehouse and security building
    - Potable water system and other building services
    - Other structures as required for proper operation of the Facility
- HVAC facilities
- Site lighting
- Construct a new road from the access road initiating from Route 1 through the front of the property to Route 3
- Provisions for optional Natural Gas pressure reduction, metering or compression and treatment station, as required
- All necessary external works including roads, fencing, gates, sewers and drainage within the power plant
- Spare parts required for commissioning, operation, and maintenance
- Special tools and maintenance equipment
- Remote terminal unit (RTU), Substation Control System (SCS) connections, communication protocols, marshalling kiosks, automatic generation control (AGC), etc.

- Switchyard
- Electrical Interconnection Facilities between the Facility and the GPA Harmon substation
- Expansion/modification to the GPA Harmon substation
- Consumables throughout the specified operating period; excluding ULSD and natural gas.

The Project Company shall be deemed to have included in his Proposal any additional plant and equipment necessary to meet the Facility design, performance, operation, and environmental criteria, but which are not specifically identified above, and to form a complete power plant which is fit in all respects for its intended purpose and use.

C. Scope of Supply for Renewable Generation

The Facility will comprise, but not necessarily be limited to the following:

- Photovoltaic
- Concentrating Photovoltaic
- Onshore Wind Turbines
- Offshore Wind Turbines
- Wave Generation
- Tidal Generation
- Hydroelectric
- Generator step-up; startup, station, and auxiliary power transformers; and associated protection and control equipment as required
- Generator circuit breakers and/or MV metalclad switchgear as required
- Station electrical distribution system
- DC equipment, batteries, and UPS systems
- Power, control and instrument cabling
- Earthing (grounding) and lightning protection
- Emergency generator plant (for auxiliaries, etc.), if required
- Cathodic protection, as required
- Lighting and small power services
- Maintenance tools and equipment for workshops, stores, and laboratories
- Fire detection and protection system
- Main metering systems for fuel, electrical energy export, and electrical energy import

- Backup metering systems for fuel, electrical energy export, and electrical energy import
- Control system for renewable technology
- Plant control system
- Security provisions compliant with NERC CIPS and US Navy
- Telecommunication systems within Facility, connection to public network, and connection to GPA private telecommunication networks [GPA to confirm]
- Load dispatch control interface facilities
- Foundations for all plant and buildings
- Civil and structural and building works associated with the plant buildings including, but not limited to:
- Main structures to house any centralized generation
- Control room, electrical room, administration building
- Fire protection pump house
- Maintenance workshop and stores
- Gatehouse and security building
- Potable water system and other building services
- Other structures as required for proper operation of the Facility
- HVAC facilities
- Site lighting
- Site access road from main highway
- All necessary external works including roads, fencing, gates, sewers and drainage within the power plant
- Spare parts required for commissioning, operation, and maintenance
- Special tools and maintenance equipment
- Remote terminal unit (RTU), Substation Control System (SCS) connections, communication protocols, marshalling kiosks, automatic generation control (AGC), etc.
- Switchyard
- Electrical Interconnection Facilities between the Facility and the GPA substations
- Expansion/modification to the GPA substation
- Consumables throughout the specified operating period

1.2.6 Rights-of-Way

Obtainment of rights-of-way for the ULSD pipeline and the 115 KV transmission interconnection from the GPA procured property identified in Section 5.0 Site Data to the Harmon substation for the Project will be the provided by GPA. Project Company will provide other rights of way. Project Company will be responsible for rights of way from any locations other than the GPA property identified in Section 5.0 Site Data to the Harmon substation.

1.2.7 ULSD Supply Infrastructure

The design, construction, and commissioning of the ULSD supply infrastructure, including, bulk storage at the plant, fuel truck loading and unloading facilities, new fuel oil and natural gas pipeline to the plant and modifications to existing pumps at the GPA Bulk Fuel Storage Facility Pump Station is the responsibility of the Bidder and will be included in the scope for any Facility which has a fossil fuel fired component. Ownership of the bulk storage, the plant site fuel truck loading facilities and the pipeline will be transferred to GPA after Commercial Operation Date.

There is an existing Bulk Fuel Storage Facility (GPA Bulk Fuel Storage Facility Facility) near the Piti and Cabras plants and an existing 8-inch RFO pipeline from the GPA Bulk Fuel Storage Facility Pump Station to the Tanguisson plant site. Any new equipment required, including storage tanks, pumps, and booster pumps shall be the responsibility of the Project Company. The new pipeline will utilize the existing fuel oil pipeline right of way to the greatest extent possible.

1.2.8 Natural Gas Supply Infrastructure

The fuel systems provided, the design, construction, and commissioning of the natural gas supply piping infrastructure beginning at an LNG receipt and storage facility at GPA Bulk Fuel Storage Facility, new natural gas pipeline to the plant will be included in the scope of this Project, and is the responsibility of the Project Company. Construction and ownership of the LNG receipt and storage at GPA Bulk Fuel Storage Facility is by Others.

The new pipeline will utilize the existing fuel oil pipeline right of way to the greatest extent possible.

1.2.9 Environmental Permitting

The Project Company shall be responsible for all environmental permitting required for the construction, ownership and operation of the Facility with associated infrastructure and terminal facilities, including the Air Permit. The Project shall meet all applicable local, state, and federal environmental regulations and permit conditions. The permits that will be required include the following:

A. Clean Water Act Sections 401, 402 and 404

B. Section 7 of the Endangered Species Act and Marine Mammal Protection Act (MMPA)

C. Section 106 of the National Historic Preservation Act

D. Federal Coastal Zone Management Act (CZMA)

E. Seashore Clearance Permit

F. GLUC Wetlands Permit, if applicable

G. GEPA Environmental Land Use

H. Air Pollution Source Construction Permit and Major Air Pollution Source Operating Permit

I. For ULSD or natural gas, a FERC certificate would not be required, but the field studies and resource reports will be required as well as Risk Management Plan (RMP) for regasification

1.2.10 Grid Study and PICES Analysis

The Project Company is responsible for completing a grid study that will evaluate the impact of the new generating plant on the existing Grid System. Information on the existing island Grid System necessary for completing this study will be supplied by GPA to the successful Project Company.

The Bidder shall provide full steady state and dynamics modeling information of the plant in GE's PSLF Rev. 21.03 software fully compatible format. (Also ref. sub-section 8.5 of Section D). The modeling information shall include all components up to the Point of Interconnection with the GPA system. This shall include, but not necessarily limited to, modeling of generator(s), excitation system(s), governor(s), generation step-up transformer(s) (GSU), and any transmission lines. The tap settings on the GSUs shall reflect the expected settings. Any other components deemed relevant for any analysis that could be performed by GE's PSLF tool, should also be modeled. For the dynamics modeling: User models are only permitted if deemed necessary for model performance. Any need for user models to be employed shall be thoroughly justified with a technical report demonstrating and explaining what is otherwise missed. Differences in characteristics of the plant based on the different fuel sources it can operate on shall be addressed in the modeling information, and may require more than one set of PSLF models. Models shall explicitly model station service as it is proposed to be served. Documentation shall be provided with background on the modeling, including of real and reactive station service shall be set for different operating points as all permutations of units online, and as needed real and reactive power output.

As built modeling information as described above shall be supplied prior to commercial operation. At any time during the life of the plant, modeling information shall be updated and submitted to GPA as components of the plant is changed, replaced, or controls are tuned.

The Project Company will coordinate with GPA to verify optimum output size with PICES (Probabilistic Investigation of Capacity and Energy Shortages) analysis. See Appendix H. GPA will provide a table that demonstrates need for particular sized units and reliability characteristics (availability) will need certain capacity to meet GPA 1 day in 4.5 years loss of load expectation.

The size of the Facility's individual units shall be such that a trip of a single Unit will not result in a loss of 44MW.

The PLCC (peal load carrying capability) indicates the peak various sizes and number of units can meet. Appendix H shows a GPA analysis output table and availability assumptions. GPA will provide PICES program and model case and offer bidders, in confidence, to confirm if project proposed output size meets GPA 1 day in 4.5-year loss of load criteria.

1.3 Terminal Points

1.3.1 Fuel

A. ULSD

If ULSD is selected by Project Company as a fuel source, the Project Company is responsible for the design and construction of ULSD supply infrastructure including any modifications at the GPA Bulk Fuel Storage Facility Bulk Fuel Storage Facility and the new pipeline that will be built to transport ULSD from the GPA Bulk Fuel Storage Facility Facility to the plant site. [The interface point for design and construction will be at the outlet flange of the isolation valve installed in the existing ULSD pipeline supplying USLD from the port to the bulk storage facilities at the plant site.] The Project Company shall provide fuel storage at the power generating plant site for a minimum of 30 days of plant operation at expected capacity factors. The Project Company will provide fuel transfer facility at the plant site for loading trucks to transport fuel oil to other GPA plants.

B. Natural Gas

The Project Company shall design the plant for future natural gas operation. If natural gas is selected by Project Company as a fuel source, the Project Company is responsible for the design and construction of natural gas supply infrastructure beginning at LNG regasification and compression and GPA Bulk Fuel Storage Facility, and the new pipeline that will be built to transport natural gas from the GPA Bulk Fuel Storage Facility location to the plant site. The interface point for design and construction will be a supply flange from bulk LNG storage at the GPA Bulk Fuel Storage Facility location. The Project Company shall provide natural gas throughput and pressure suitable to support the peak Facility demands noted herein.

1.3.2 Substation / Interconnection

The Project Company is responsible for the design and construction of the Electrical Interconnection Facilities. See Sections 3.6 and 3.7 for more detailed information on the requirements of the interconnection. The terminal point for design and construction included in Project Company's scope will be at the interface between the existing GPA Harmon substation and Electrical Interconnection Facilities also known as the Point of Interconnection (POI). The Electrical Interconnection Facilities will be transferred to GPA after Commercial Operation Date.

1.3.3 Water Supply

Water supply to the Facility will be the responsibility of the Project Company. It is preferred that the raw water for cycle makeup, as well as for potable water will be supplied from Guam Water Authority.

Guam Water Authority (GWA) will supply grey water to the plant from the nearby Northern District Wastewater Treatment Plant (NDWWTP) to be used for cycle cooling water system if required. Available quantity and analysis of the grey water is included in Appendix A. The Project Company shall be responsible for determining the water treatment requirements for the water sources. The grey water supply interface point will be at NDWWTP. The precise location of the terminal point will be determined by the Selected Project Company at the detailed design stage.

There will be no sea water makeup utilized.

1.3.4 Wastewater Discharge

Wastewater discharge will be the responsibility of the Project Company. The Project Company will need to determine wastewater pretreatment quality to meet the requirements of GWA. Sanitary sewer may potentially be discharged to the GWA treatment facility. The Project Company shall be responsible for the wastewater discharge permitting, and any contractual agreements with GWA.

2 DESIGN PHILOSOPHY AND PRINCIPLES

2.1 Design Requirements

2.1.1 Engineering

A. General

1. The plant design life shall be thirty (30) years with normal required maintenance. The plant shall be designed for construction and operational safety, as well as ease of maintenance and accessibility. Reliability, availability, and maintainability are prime objectives of this facility.

2. The equipment shall be designed for base load operation with potential frequent and rapid load changes. The Facility will be a primary power source for Guam; therefore, there shall be no single contingency (single mode failure) that could cause a sustained outage or partial outage for the Grid System.

3. Design for the Project shall contain Prudent Utility Practice margins with new components and systems such that the ability of the units to operate continuously shall not be compromised due to normal wear and deterioration of equipment.

4. All construction documents must be stamped by a licensed Professional Engineer registered by the Territory of Guam, in the appropriate discipline, in accordance with Territory of Guam Rules and Regulations.

5. The Facility shall be designed and constructed in accordance with all applicable Federal, Territory of Guam, and local codes and standards including the most applicable sections of the codes, standards and regulations of the following organizations or their acceptable equivalent European, Japanese and South Korean standards. If European, Japanese, or South Korean standards are proposed the Project Company must demonstrate equivalency. Only one set of standards shall be applied throughout the Facility. This list of organizations is not complete,

and does not relieve the Project Company from complying with any other requirements and regulations applicable to this Project. The effective dates of the Codes and Standards of these organizations shall be the most recent edition plus any revisions and supplements prior to the Contract date.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ARI	Air-Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CFR	Code of Federal Regulations
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
EIA	Electronic Industry Association
EJMA	Expansion Joint Manufacturing Association
EPA	Environmental Protection Agency
HEI	Heat Exchange Institute
ICC	International Code Council
IEEE	Institute of Electrical and Electronics Engineers

ISA	International Society for Automation
MBMA	Metal Building Manufacturers Association
MSS	Manufacturers Standardization Society of Valves and Fittings Industry
NAAMM	National Association of Architectural Metals Manufacturers
NACE	National Association of Corrosion Engineers
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCI	Pre-stressed Concrete Institute
PFI	Pipe Fabrication Institute
SAMA	Scientific Apparatus Makers Association
SFC	State Fire Code
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
TEMA	Tubular Exchanger Manufacturer Association
UL	Underwriters Laboratory

B. Drawings and Design Model

1. A complete set of Issue for Construction (IFC) design and vendor shop drawings shall be submitted to GPA at the Commercial Operation Date, in CAD and PDF format. All drawings shall be in English language and units, or a combination of Metric / English units if the drawing initially only has Metric Units. A 3D computer model of the Facility shall be submitted in addition to the drawings. The 3D model shall be in Bentley.dgn format.

C. Documentation and Manuals

1. Operations and maintenance manuals, presented in clear and thorough manner, complete with respect to dimensions, design criteria, materials of construction, and like information, shall be submitted for all equipment. Details shall be identified by reference to sheet and detail shown on Drawings. Manuals shall be written in English. All manuals shall clearly delineate the make, model and options of each piece of equipment or material included in the project.

2. Operations and maintenance manuals shall be submitted to GPA in PDF format at the Commercial Operation date. Operation and maintenance manuals for new equipment purchased after the Commercial Operation date shall also be provided to GPA at the time of purchase.

3. The Project Company shall arrange for all plant Operating and Maintenance Instructions to be kept fully maintained and updated throughout the Term of the Project and be transferred to GPA at the end of the Term of the Project.

D. Specifications

1. The Project Company shall be responsible for development of all procurement, construction, installation, start-up, and commissioning specifications required for construction of the plant. Project Company shall be responsible for developing a QA/QC and testing/commissioning plan approved by GPA. At a minimum the plan must conform to applicable NETA requirements for new facilities and comply with GPAMOD 0025, 0026, 0027. The Project Company shall provide a PDF copy of all the conformed specifications to GPA at the Commercial Operation Date.

E. Tagging System

1. The plant shall utilize a tagging system to be determined by the Project Company. The tagging system shall include all equipment, enclosures, cables, pipes, instruments, control devices, valves, and other equipment. All equipment in the plant shall be identified with a stainless-steel tag permanently affixed to the equipment and in a location that is easily accessible to plant personnel.

F. As-Built Drawings

1. Record As-Built Drawings, in PDF format, shall be provided to GPA at Commercial Operation Date. Throughout the life of the plant, the Project Company shall update the As-Built drawings in electronic format, to reflect any plant modifications. These updated drawings will be transferred to GPA as the modifications are made, and at the end of the Term of the Project.

2.2 Performance Requirements for Fossil Fired Plants

2.2.1 Capacity

A. The plant net capacity is the net electric output measured at the Delivery Point / Point of Interconnection. The Contracted Facility Capacity shall be within the range of 180 (net) MW, at Site Reference Conditions specified in Section 5.5 of this Specification. Because of the variability of technologies allowed and unit sizes, GPA will consider evaluating proposals that are within plus/minus10 % of the preferred capacity. The size of the Facility's individual units shall be such that a trip of a single Unit will not result in a loss of 45 MW.

B. The Project Company shall also provide the expected generation net output for all combinations of units online, while in compliance with permitted emissions guarantees.

C. The plant shall be capable of providing a minimum level of 700 MVA of Short Circuit energy at the 115 kV POI when operating at 20 MW or higher real power output. This may require either dedicated synchronous condensers, or some of the generating units not producing real power in such a scenario to be able to operate as synchronous condensers or the provision of a separate energy storage system.

D. The plant is expected to provide inertia for the GPA system primarily through the inertia of the plant generators. As such, the generators are expected to be oversized relative to the capacity of the units to provide increased inertia. The

generators MVA rating must be sized a minimum of 140% of the real power capacity of the prime mover

2.2.2 Fossil Fuel Heat Rate

A. The fossil fuel plant net Heat Rate (Btu/kW-hr) is the heat input (Btu/hr) to the plant, divided by the plant net capacity (kW – net). The heat input is the higher heating value of fuel (Btu/lb) multiplied by the fuel flow rate (lb/hr). The plant will be evaluated based upon the least cost of operation to the GPA system. The target efficiency for the facility at base load is 45% or greater. The Project will be evaluated by its estimated cost of generation over the life of the plant (see IFB Sections B and D for details on evaluation methodology). The Project Company shall submit the Guaranteed Heat Rates at different loads as requested in Section D, Form 15.

2.2.3 Start Up Duration

A. The start-up duration is defined as the time for each unit to reach its full net capacity from initiation of start-up sequence. The Project Company shall provide a startup duration, including from hot and cold conditions. Project Company's offering combined cycle plants shall provide startup times for the simple cycle unit as well as for individual steam generators associated with each combustion Turbine Generators.

2.2.4 Transient Response

A. The governor transient response shall be fast enough such that following a frequency disturbance a change of at least 5% of a single unit's capability shall be achievable within 1 second, and at least 10% of single unit's capability shall be achievable within 2 seconds following the disturbance.

2.2.5 Regulation Performance

A. The plant shall be capable of performing regulation required for renewable projects on the GPA system. The plant shall be capable of providing regulation of at least 25 MW/minute, up- and down-ramp, with equivalent of 66% of the plant real power capacity online. It shall be clearly stated what the achievable ramp rate is for all valid combinations of generating units online.

2.2.6 Availability and Reliability

The Facility shall be designed to achieve the levels of availability and reliability normally expected for similar modern plants of the technology considered.

It is expected that the Facility will operate based on economic dispatch, with an average annual Equivalent Availability Factor during the plant lifetime of no less than 90%.

The Equivalent Availability Factor Formula is defined in accordance with ANSI/IEEE Standard 762-1987, Appendix C, Equation C-7 as follows:

$$EAF + POF + UOF + UDF + SDF = 100$$

where

EAF = equivalent availability factor
POF = planned outage factor
UOF = unplanned outage factor
UDF = unit derating factor
SDF = seasonal derating factor

Equation C-2

The equation shows that there are recognized sources of energy loss due to planned outages (full), unplanned outages (full), Unit deratings, and seasonal deratings. Each energy loss is represented by a separate index, POF, UOF, UDF, and SDF respectively. These indices are defined in such a way as to be additive. Therefore, the total per Unit energy loss is the sum of the four indices, and the remaining per Unit energy not lost is called equivalent availability factor (EAF).

See also the draft ECA Article 9.3, for the approach to liquidated damages to be charged because of "excessive outages" (those beyond the allowable number of outage hours per year for forced, maintenance, and scheduled outages).

2.2.7 Emissions

A. The Project Company is responsible for meeting the environmental permitting requirements.

2.2.8 Noise

A. Noise level at the site boundary shall not exceed 45 dB(A), measured in the horizontal plane and at an elevation of 5 feet (1.5 meters) from grade with all equipment running at full capacity.

B. Noise level of operating equipment inside the plant boundary shall not exceed 85 dB(A) when measured 3 ft (1 meter) in the horizontal plane and at an elevation of 5 ft (1.5 meters) from grade, in accordance with ANSI S1.13.

C. Noise level of any equipment shall not exceed 115 dB(A) measured from a distance of 3 ft (1 meter). Equipment with noise level greater than 85 dB(A) shall have a separate noise enclosure, or meet OSHA hearing protection requirements.

2.2.9 Frequency Response, Short-circuit contribution and Inertia Support

A. The GPA system is expected to markedly increase its renewable energy production during the life of the plant. As such, the plant is expected to provide ancillary services such as regulation and inertia support as well as primary frequency response to system requirements. As such, the minimum operating point, regulation capabilities, short circuit contribution and frequency support will be evaluated as part of the evaluation process as described in other sections. The capabilities of the plant should be clearly stated for all possible unit commitment scenarios.

2.2.10 Performance of Generators w/ Synchronous Condenser Mode when operating as Synchronous Condensers.

A. The Bidder shall provide data for the time frame to go from a cold / offline condition for a unit to synchronous condenser operation.

B. The Bidder shall provide detailed explanation on how a unit is switched from synchronous condenser mode to generation mode. This should include the timing to switch a unit from synchronous condenser mode to minimum real power output, and to maximum real power output. The description shall clearly detail times where no real and / or reactive power is available from the unit in transition.

2.3 General Requirements

2.3.1 Procurement Requirements

A. Approved Suppliers

1. Provided equipment and technology must be of proven design which mean that the power generation equipment and technologies specified must have engaged in reliable commercial operation for at least three (3) continuous years at three different sites.

2. Equipment and materials shall be new and conform to a recognized standard such as ASTM. Reference Section 3.0, Particular Technical Requirements, for more detail pertaining to specific equipment, materials, and applicable codes.

2.3.2 Construction Requirements

A. General

1. The Project Company shall be responsible for all construction work on the Project. The construction, erection, and commissioning services shall include all material, labor, supervision, technical advisory services required to make the plant ready for commercial operation. The Project Company shall provide, install, and maintain temporary site facilities for use during construction, including temporary construction offices, trailers, utilities, and power during construction.

B. Safety

1. The Project Company shall establish safety regulations in conformance with OSHA, and adhere to those safety regulations at all times.

A key objective for the Project is to construct safely, with a goal of zero OSHA recordable events throughout construction and start-up activities.

3 PARTICULAR TECHNICAL REQUIREMENTS

3.1 Mechanical Plant and Systems Requirements

3.1.1 Applicable Codes and Standards

A. The design and specification of all mechanical work related to the Project shall be in accordance with all applicable laws and regulations of the federal and state governments and with the applicable local codes and ordinances. The mechanical design shall be in accordance with the International Mechanical Code (IMC), the International Plumbing Code (IPC), and the International Fire Code (IFC).

B. The codes and industry standards used for design, fabrication, and construction will be the codes and industry standards, including all addenda, in effect as stated in equipment and construction purchase or contract agreements.

C. All mechanical design shall be performed by or done under the supervision of a Professional Engineer registered in Guam.

D. The following are a list of relevant mechanical codes and standards that shall be followed in the design of the plant. Project Company may design to acceptable equivalent European, Japanese and Korean standards. The Project Company must demonstrate equivalency. Only one set of standards shall be utilized throughout the Facility.

ASME	American Society of Mechanical Engineers (ASME)
ASME	Section I Rules for Construction of Power Boilers
ASME	Section V Nondestructive Examination of the ASME Boiler and Pressure Vessel Code
ASME	Section VIII Division 1 Pressure Vessels of the ASME Boiler and Pressure Vessel Code
ASME	Section IX Welding and Brazing Qualifications of the ASME Boiler and Pressure Vessel Code
ASME	B16.1 Cast Iron Pipe Flanges and Flanged Fittings
ASME	B16.3 Malleable Iron Treaded Fittings
ASME	B16.5 Pipe Flanges and Flanged Fittings
ASME	B16.9 Factory Made Wrought Steel Butt Welding Fittings
ASME	B16.11 Forged Fittings, Socket Welding and Threaded
ASME	B16.15 Cast Bronze Threaded Fittings Classes 125 and 250

ASME	B16.20 Metallic Gaskets for Pipe Flanges
ASME	B16.21 Non-Metallic Flat Gasket for Pipe Flanges
ASME	B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME	B16.24 Cast Copper Alloy Pipe Flanges and Flanged Fittings
ASME	B16.28 Wrought Steel Butt Welding Short Radius Elbows and Returns
ASME	B16.34 Steel Butt Welding End Valves
ASME	B16.36 Orifice Flanges
ASME	B18.2.2 Square and Hex Nuts Inch Series
ASME	B31.1 Power Piping
AMCA	Air Movement and Control Association
AGMA	American Gear Manufacturers Association
ANSI	American National Standards Institute
ANSI	Z9.2 Fundamentals Governing the Design and Operation of Local Exhaust Systems
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASHRAE	62 Ventilation for Acceptable Air Quality
ASHRAE	Handbook HVAC Applications
ASHRAE	Handbook HVAC Fundamentals
ASHRAE	Handbook HVAC Systems and Equipment
ASHRAE	15 - 2004 Safety Standard for Refrigeration Systems
ASHRAE	52.1 – 1992 Gravimetric and Dust Spot Procedure for Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter
ASHRAE	52.2 - 1999 Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency in Particle Size
ASHRAE	70 – 1991 Method of Testing for Rating the Performance of Air Outlets and Inlets
ASHRAE	90.1 Energy Standard for Buildup except Low-Rise Residential Building
ASTM	American Society for Testing and Materials
ASTM	A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded and Seamless
ASTM	A105 Specification for Carbon Steel Forgings for Piping Applications
ASTM	A106 Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM	A182 Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
ASTM	A312 Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless

Steel Pipes
ASTM A234 Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A403 Specification for Wrought Austenitic Stainless Steel Piping Fittings
ASTM B88 Specification for Seamless Copper Water Tube
ASTM D2657 Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
ASTM D3035 Specification for Polyethylene (PE) Plastic Pipe Based on Controlled Outside Diameter
ASTM D3261 Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM F714 Specification for Polyethylene (PE) Plastic Pipe Based on Outside Diameter
AWS American Welding Society
AWS D1.1 Structural Welding Code Steel
AWS QC1 Standard for AWS Welding Inspectors
AWWA American Waste Water Association
AWWA C301 Pre-stressed Concrete Pressure Pipe, Steel-Cylinder Type
AWWA C304 Design of Pre-stressed Concrete Cylinder Pipe
AWWA Manual M9 Concrete Pressure Pipe
AWWA C200 Steel Water Pipe 6 in. (150mm) and Larger
AWWA C207 Steel Pipe Flanges for Waterworks Service. Sizes 4 in. Through 144 in. (100 mm through 3,600 mm)
AWWA C208 Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C504 Rubber-Seated Butterfly Valves
CFR Code of Federal Regulations
CFR 29CFR1910 Occupational Safety and Health Standards
CFR 29CFR1926 Safety and Health Regulations for Construction
CFR Volume 40 Part 60 Standard of Performance for New Stationary Sources
CTI Cooling Technology Institute Standards
HEI Heat Exchange Institute Standards
HI Hydraulic Institute Standards
ACGIH American Council of Government Industrial Hygienists
Industrial Ventilation: A Manual of Recommended Practice

MSS SP-61 Pressure Testing of Steel Valves
MSS SP-84 Steel Valves, Socket Welding and Threaded Ends
MSS SP-58 Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation
MSS SP-97 Integrally Reinforced Forged Branch Outlet Fittings –Socket Welding, Threaded and Butt Welding Ends
MSS SP-127 Bracing for Piping Systems: Seismic – Wind – Dynamic Design, Selection, and Application
NFPA National Fire Protection Association
NFPA 11 Low Medium and High Expansion Foam
NFPA 13 Standard for the Installation of Sprinkler Systems
NFPA 14 Standard for the Installation of Standpipe, Private Hydrant and Hose Systems
NFPA 15 Standard for Water Spray Fixed Systems for Fire Protection
NFPA 16 Standard for the Installation of Foam-Water Sprinkler and Foam- Water Spray Systems
NFPA 20 Standard for the Installation of Stationary Pumps
NFPA 24 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 68 Guide for Venting of Deflagrations
NFPA 70 National Electrical Code
NFPA 72 National Fire Alarm Code
NFPA 85 Boiler and Combustion System Hazards Codes
NFPA 90A Standard for Installation of Air Conditioning and Ventilating Systems
NFPA 90B Standard for the Installation of Warm Air Heating and Air Conditioning Systems
NFPA 850 Recommended Practices for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
SMACNA Sheet Metal and Air Conditioning Contractors National Association
SMACNA Rectangular Industrial Duct Construction
SMACNA Round Industrial Duct Construction
SSPC Society of Protective Coatings
SSPC-PA1 Shop Field and Maintenance Painting of Steel
SSPC-SP3 Power Tool Cleaning
SSPC-SP5/NAC-1 White Metal Blast Cleaning
SSPC-SP6/NACE-3 Commercial Blast Cleaning
UL Underwriters Labs

3.1.2 Plant Piping Systems

A. See Appendix B for piping systems and pipeline for ULSD supply or Natural Gas supply.

B. General Design and Selection Criteria Except as noted in Appendix B: Piping shall be designed in accordance with the requirements of the Code for Pressure Piping, or ASME B31.1 - Power Piping, as applicable.

C. Piping materials shall be in accordance with applicable ASTM and ANSI standards, or equivalent DIN standards. Materials to be incorporated in permanent systems shall be new, unused, and undamaged. Piping materials will generally be in accordance with the following criteria:

D. Material selection shall generally be based on the design temperature and service conditions in accordance with the following:

1. Carbon steel piping materials shall be used for design temperatures less than or equal to 371 °C (700 °F).
2. 1-¼ percent or 2-¼ percent chromium alloy steel piping materials shall be used for design temperatures greater than 371 °C (700 °F). At the client's request field welding of 9 percent chrome shall be avoided where possible.
3. 1-¼ percent or 2-¼ percent chromium alloy steel piping materials shall be used where flashing may occur, including heater drains service. Field welding of 9 percent chrome shall be avoided where possible.
4. Stainless steel piping shall be utilized for high resistance to corrosion, and for piping applications requiring a high degree of cleanliness.
5. Fiberglass reinforced plastic piping materials shall be used only in applications requiring corrosion-resistant materials.
6. Underground circulating water piping shall be pre-stressed concrete embedded cylinder pipe with concrete encased welded steel pipe at locations under buildings. Above ground circulating water piping shall be welded steel.
7. Plastic piping having a high coefficient of thermal expansion shall be used only after a thorough analysis of the piping system thermal expansion parameters.
8. High density polyethylene (HDPE) piping shall be used for underground air service and water service other than circulating water.

3.1.3 Mechanical Installation Requirements

A. Insulation

1. All piping, equipment, or surfaces operating above 140°F near walkways, access points, maintenance areas, or operation areas shall be sufficiently insulated to reduce the surface temperature to 140°F for personnel protection. All piping, equipment, or surfaces where operating temperatures exceed 140°F or where heat conservation is necessary shall be sufficiently insulated to reduce

the surface temperature to 140°F. Material containing cold fluids shall receive insulation as required to prevent condensation from forming.

3.1.4 Products

A. Valves

1. Valves shall be provided to control and isolate different systems within the plant. Where possible equipment shall be provided with isolation and bypass valves to allow for equipment maintenance without a plant outage. Valve operators shall include levers, wheels, chain pulley and pneumatic operators as required by the location and service conditions of the valve. Valves shall be arranged for operation from floor level where possible and if required, will have extension spindles, chain operators, or gearing. The location of valves shall be accessible without the use of portable ladders or a man-lift. Hand-actuated valves shall be operable by one person. Valve materials shall be consistent with pipe specifications.

2. The design, fabrication, construction and testing of valves shall conform to the applicable codes and standards in Section 3.2.1.

B. Pumps

1. Pumps shall be designed for ease of maintenance with a removal area for the pump and motor. General service pumps shall be in accordance with the recommendations of the Hydraulic Institute Standards, and shall be suitable for the service and environment for which they are installed.

C. Heat Exchangers

1. Miscellaneous heat exchangers shall be furnished in accordance with:

ASME	Boiler and Pressure Vessel Code, Section VIII
HEI	Heat Exchanger Institute – Standards for Power Plant Heat Exchangers
TEMA	Tubular Exchanger Manufacturers Association
API 661	Air Cooled Heat Exchangers

D. Shop Fabricated Tanks

1. Shop fabricated tanks shall be designed and fabricated in accordance with:

ASME	Boiler and Pressure Vessel Code, Section VIII
AWWA	American Water Works Association

3.1.5 Execution

A. The Project Company shall develop construction specifications for erection, installation, and assembly of mechanical equipment to ensure a high-quality product in accordance with the applicable codes and standards in this Specification. The specifications shall detail equipment assembly, alignment, anchoring, welding

procedures, cleaning, erection of piping and equipment, piping system cleaning, piping inspection and testing and acceptable materials.

3.2 Electrical Plant and Systems Requirements

1. Each unit in the Facility shall remain connected to the Grid System from frequency ranges of 57.0 – 63.0 Hz in accordance with GPAPRC-006
2. Voltage range to be withstood by the Facility without disconnecting should be as follows (based on NERC PRC-024-2):

High Voltage Ride-Through Duration		Low Voltage Ride-Through Duration	
Voltage (pu)	**Time (sec)**	**Voltage (pu)**	**Time (sec)**
>1.20	Instantaneous	<0.45	0.15
≥1.175	0.20	<0.65	0.30
≥1.15	0.50	<0.75	2.00
≥1.10	1.00	<0.90	3.00
Ref. additional detail as stated in PRC-0024-2 for voltage ride-through.			

3. Communication (SCADA) requirements shall be specified including the communication protocol, type of the carrier, and a list of signals (information, alarms, etc..) to be communicated to the GPA dispatch center.
4. Automatic Generation Control Facility should not include any AGC system other than unit governors. AGC will be performed by GPA AGC system. Plant control system should not change or modify governor set-point or plant output other than through long-term control. If plant control system has control capability of individual units' real power output, it must include a droop component in the control.
5. Controller ability to mitigate sub-synchronous resonance.
6. Power revenue metering requirements (accuracy class, number of tariffs that can be programmed in the metering system, data logging and storage requirements, software for remote billing requirements, etc.).
7. Information and requirements for the Electrical Interconnection Facilities (voltage level and location of the GPA substation to be used to for power evacuation, one-line diagram and layout of the substation, specifying whether it is single or double circuit).

8. Governor requirements. Unit governors should be droop based governors with a dead band not exceeding 0.025 Hz. Each unit should be controlled by its own governor. Governor set-point should not be altered or changed automatically by plant DCS. Automatic set-point changes should only be made by the GPA SCADA system.

3.2.1 Applicable Codes and Standards

A. Unless noted otherwise, all electrical components, design and construction shall conform to applicable governmental codes, and latest editions of recommended practices and standards of the following organizations: (Project Company may offer acceptable equivalent European, Japanese and Korean standards. The Project Company must demonstrate equivalency.) Only one set of standards shall be applied throughout the Facility.

NFPA 70	National Electrical Code
NFPA 70E	National Electrical Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
IEEE 100	Authoritative Dictionary of Standard Terms
IEEE C37.1	IEEE Standard for SCADA and Automation Systems
IEEE C37.2	Electrical Power System Device Function Numbers, Acronyms, and Contact Designations
IEEE C37.04	IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers
IEEE C37.06	IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis Preferred Ratings and Related Required Capabilities
IEEE C37.09	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
IEEE C37.12	IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)
IEEE C37.17	IEEE Standard for Trip Systems for Low Voltage (1000V and Below) AC and General Purpose (1500V and Below) DC Power Circuit Breakers
IEEE C37.20.1	IEEE Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
IEEE C37.20.2	IEEE Standard for Metal-Clad Switchgear

IEEE C37.20.3	IEEE Standard for Metal-Enclosed Interrupter Switchgear
IEEE C37.20.7	IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38kV for Internal Arcing Faults
IEEE C37.23	IEEE Standard for Metal-Enclosed Bus
IEEE C37.90	IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C37.90.1	IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C37.91	IEEE Guide for Protecting Power Transformers
IEEE C37.102	IEEE Guide for AC Generator Protection
IEEE C37.110	IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes
IEEE C50.12	IEEE Standard for Salient-Pole 50 Hz and 60 Hz Synchronous Generators and Generator/Motors for Hydraulic Turbine Applications Rated 5 MVA and Above
IEEE C50.13	IEEE Standard for Cylindrical-Rotor 50 Hz and 60 Hz Synchronous Generators Rated 10 MVA and Above
IEEE C57.12	IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers
IEEE C57.12.01	IEEE Standard General Requirements for Dry-Type distribution and Power Transformers Including Those with Solid-Cast and/or resin-encapsulated Windings
IEEE C57.12.10	IEEE Standard Requirements for Liquid-Immersed Power Transformers
IEEE C57.12.70	IEEE Standard for Standard Terminal Markings and Connections for Distribution and Power Transformers
IEEE C57.13	IEEE Standard Requirements for Instrument Transformers
IEEE C57.13.3	IEEE Guide for Grounding of Instrument Transformer Secondary circuits and Cases

IEEE C62.11	IEEE Standard for Metal-Oxide Surge Arrestors for AC Power Circuits (>1 kV)
IEEE C62.22	IEEE Guide for the Application of Metal-Oxide Surge Arrestors for Alternating-Current Systems
IEEE C62.23	IEEE Application Guide for Surge Protection of Electric Generating Plants
IEEE 112	IEEE Standard Test Procedures for Polyphase Induction Motors and Generators
IEEE 141	IEEE Recommended Practice for Electric Power Distribution for Industrial Plants
IEEE 142	IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems
IEEE 242	IEEE Recommended Practice for Protection and Coordination of Industrial and commercial Power Systems
IEEE 386	Standard for Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV
IEEE 399	IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis
IEEE 493	IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems
IEEE 551	IEEE Recommended Practice for calculating Short-circuit Currents in Industrial and Commercial Power Systems.
IEEE 519	IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
IEEE 664	IEEE Guide for Generating Station Grounding
IEEE 1547	Standard for Interconnecting Distributed Resources with Electric Power Systems
NEMA MG-1	Motors and Generators
NEMA VE-1	Metal Cable Tray Systems
NEMA VE-2	Cable Tray Installation Standards
NEMA ICS 1	Industrial Control and Systems General Requirements
NEMA ICS 3	Medium Voltage Controllers Rated 2001 to

	7200 Volts AC
NEMA WC 74	5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy
UL 44	Thermoset-Insulated Wires and Cables
UL 96	Standard for Lightning Protection Components
UL 96A	Standard for Installation Requirements for Lightning Protection Systems
UL 347	Medium Voltage AC Contactors, Controllers and Control Centers
UL 508	Industrial Control Equipment
UL 508A	Standard for Industrial Control Panels
UL 845	Motor Control Centers
UL 1072	Standard for Medium-Voltage Power Cables
UL 1558	Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear

3.2.2 General Design Requirements

A. Power plant shall have an auxiliary electrical system. The auxiliary electrical system shall be supplied from one or more of the following sources:

1. Generator(s) power bussing
2. Generator(s) breaker switchgear
3. GPA 115 kV transmission grid

B. Power plant auxiliary voltages are as follows:

1. Medium Voltage: 5kV to 15kV, 3 phase
2. Low Voltage: 480V, 3 phase
3. House and convenience power 208/120V, 3 phase

C. Medium voltage system

1. Generator(s)
2. Generator power bussing
3. Step up transformer

D. Generator(s) shall be the source of electric power.

1. Mechanical, rotating generator(s) shall be synchronous type of either cylindrical rotor or salient pole type. Generators shall have the following ratings:

a. To provide increased inertia and short circuit current, generators should be oversized to compensate for lack of inertia for aero-derivative or reciprocal generation. The unit is expected to provide inertia for the GPA system primarily through the inertia of the plant generators. As such, the generators are expected to be oversized relative to the capacity of the units to provide increased inertia. The generators MVA rating must be sized a minimum of 140% of the real power capacity of the prime mover

b. Number of phases: 3

c. Output frequency: 60 Hz

d. Minimum power factor: 0.80 lagging. The generators full dynamic range should be available at the Point of Interconnection (allowing for offset to reactive losses from generator terminals to the Point of Interconnection), including at full load. Under no circumstances should the dynamic power factor range at the POI be less than +/- 0.85.

e. Winding pitch: 5/6

2. Non-mechanical generator shall interface with the 115 kV grid through a step up transformer and shall have the following requirements:

   a. Generate a 3-phase voltage and current from DC or other AC single and poly phase sources as part of the power generation process.

   b. Be able to operate through the four power quadrants.

   c. Shall have an efficiency of greater than 95%.

   d. Shall comply with IEEE 1547.

3. Renewable Generation

   a. Photo-Voltaic solar panels

      i. Panel output collector system to be DC

   b. Wind Turbines

   c. Concentrated Solar Thermal

   d. As a standalone system or in addition to another generating system, renewable generation must have the following ramp rates while connected to the Guam grid:

      i. Maximum ramp rate up: 1% of project nameplate capacity per minute

      ii. Maximum ramp rate down: 1% of project nameplate capacity per minute

4. Equipment furnished shall be capable of serving maximum rated output of prime movers at rated power factors, under all ambient and cooling conditions, with minimum additional 5% capability.

5. Design generator to withstand bolted 3-phase fault at generator terminals without damage per IEEE C50.12 and C50.13 while operating within rated

operating frequency range with an excitation value equivalent to maximum rated terminal voltage at rated lagging power factor.

6. Mechanical generator shall be capable of withstanding overspeed following unit trip under full load or in accordance with GPAPRC-006 without mechanical degradation.
7. Power generation and power handling conductors as part of the generator to be of copper construction.
8. Provide partial discharge monitor and control system complete with corporate license software.
9. Provide surge capacitor and surge arresters.
10. Provide neutral grounding equipment in accordance with neutral grounding method specified.
11. Provide generator excitation system complete with equipment, materials, and accessories.
12. Provide voltage regulator that shall be capable of automatic and manual voltage regulation.

E. DC Power System

1. As part of a proposed generating system, DC power system shall have the following requirements
2. No more than 1500 volts DC nominal.
3. System shall be ungrounded and shall have ground detection capability.
4. System shall have overcurrent and over/undervoltage protection per the standards.

F. Battery Energy Storage

1. Any proposed battery energy storage system shall have an integral Battery Management System (BMS).
2. Submit a battery cell maintenance and disposal plan with bid.

G. Flywheel Energy Storage

1. Flywheel systems must be able to contain flywheel rotor disintegration without affecting any surrounding plant infrastructure components or personnel.

H. Medium Voltage Switchgear

1. Switchgear shall handle the distribution and protection of medium voltage power (5 – 15 kV) for the plant.
2. Switchgear shall be a complete, coordinated factory assembly ready for installation, connection, and designed for operation at site ambient temperatures and elevations.
3. If arc-resistant gear is specified, manufacturer shall provide complete and coordinated arc chute plenum design including supports and vents. This shall

include routing of arc chute to vent location as coordinated with Engineer. If arc-resistant gear is not provided, manufacturer shall include arc-flash mitigation such as differential relays in all zones of protection, arc-detection relays in switchgear where hazard rating exceeds Category 2 without such protection.

4. Switchgear assembly shall consist of individual free-standing vertical sections to form a rigid, metal-clad switchgear assembly.
5. Switchgear main bus shall be copper bar, designed to continuously carry specified load current without exceeding temperature rise requirements.
6. Provide uninsulated copper ground bus with momentary rating at least equal to momentary rating of Switchgear.

I. Medium Voltage Motor Control Centers

1. Motor control centers shall control medium voltage motors or similar single loads by across the line starting methods.
2. Medium-voltage motor control center assembly(ies) complete with accessories including, but not limited to:
   a. Control center structure.
   b. Incoming line enclosure.
   c. Main horizontal and insulated vertical bus.
   d. Fused vacuum contactors.
   e. Main breaker or fused switch.
   f. Isolation and load break switches.
   g. Isolated low-voltage compartments.
   h. Protective relays and metering devices.
   i. Communications.
   j. Portable racking and lifting devices capable of transporting contactor outside of compartment.
3. MCC structures shall welded steel frame, formed steel doors and side sheets, flat steel top and rear covers forming metal enclosed, dead front freestanding assembly.
4. Each starter shall include, but not be limited to, isolating switch, medium-voltage fuses, contactor, control power transformer, and low-voltage section.
5. Vertical and horizontal buses are to be of copper construction.

J. Step-up and Auxiliary Transformers

1. Transformers shall be provided to provide appropriate voltages for in plant electrical systems and tying to GPA's electrical distribution system.

2. Transformer shall be capable of withstanding without injury mechanical and thermal stresses resulting from short circuit currents.
3. Transformer core and coils shall have circular cross sections.
4. Transformer coils shall be of copper construction.
5. Provide transformer with manufacturer's standard oil conservation system.
6. Provide bushing type CTs with fully distributed windings for relaying or metering service in quantities, ratios, and ratings as required.
7. Provide metal-oxide station class arresters with voltage ratings as required.
8. Provide tap voltages of +/- 2.5% and +/- 5% on the primary winding. Each tap position shall be fully rated and shall not limit kVA rating of transformer.
9. For ventilated, dry type transformers, silicon-resin, vacuum encapsulation or vacuum pressure impregnated (VPI) process shall apply 4-dip protective shield of silicon resin to coils.

K. Isolated Phase Bus

1. Isolated phase bus can be used to transmit electric power at high ampacities (>= 5000 amps).
2. Isolated phase bus duct system includes, but is not limited to:
    a. Bus and enclosure.
    b. Hardware and components for connections to equipment.
    c. Flexible links for all connections.
    d. Expansion joints.
    e. Vapor barriers and wall penetrations.
    f. All necessary bus support structures
        i. Isolated phase bus shall be of aluminum construction for both the conductors and the outer duct enclosure.
        ii. Design bus duct systems for nominal voltages, BIL, number of poles and rated maximum voltages.

L. Nonsegregated Phase Bus Duct

1. Nonsegregated phase bus can be used to transmit electric power within the plant.
2. Nonsegregated phase bus duct system includes, but is not limited to:
    a. Bus and enclosure.
    b. Hardware and components for connections to equipment.
    c. Flexible links for all connections.
    d. Expansion joints.

e. T-tap connections.

f. Vapor barriers and wall penetrations.

g. All necessary bus support structures.

3. Nonsegregated phase bus bar conductors from high-grade, 98% pure copper bus bars. Connection areas shall be tinned or silver-plated.

4. Design bus duct systems for nominal voltages, BIL, number of poles and rated maximum voltages.

M. Low Voltage System

1. Low Voltage Switchgear

2. Switchgear shall handle the distribution and protection of low voltage power (600V or less) for the plant.

3. Factory wired switchgear assembly consisting of, but not limited to:

a. Dead-front metal-enclosed compartments containing power buses, neutral bus, ground bus.

b. Power circuit breakers.

c. Safety interlocks and auxiliary control devices.

d. Instrument transformers.

e. Protective relays.

f. Metering.

g. Switches.

4. Switchgear shall be a complete, coordinated factory assembly ready for installation, connection, and designed for operation at site ambient temperatures and elevations.

5. If arc-resistant gear is specified, manufacturer shall provide complete and coordinated arc chute plenum design including supports and vents. This shall include routing of arc chute to vent location as coordinated with Engineer. If arc-resistant gear is not provided, manufacturer shall include arc-flash mitigation such as differential relays in all zones of protection, arc-detection relays in switchgear where hazard rating exceeds Category 2 without such protection.

6. Entire assembly shall be suitable for 600 volts maximum ac service regardless of operating voltage.

7. Bus system shall have minimum ANSI 4-cycle short-circuit withstand rating.

8. Switchgear main bus and ground bus shall be copper bar, designed to continuously carry specified load current without exceeding temperature rise requirements.

N. Motor Control Centers

1. Motor control centers shall control low voltage motors by across the line starting methods and to distribute low voltage power to other electrical power distribution equipment (switchboards, panelboards, etc.) as well as single loads.
2. Motor control center shall be continuous, coordinated, factory assembly ready for installation, connection, and immediate service designed for operation at site ambient temperatures and elevations.
3. Motor control center may include, but is not limited to:
    a. Horizontal power bus.
    b. Dead-front metal enclosed compartments containing power buses.
    c. Ground bus.
    d. Feeder circuit breakers and combination motor controllers.
    e. Auxiliary and transition compartments.
    f. Auxiliary control devices.
    g. Instrument transformers.
    h. Relays.
    i. Meters.
    j. Control switches.
4. Motor control centers shall be suitable for operation on 3-phase electrical system.
5. Main horizontal bus and vertical bus shall be either tin-plated for corrosive environments or silver-plated at bolted connections. Fabricate from copper. Minimum ampacities shall be as designed at 50°C temperature rise over 40°C ambient in compliance with UL standards.

O. Variable Frequency Drives

1. Variable frequency drives shall be used when the driven load must be controlled over a continuous range of speeds.
2. VFD shall convert incoming fixed frequency 3-phase ac power into variable frequency and voltage for controlling speed of 3-phase ac motor.
3. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for eliminating need for motor derating.
4. VFD shall be sinusoidal PWM type drive with sensor-less torque vector control capability. Control techniques other than PWM, not acceptable.
5. Components:
    a. Full-wave diode rectifier to convert supply ac to fixed dc voltage.
    b. DC link capacitors.

c. Insulated Gate Bipolar Transistor (IGBT) power section, dual rated for either variable or constant torque applications.

d. VFD shall be microprocessor-based with LED and LCD display to monitor operating conditions.

e. Separate control and power terminal boards.

6. VFD installations must meet the requirements of IEEE 519 at the point of common coupling (PCC). The PCC shall be defined as the first motor control center or switchgear bus upstream from the VFD.

P. General Plant Requirements

1. Medium Voltage Power Cable

a. Cables and accessories shall be in accordance with applicable standards

b. Medium Voltage power cables shall have copper conductors.

c. Single and multi-conductor cables shall have shielded conductors.

d. PVC jacketing not allowed.

2. Low voltage power and control cables

a. Power and control cables specified are for voltages 600 volts and below.

b. Instrumentation and thermocouple extension cables specified for voltages of 300 volts or below.

c. Power, control and instrumentation cables shall have copper conductors.

d. Power and control cable insulation shall comply with NEC type XHHW-2.

e. Minimum wire size is:

i. #14 AWG for control circuits

ii. #16 AWG for instrumentation circuits

iii. #12 AWG for power circuits

3. Motors

a. Electric motors ½ hp and larger shall be 3 phase, squirrel cage induction motors.

b. Motors shall be in accordance with applicable requirements.

c. Motor windings shall be copper.

d. Motors driven by VFDs shall be VFD compliant.

4. Grounding

a. Ground and bond all plant electrical, mechanical and structural components to the plant grounding system.

b. Provide a ground grid as the main plant grounding system.

c. Grounding and bonding conductors shall be tinned copper.

5. Lightning Protection
    a. Provide a Franklin style lightning protection system.
    b. Lightning protection conductors and air terminals shall be of aluminum construction.
6. Cathodic Corrosion Protection
    a. Provide cathodic protection for the following:
        i. Underground steel, stainless steel, copper, or brass piping using galvanic anodes.
        ii. Bottoms of pad mounted steel water storage tanks using galvanic anodes.
        iii. The fuel and natural gas pipelines from GPA Bulk Fuel Storage Facility tank farm to the plant site if fossil fuel is offered.

Q. Plant Control System

1. Provide a control system including process controllers, redundant power supplies, chassis, Input/Output (I/O) modules, communications interface modules, and associated hardware. The control system shall meet all NERC CIPS security requirements.
2. Provide a complete and coordinated control system equipment and software package that safely controls all aspects of power plant operations. The control system shall not automatically control the output of individual units or adjust the unit output of any individual unit under AGC and governor control. DCS shall not provide an interface between the GPA AGC system and the unit governor.
3. Control system shall have both discrete and analog input and output signals management capability as well as interpreting HART (Highway Addressable Remote Transducer) signal protocol.
4. Control system software programming shall have a prioritized alarms management system.
5. Control system shall have human-machine interfaces (HMIs) with dual monitors displaying information in a diagrammatic fashion. One-Line Diagrams and Process and Instrumentation Diagrams (P&IDs) shall be used as a basis for graphical screen layouts.
6. Control system shall be capable of the following communications protocols:
    a. Modbus
    b. Modbus TCP

c. DNP3

d. Profibus

e. Devicenet

R. Dynamic Fault recorder

1. The plant shall include a Tesla 4000 Power System Monitoring Recorder. The recorder shall monitor the voltage and current of each unit, the plant as a whole and each 115 kV transmission line interconnecting to the GPA system. The recorder shall also monitor the breaker status of each unit breaker and each line breaker and fault detection on the 115 kV and generation relays. The generator units shall also monitor the governor set point and any changes made to the governor set-point. All digital or analog inputs shall be accurately reported to the recorder within 8 ms of the actual change.

S. Protective Relaying

1. Plant electrical protective relaying system shall be provided to protect plant personnel and equipment from inadvertent electrical energization.

2. Protective relays shall specifically protect the following equipment:

a. Generator(s)

b. Medium voltage switchgear

c. Low voltage switchgear

d. Unit auxiliary and step-up transformers

3. Protective relay system shall be designed and set in accordance with the latest Standards. GPA has standardized on utilizing Schweitzer Engineering Laboratories, Inc. protective relays SEL-411L type relays for 115KV and 34.5KV transmission line. Primary and backup relays are required.

4. For electrical equipment not protected by protective relays or trip units, provide thermal-magnetic breakers for overcurrent protection (50/51).

5. All switchgear not designed as arc-resistant gear shall include arc-detection relays and protection.

6. All 115 kV relays shall be SEL type relays.

T. Unit Response Requirements

The unit(s) must meet the GPA Grid and Reliability Standards in Appendix G.

3.2.3 Electrical Installation Requirements

A. Electrical installation shall conform to NFPA 70 and NFPA 70E.

3.2.4 Execution

A. The Project Company shall develop construction specifications for erection, installation, and assembly of electrical equipment to ensure a high-quality product in accordance with the applicable codes and standards in this Specification. The

specifications shall detail equipment assembly, alignment, anchoring, welding procedures, erection of equipment, testing and acceptable materials.

3.3 Civil Requirements

3.3.1 Applicable Codes and Standards

A. Unless noted otherwise, all design and construction shall conform to applicable governmental codes, and latest editions of recommended practices and standards of the following organizations:

American Association of State Highway and Transportation(AASHTO)

American Concrete Institute(ACI)

American Concrete Pavement Association(ACPA)

American with Disabilities Act(ADA)

Asphalt Institute AI)

American Institute of Steel Construction(AISC)

American Iron and Steel Institute(AISI)

American National Standards Institute(ANSI)

American Public Works Association(APWA)

American Road and Transportation Builders Association(ARTBA)

American Society for Testing and Materials(ASTM)

American Society of Landscape Architects(ASLA)

American Traffic Safety Services Association(ATSSA)

American Welding Society(AWS)

American Society of Civil Engineers(ASCE)

American Water Works Association(AWWA)

Concrete Reinforcing Steel Institute(CRSI)

Federal Acquisition Regulations (48 CFR Chapter 1)(FAR)

Federal Highway Administration(FHWA)

Federal Land Highways(FHA)

Federal Specifications and Standards(FSS)

Federal Test Method Standard(FTMS)

Institute of Electrical and Electronic Engineers(IEEE)

Institute of Transportation Engineers(ITE)

National Electrical Manufacturer's Association(NEMA)

Portland Cement Association(PCA)

Prestressed Concrete Institute(PCI)

Post Tensioning Institute(PTI)

Occupational Safety and Health Administration(OSHA)

Guam Department of Public Works Standard Plans

Guidebook to Development Requirements on Guam

Environmental Procedures Guide for Transportation Projects on Guam

3.3.2 General Design Requirements

Project Company shall perform site studies it deems necessary for their design. Studies may include but are not necessarily limited to the following:

- Property maps and boundary surveys
- Topographic surveys
- Hydrological data
- Subsurface utility investigation
- GWA water system model
- Cultural resources surveys
- Natural resources surveys
- Geotechnical Investigation

A. Water supply: The plant potable water supply will originate from the GWA public water supply. Cooling water will be drawn from the effluent of the GWA Northern District Wastewater Treatment Plant. Project Company shall treat the water as necessary for service water, fire water, and boiler makeup.

B. Facility shall be designed for an expected service life of 30 years or greater.

3.3.3 Products

A. Construction Documents including but not limited to Drawings and Specifications.

3.3.4 Execution

A. Project Company to prepare construction documents for all civil improvements.

3.4 Structural Requirements

3.4.1 Applicable Codes and Standards

A. Unless noted otherwise, all design and construction shall conform to applicable governmental codes of the Territory of Guam, and latest editions of recommended practices and standards of the following organizations or their European, South

Korean, or Japanese equivalent: Only one set of standards shall be applied throughout the Facility.

Aluminum Association(AA)

American Architectural Manufacturers Association(AAMA)

American Concrete Institute(ACI)

American Institute of Steel Construction(AISC)

American Iron and Steel Institute(AISI)

American National Standards Institute(ANSI)

American Society for Testing and Materials(ASTM)

American Welding Society(AWS)

American Society of Civil Engineers(ASCE)

APA – Engineered Wood Association

American Society of Safety Engineers(ASSE)

American Wood Council(AWC)

American Wood Protection Association(AWPA)

Concrete Reinforcing Steel Institute(CRSI)

International Code Council(ICC)

Society for Protective Coatings(SSPC)

National Concrete Masonry Association(NCMA)

National Association for Corrosion Engineers(NACE)

National Assoc. of Arch. Metals Manufacturers(NAAMM)

Occupational Safety and Health Administration(OSHA)

Pre-stressed Concrete Institute(PCI)

Post Tensioning Institute(PTI)

Steel Deck Institute(SDI)

The Masonry Society(TMS)

Wire Reinforcement Institute(WRI)

3.4.2 General Design Requirements

A. The construction documents shall contain all information required by the applicable codes and standards.

B. All structures, equipment, tanks, piping and pipe supports, cable tray, conduit, and supports shall be designed to resist the dead, live, test, operating, rain, wind and seismic loads applicable to the plant site.

3.4.3 Design shall be to approved applicable codes and standards and result in producing safe facilities.

3.4.4 Materials

Materials of construction shall be suitable for their intended purpose and longevity. Materials to be used shall be selected from the following standards or their European, South Korean, or Japanese equivalents. Only one set of standards shall be applied throughout the Facility.

A. Steel:

1. Wide Flange and WT Shapes: ASTM A992
2. Channel, Angle, M, MT, S and ST Shapes: ASTM A36, ASTM A992
3. HP Shapes: ASTM A572, Grade 50
4. Rectangular HSS Shapes: ASTM A1085, Fy=50 ksi min., ASTM A500, Grade B, Fy=46ksi min.
5. Round HSS Shapes: ASTM A1085, Fy=50 ksi min.,ASTM A500, Grade B, Fy=42ksi min.
6. Pipe: ASTM A53, Grade B, Fy=35 ksi min.
7. Threaded Rod: ASTM A36
8. Fasteners: High Strength Bolts: ASTM F3125, Grade A325, A490, Heavy Hex, Type 1; ASTM Grade F1852, F2280, Twist-Off, Type 1.
9. Common Bolts: ASTM A307, Grade A
10. Nuts: ASTM A563, Grade C, DH
11. Washers: ASTM A436, or ASTM A959 for direct tension indicators
12. Welded Headed Studs: ASTM A108
13. Anchor Rods: ASTM F1554, Grade 55 or 105
14. Stainless Steel: ASTM A276, Grade 304, 304L, 316, 316L
15. Raised pattern floor plate: ASTM A786
16. Plates and bars: ASTM A36, A572

B. Concrete:

Compressive strength as required for design and exposure per ACI 318.

Reinforcing Steel: ASTM A615, Grade 60, ASTM A706, Grade 60 (Welded reinforcing steel); ASTM A775 (Epoxy coated); ASTM A934 (Epoxy coated prefabricated bars); ASTM A955 (Stainless steel bars); ASTM A1055 (Zinc and Epoxy Dual Coated bars); ASTM A767 (Galvanized bars).

Welded Wire Fabric: ASTM A1064 (carbon steel, plain and deformed); ASTM A1022 (stainless steel plain and deformed); ASTM A884 (epoxy coated); ASTM A1060 (galvanized, plain and deformed).

Prestressing Steels: ASTM A416 (strand), A421 (strand), A722 (bars)

Aggregates: ASTM C33

Portland Cement: ASTM C150

Blended Hydraulic Cements: ASTM C595

Mixing water: ASTM C1602

Admixtures: ASTM C494

C. Masonry:

Hollow Load Bearing Concrete Masonry Units: ASTM C90

Mortar: ASTM C270

Grout: Portland Cement ASTM C150

Hydrated Lime: ASTM C207

Aggregate for Grout: ASTM C404

Joint Reinforcement: ASTM A951

3.4.5 Structural Loads

A. General:

Design loads for all enclosures, structures, structural components and equipment will be determined according to the criteria described below, except where the applicable code requires more severe loading conditions.

Loads shall be determined per the ICC International Building Code (IBC) and supplemented with ASCE 7 "Minimum Design Loads for Buildings and Other Structures", editions in effect at time of bidding.

Loads shall include all dead, live, soil, hydrostatic, flood, wind, rain, earthquake, and any special loads.

Where structural design must proceed without certified load data for vendor supplied equipment, estimated load data may be used and loads shall be increased to compensate for the lack of final certified design data. Catalog data or similar previous data for minor equipment may be used, but loads shall be increased by a minimum of 20% to cover anticipated variations and contingencies.

B. Design Loads:

1. Dead Loads - D

In lieu of actual available data, the following dead loads shall be used as minimum loads:

Roof with Metal Deck

Metal Deck	5 psf
Insulation	1 psf

Light Fixtures and Sprinklers	3 psf	
Steel Framing (light)	10 psf	
Steel Bar Grating		
1 ¼" x 3/16"	12 psf	
All other types refer to catalog data		
Cast in place Concrete		
Formed	150 pcf	
On metal deck (inches above deck)		12.5 lb/in of thickness
Steel Floor Framing		
Light framing	10 psf	
Medium framing	18 psf	
Heavy framing	25 psf	

Partition Walls with normal weight concrete masonry units, ungrouted (psf of wall area)

6"	37 psf
8"	42 psf
10"	47 psf
12"	62 psf
Siding and Girts	10 psf

2. Live Loads - L

In design of floors and floor support structure, the following specified uniform floor design live loads are minimums. Where equipment is located on a floor, the structure shall be designed for the larger of the equipment weight (equipment fixed in place shall be considered as dead load and moveable equipment shall be considered as live load) or the displaced specified floor live load.

a. Ground floor

Heavy Traffic Aisles	400 psf
Light Traffic Zones	250 psf
Storage Areas	150 psf
As required for special construction and maintenance	

b. Office floors 50 psf

c. Partitions 20 psf

d. Superstructure floors

Main platforms and floors	100 psf

Auxiliary platforms 70 psf

Concrete floors 100 psf

Steam Turbine floors 450 psf

2000 lb concentrated point load placed on an area 2.5' square, anywhere on a floor

e. Electrical Rooms 200 psf

f. Walkways 60 psf

g. Stairs, corridors and intermediate landings 100 psf

3. Roof Live Load – Lr 20 psf

4. Roof Rain Load – R Per IBC

Rainfall Intensity: Per United States Department of Agriculture, Natural Resources Conservation Services, Engineering Technical Note No.3, "Rainfall - Frequency and Design Rainfall Distribution for Selected Pacific Islands", Table 2-1D, 100 year, 1 hour rainfall: 4.7 inches.

5. Wind Loads - W

Per IBC 2009 Section 1609

Occupancy Category: IV

Basic wind speed: 175 mph (3 second gust, Exposure Category C)

Importance factor, I: 1.15

6. Earthquake Loads - E

Per IBC 2009 Section 1613 and PPRBC Section RBC302.4.35

Occupancy Category: IV

Importance factor, I: 1.5

Short Period Spectral Response Parameter Ss = 2.86

1 Second Spectral Response Parameter S1 = 0.61

Site Class shall be determined by geotechnical investigation

Seismic Design Category shall be assigned and other parameters calculated upon determination of Site Class

7. Equipment Loads:

1. Dead Load - D

b. Refer to vendor equipment drawings

2. Live Load - L
    c. Refer to vendor equipment drawings

3. Abnormal Operating Load - L
    a. This condition occurs when equipment, hoppers, vessels, conveyors, etc., are filled to capacity or choked at outlets under abnormal operations.
    b. Consider vibration, impact, and temperature loads as required under abnormal operating conditions.
4. Impact Loads - I
    d. Per IBC Chapter 16.

5. Rotating and Reciprocating Equipment Loads - L
    a. 50% of the equipment weight

6. Piping and Electrical Loads – D,L, W, E
    a. Hanger, guide and anchor loads for piping shall include dead, live, test, wind, and earthquake.
    b. Electrical cable trays, bus ducts, and conduit loads shall include dead, live, wind, seismic.

7. Hydrostatic Test Loads - F
    a. Hydrostatic test loads shall be considered for piping and equipment.

8. Vehicular Loads – D,L
    a. Dead Load: Per specific vehicle type.
    b. Live Load: Per specific vehicle type
    c. Fork lift, 6000lb capacity: Use 85% load distribution on front axle, unless noted otherwise.
    d. Truck Live Load: AASHTO HS20 44 load distribution.
    e.

9. Vibration Loads - L
    a. The frequencies of rotating machinery shall be defined by the vendor.

b. Adequate stiffening, bracing shall be used to produce a satisfactory design for vibration using acceptable design analysis.

c. Resonant vibration of the foundation shall be avoided. Foundation frequency shall differ from the machine, equipment operating frequency by a minimum of ± 20 percent.

10. Contingency Loads – D

a. Non-accumulating point loads shall be used on steel beams to account for concentration of hanging loads to individual beams that exceed the area hanging load allowance. (2000 pounds minimum)

3.4.6 Steel Design

A. Codes

1. American Institute of Steel Construction:

a. "Steel Construction Manual" (Thirteenth Edition).

b. "Specification for Structural Steel Buildings, including Supplement No. 1, dated 2005" (AISC 360-05).

c. "Seismic Provisions for Structural Steel Buildings" (AISC 341-05).

d. "Specification for Structural Joints Using ASTM A325 or A490 Bolts", June 30, 2004.

e. "Code of Standard Practice for Steel Buildings and Bridges" March 18, 2005 (AISC 303-05).

f. "Detailing for Steel Construction", Third Edition (AISC 326-09).

2. Steel Deck Institute:

a. "Design Manual for Composite Decks, Form Decks and Roof Decks-No. 31".

B. Design Guidelines

a. The following guidelines will apply in general and will be superseded only by engineering and design considerations:

b. Elevated concrete floor slabs can be considered as providing horizontal stability by diaphragm action after setup and curing.

c. Grating floors shall not be considered as providing horizontal rigidity.

d. For deflection limits of structural members, see 2009 IBC Section 1604.3 and Table 1604.3.

e. Minimum Sizes:

f. Bracing size minimum - L 3 x 3 x 1/4

g. Wide Flange and Tee shapes and Angles: In areas of high corrosion the web and flange min thickness = 1/4"

3.4.7 Foundation Design

A. Codes and Standards

1. American Concrete Institute:

a. “Building Code Requirements for Structural Concrete" (ACI 318 08).

b. “Foundations for Dynamic Equipment” (ACI 351.3-R04)

c. "Details and Detailing of Concrete Reinforcement" (ACI 315).

d. "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures" (ACI 315R 04).

e. “ACI Detailing Manual–2004, Publication SP-66

2. American Welding Society:

a. "Structural Welding Code-Reinforcing Steel" (AWS D1.4)

B. Design Guidelines

1. All foundation design shall be in accordance with the Project geotechnical report and ACI design codes. Deviations from the recommendations will be resolved with the geotechnical consultants. Analysis of foundations shall follow generally accepted practice. Vibration requirements shall be considered in the design of foundations for equipment where manufacture or working environment requires consideration of operation or human access.

C. Stability - Minimum factor of safety:

1. Overturning: 1.5

2. Stability against sliding: 1.5

3. Uplift 1.0 (75% of Dead load used as resisting)

4. Lateral forces shall be resisted in accordance with the geotechnical report.

D. Housekeeping Pads

1. Housekeeping pads shall be supplied under all equipment unless noted otherwise. Pads will be nominally 6” thick consisting of 4 ½” thick reinforced concrete and 1½” grout or as shown on drawings.

2. Electrical equipment pads will generally consist of 4½” thick reinforced concrete with leveling channels or as otherwise indicated on the drawings.

3.4.8 Structural Welding

A. Codes:

1. American Welding Society:

a. "Structural Welding Code Steel" (AWS D1.1)

b. “Structural Welding Code – Aluminum” (AWS D1.2)

c. "Structural Welding Code Sheet Steel" (AWS D1.3)

d. “Structural Welding Code Reinforcing Steel" (AWS D1.4)

e. “Structural Welding Code Stainless Steel" (AWS D1.6)

f. “Structural Welding Code – Seismic Supplement" (AWS D1.8)

3.4.9 Surface Preparation and Protective Coatings

A. Surface preparation:

1. Structural steel shapes: “Commercial Blast Cleaning” in accordance with SSPC-SP6.

2. Guardrail, ladders and grating: “Power Tool Cleaning” in accordance with SSPC-SP3 or “Commercial Blast Cleaning” in accordance with SSPC-SP6.

B. Painting:

1. All steel shall be shop primed. Finish color will be selected by owner.

2. Guardrails, ladders and stairs shall be shop finish painted using “Safety Yellow” color for guardrails, handrails, self-closing gates and ladders.

3.5 Substation Requirements

3.5.1 General

A. Materials and equipment shall be furnished in a fully engineered and coordinated design package.

B. The substation shall be designed based on the most recent revision of the following codes and standards as of the date of approval of the design criteria unless otherwise noted:

NFPA 70 National Electrical Code

NFPA 70E National Electrical Safety Code

NFPA 780 Standard for the Installation of Lightning Protection Systems

NEMA C29.7 Wet Process Porcelain Insulators - High Voltage Line Post Type

ANSI C29.9 Wet Process Porcelain Insulators – Apparatus, Post Type

IEEE C37.010 IEEE Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis

IEEE C37.04 IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers

IEEE C37.06 IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis Preferred Ratings and Related Required Capabilities

IEEE C37.09 IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

IEEE C37.1 IEEE Standard for SCADA and Automation Systems

IEEE C37.11 IEEE Standard Requirements for Electrical Control for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis

IEEE C37.12 IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)

ANSI C37.32 High Voltage Switches, Bus Supports and Accessories Schedule of Preferred Ratings, Construction Guidelines and Specifications

IEEE C37.90 IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus

IEEE C37.90.1 IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus

IEEE C37.110 IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes

IEEE C57.13 IEEE Standard Requirements for Instrument Transformers

IEEE C57.19.01 IEEE Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings

IEEE C62.11 IEEE Standard for Metal-Oxide Surge Arrestors for AC Power Circuits (>1 kV)

IEEE C62.22 IEEE Guide for the Application of Metal-Oxide Surge Arrestors for Alternating-Current Systems

IEEE 605 IEEE Guide for Bus Design In Air Insulated Substations

IEEE 80 IEEE Guide for Safety in AC Substation Grounding

IEEE 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System

NEMA SG4 Alternating Current High Voltage Circuit Breakers

NETA ATS Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

Guam Power Authority Standard Specifications as applicable.

Project Company may design to equivalent approved European, Japanese or Korean standards. Project Company must demonstrate equivalency. Only one set of standards shall be applied thoughout the Facility.

3.5.2 Steel Structures

A. Dimensions:

1. As required to provide structural strength, maintain electrical clearances, and to suit equipment specified and provided.
2. Required clearances and spacings:
    a. Bus and line clearances: NEMA SG6, NESC.
    b. Phase spacing, outdoor switches, and fuses: NEMA SG6.
3. Shielding mast
    a. Type: Self-supporting, continuously tapered tubular; galvanized steel; with welded baseplate; anchor bolts; hand-hole at base; internal damping cable, or equivalent means.
4. Grounding: Provide 2 ground lugs on opposite sides of structures or equipment.

B. Grounding (above-grade):
1. Provide grounding for equipment mounted on structures.
2. Structure ground attachment locations:
3. Provide NEMA 2-hole attachment 12" (300 mm) above each baseplate.
4. Provide single-hole attachment every 4' (100 mm) (maximum) on vertical and horizontal members to structure mounted equipment.
    a. Ground conductor shall be stranded soft-drawn copper.

C. Ground clamps:
1. Provide bolted, NEMA 2-hole, bronze or copper clamp on each structure leg or column 12" (300 mm) above baseplate.
2. Provide bolted, bronze or copper clamp for support of ground cable on vertical and horizontal members.
3. Grounding operator's platforms: 4'-0" x 5'-0" galvanized steel grating. Furnish for each group-operated switch and circuit switcher.

3.5.3 Buses and Conductors

A. Rigid buses: Aluminum tubular bus conductor AA Schedule 40 pipe (standard pipe size), ASTM B429, 6063-T6 alloy.

B. Cable for jumper buses shall be in ASCR accordance with:
1. ASTM B232.

C. Core wire shall be galvanized steel wire, ASTM B245. 1350-H19 (EC) grade aluminum: ASTM B230.

D. Provide damping conductor for horizontal and vertical bus runs of aluminum bus sized appropriately according to the current revision of IEEE 605.

E. Bus design shall be in accordance with the current revision of IEEE 605. Standard tubular aluminum bus pipe sizes shall be used. Each tubing section of shall be

provided with midspan drain holes and end caps. All construction of bus systems shall be welded.

F. Bus design shall take expansion into consideration as detailed in IEEE 605 due to ambient temperatures and energized heating. Expansion shall be accounted for, where required, by fixed and slide fit bus clamps or expansion fittings. Expansion fittings shall be used for connections at major equipment.

G. Project Company shall weld all aluminum bus connections.

H. Damping conductor shall be ACSR.

I. Identification tags:

1. Furnish porcelain enamel phase identification tags with black letters on white background mounted to structures at ends and midway of each bus, at each incoming/outgoing line position, over each PCB position, and at each VT or CCVT.

2. Furnish one tag for each switch and PCB with designations provided later by Owner.

3. Switch identification tags shall be located on steel next to switch operator.

3.5.4 Grounding

A. All structures shall have two connections to ground except single phase devices and bus supports shall have one connection.

B. Ground pads shall be provided for two 2-hole NEMA type compression connectors with 1 3/4" bolt centers.

C. Below grade ground grid including the copper rods and copper cables and short leads to the above ground equipment shall be provided by the Project Company. Project Company shall provide above grade cables, cable supports and NEMA two hole full compression (indent) type connectors for all structures and equipment located within the substation including, but not limited to bus duct(s), instrument transformers, breakers, switches, lightning arresters and grounding mats. Project Company shall furnish all above-grade ground connectors for all galvanized steel fencing, including but not limited to gates and barbed wire. Grounding connectors and supports shall be tin-plated.

D. The switchyard ground grid system shall be designed in accordance with current revisions of IEEE Standards 665, 80 and 81. An approved program such as CDEGS shall be used for the ground grid design and analysis. Measured step and touch potential shall be identified as well allowable step and touch potentials as specified by IEEE 80. Ground grid model and analysis shall be submitted to GPA and must include all pipes, conductors, water lines etc within the substation and power plant area.

E. The substation fence shall be grounded in accordance with IEEE Standards 665 and 80.

F. All above and below grade grounding conductors shall be annealed, bare, stranded copper wire conforming to ASTM Specification B8. Conductor size shall not be less than the minimum requirements of NFPA 70.

G. Ground lugs and connectors shall be of bronze or copper, and all hardware such as bolts, washers, and nuts shall be of Durium, Everdur, or silicon bronze. Ground lugs shall be Burndy or Owner approved equal.

H. Grounding system shall provide for permanent grounding of all frames, housings, and support steel of all electrical equipment, panels, lighting protective apparatus, cabinets, wiring devices, electrical metallic raceways, lighting fixtures and boxes.

I. All conduit runs shall be grounded at enclosures of electrical distribution or control equipment at which they originate, and shall provide a conductive path, in compliance with the NEC for grounding of enclosures of all locally mounted electrical equipment.

3.5.5 Surge Arrestors

A. Type: Metal-oxide station class.

B. Standard: ANSI C62.11.

3.5.6 Insulators

A. Conform to NEMA SG6, NEMA C29.7.

B. Color: ANS No.70.

C. Insulators shall be porcelain type. Insulator strength to be determined during detailed design, rated for the required impulse withstand voltage, voltage level, physical dimensions and strength class (compression, cantilever, torsion and tension). All insulators shall have galvanized malleable iron or galvanized forged steel hardware.

3.5.7 Disconnect Switches

A. The disconnect switches shall be three-pole, single-throw, gang-operated, air break, manually operated, rated for outdoor service on a 60 Hz, 3-phase, system. The operating mechanism shall be provided as a factor complete assembly including all necessary shafts, interconnecting rods, linkages, supports and accessories.

B. High pressure type contacts with silver to silver contact surfaces to be used. The contacts to have a wiping and cleaning motion when opened and closed. Switch design to all for the accurate positioning of switch blade tips in the jaw contacts.

C. Disconnect switch operating mechanisms shall be furnished with noncorrosive, greaseless, roller or ball type main bearings. A flexible braided grounding apparatus shall be provided on the operating rod, above the operating crank. The grounding device shall be rated to carry the same short time and momentary currents as the disconnecting switch. Operating mechanisms and linkages to be designed so all blades of the switch will be in the fully opened or completely closed positions when the operating crank is in the fully rotated position. Operating mechanisms shall be provided complete with all fittings required for total switch operation.

D. Threaded clevis type fittings to be provided on all interphase type control pipes and connecting links between gang-operated switch and switch crank arm.

E. Operating mechanisms shall be designed to allow padlocking in either the fully open or fully closed position with one inch shackle clearance.

F. All manual operating type mechanisms shall be marked to indicate the open and closed switch directions.

G. Two separate normally open "a" and two normally closed "b" auxiliary contacts shall be provided for each disconnect switch for remote indication of the open and closed position of the switches.

H. Insulators shall conform to ANSI C29.9, high-voltage post-type apparatus insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy.

I. Operating mechanism:

1. Heavy-duty, gear-operated complete with accessories.
2. Size to eliminate twisting or sag.
3. Switch poles shall be fully coordinated and field adjustable per pole and for alignment and 3-phase timing coordination.
4. Switch contacts to be self-wiping, field-adjustable and have field-adjustable contact pressure.
5. Standards: NEMA SG6 and ANSI C37.32.
6. Longitudinal switches (parallel to switch blades) shall be capable of resisting, without injury or failure, force listed in ANSI C37.32, Table 2.

3.5.8 Coupling Capacitor Voltage Transformers

A. Type: Base-mounted, high-capacitance, coupling capacitor voltage transformer with dual main windings

B. Terminals: Polarity and terminals: ANSI C57.13. Clearly indicate by permanent markings not easily obliterated.

C. Short circuit capability: Capable of withstanding for 1 second mechanical and thermal stresses resulting from short-circuit on secondary terminals with full voltage maintained in primary terminals in accordance with ANSI C57.13 and C93.2.

D. Other ratings and features: NEMA SG 2.

E. Accessories when required:

1. Ferroresonance-suppressing filter. Device shall pass ANSI C93 Ferroresonance test.
2. Potential grounding switch and terminal box for secondary voltage connections with conduit entrance plugs.
3. Provide corona suppression rings if required.

4. Provide lifting hooks or eyes for lifting filled unit by overhead crane.

5. Potential device: Factory calibrated.

F. Transformer oil:

1. Oil furnished with transformer shall be Type 1 mineral insulating oil in accordance with current ASTM standards.

G. Certify that oil being supplied is classified as noncontaminated by PCBs. Standard: ANSI C93.1.

3.5.9 Circuit Breakers Connections

A. Project Company shall provide the necessary bus connection adapters to bolt to the terminal connectors provided in the circuit breaker.

B. Project Company shall assemble all component parts that were initially disassembled for shipment in accordance with the manufacturer's instructions.

3.5.10 Quality Assurance

A. Regulatory requirements: Design, fabricate, and test equipment in accordance with applicable standards of ANSI, NEMA, NFPA 70, IEEE, and shall be in accordance with applicable requirements of OSHA.

3.5.11 Environmental Requirements

A. Design shall comply with any unusual service conditions as outlined in C37.010 and ASTM D1472.

3.5.12 System Description

A. Outdoor, 3-pole, single-throw, SF6 gas-filled, single-tank or 3-tank, frame-mounted on common base.

3.5.13 Control Wiring

A. Wiring:

1. Provide control wiring in accordance with ANSI C37.11 as a minimum.

2. Control voltage ranges for closing and tripping shall be in accordance with ANSI C37.06.

3.5.14 Functional Components

A. Operating mechanism: Pneumatic, hydraulic, or motor-charged spring with features and performance in accordance with NEMA SG4, Section 3.

B. Bushings:

1. Type: Porcelain, in accordance with IEEE C57.19.01.

2. Conform to general requirements of, and test in accordance with IEEE C57.19.00.

3. Use manufacturer's standard dimensions and characteristics. Electrical characteristics shall comply with IEEE C57.19.01.
4. Pressure components and systems:
5. Comply with NEMA SG4, Section 4.
6. Welds on breaker tank assembly shall meet AWS D1.1 Section 5.30.

3.5.15 Current Transformers

A. Accuracy classification, characteristics, and performance data in accordance with IEEE C57.13 and NEMA SG4. . At a minimum, multi-ratio Class 400 current transformers shall be specified.

3.5.16 Source Quality Control

A. Each circuit breaker furnished shall be completely assembled and tested at manufacturer's facility.

B. Perform production tests in accordance with NEMA SG4 and ANSI/IEEE C37.09.

C. Operating mechanisms shall be tested for proper operating speed in accordance with ANSI C37.09.

D. Components shall be given dielectric test if applicable, in accordance with ANSI/IEEE C37.09.

E. Furnish certification each type, style, and model bushing has passed test requirements of IEEE C57.19.01.

F. Furnish certification bushing-type current transformers have been tested and meet requirements of ANSI C57.13 for continuous thermal current, thermal short-time and mechanical short-time ratings, and applied potential.

3.5.17 Field Quality Control

A. Perform acceptance test as described in NETA Section 7.6.2 – Circuit Breakers.

3.5.18 Lighting

A. The lighting system shall consist of light emitting diode (LED) type fixtures. A two (2) foot candles of illumination level shall be provided in substation yard area for up lighting of the structures and ground level light. All exterior lights shall be photocell controlled and provided with control switches for manual or automatic operation.

B. All fixtures shall be completely wired in accordance with the latest requirements of the National Electrical Code. All fixtures shall bear the Underwriters' label of approval.

C. Project Company shall furnish and install all associated cables and raceways for the substation lighting.

3.5.19 Lightning Protection

A. Project Company shall provide lightning protection system for the substation against direct lightning strokes. The lightning protection system shall consist of suitable lightning masts installed on concrete footings or on substation dead-end structures to provide zones of protection in accordance with NFPA 780.

3.5.20 Relaying Protection and Control Systems

A. Substation protective relaying design to interface with existing Guam Power Authority substation, generation and transmission line protection and control relaying systems.

B. Substation relaying schemes to include but not limited to line current differential, bus differential, breaker failure, reclosing, synchronizing, distance, overcurrent and instantaneous overcurrent protection types. Vendor shall be responsible for the design, supply and installation of compatible relaying at adjacent interconnected stations on the GPA system. Step-distance relaying without communications assistance is not acceptable. Fault clearing of transmission lines must be accomplished within 5 cycles, inclusive of far end faults. Primary and backup relays shall be provided.

C. Guam Power Authority has standardized on utilizing Schweitzer Engineering Laboratories, Inc. (SEL) protective relays.

3.5.21 Communication Systems

A. Substation communications design to interface and be compatible with existing Guam Power Authority communications and SCADA systems. Communications systems shall meet all NERC CIPS security requirements.

B. Open/closed contacts to be designed to provide status to SCADA system for the following equipment:

C. Circuit breakers

D. Disconnect switches

E. The minimum data required to measure is the following: watts/vars, voltage, kilowatt-hours, power factor, harmonic distortion and historical data logging with minimum and maximum measured levels.

F. Communications mediums to include but not limited to fiber optics and microwave types.

3.5.22 Metering

Add metering requirements including identifying delivery point, the place where meters will be installed, whether the main and backup meters are required, how the data will be transferred to GPA, etc.

3.6 Transmission Requirements

3.6.1 General

A. This section covers the requirements for the transmission interconnection line between Facility's switchyard and the GPA transmission system interconnection at the 115 kV Harmon Substation.

B. The transmission interconnection line shall be designed based on the most recent revision of the following codes and standards as of the Bid Date unless otherwise noted:

1. National Electrical Safety Code (NESC-C2)
2. Rural Utilities Service Design Manual (RUS Bulletin 1724E-200)
3. American National Institute (ANSI)
4. National Electrical Manufacturers Association (NEMA)
5. American Society for Testing and Material (ASTM)
6. American Institute of Steel Construction (AISC)
7. American Society of Civil Engineers (ASCE)
8. Structural Engineering Institute (SEI)
9. Institute of Electrical and Electronics Engineers (IEEE)
10. American Concrete Institute (ACI)
11. Guam Power Authority (GPA)

3.6.2 Design Criteria

A. Project Company shall develop a detailed design criteria memorandum which shall provide the details and design guidance required to perform detailed transmission facility design. Design criteria memorandum shall comply with the latest version of IEEE 1724.

B. Design criteria shall be submitted by Project Company to GPA for review and approval.

C. Purpose of design criteria is as follows:

1. Description of design practices or procedures to be utilized.
2. Use of consistent and common material or types of material and material specifications.
3. Guidelines for consistent approach to design and engineering.
4. Transmission design criteria may be incorporated into larger design criteria documents but should exist as a stand-alone section.

5. Detailed design of transmission facilities shall not deviate from design criteria without prior approval of GPA.

3.6.3 Transmission Route

A. Transmission line route between the GPA procured property described in Section 5.0 Site Data and the Harmon substation shall be selected by Project Company and shall be reviewed and approved by GPA prior to any additional work being performed.

B. Route shall be selected based upon the following criteria:

1. Avoidance of sensitive habitats.
2. Avoidance of potential terrain hazards with the goal of increasing reliability and security.
3. Avoidance of environmentally sensitive areas.
4. Utilizing most direct route with goal of increasing reliability and security.

C. Detailed surveys shall be carried out on the transmission line route selected by Project Company and approved by GPA to support the design and identify the right-of-way (ROW). ROW shall be selected to accommodate insulator swing, structure deflection, standard electrical clearance and requirements for electrostatic and electromagnetic field strengths.

D. For Project Company offering a site other than the one described in Section 5.0 Site Data; the Project Company will be responsible for Right of Way from proposed alternate site to Harmon Substation.

3.6.4 Geotechnical Investigation

A. Project Company shall perform geotechnical investigation along the transmission line route. Geotechnical investigation shall include a detailed geotechnical report properly reviewed and affixed with a Guam registered professional engineer stamp.

B. Geotechnical investigation shall include sufficient soil borings and soils analysis to meet or exceed the following requirements:

C. Quantity of soil borings shall not be less than four (4) for line lengths of 1.5 miles or less, with at least two (2) soil borings for each additional mile of transmission centerline length.

D. All soil borings will also include soil resistivity measurements made in accordance with standard testing procedures and equipment.

E. Soil boring at each location shall be of appropriate depth required for thorough soil analysis and accurate design recommendations. Appropriate depth is assumed to be the greater of:

1. 1.2 times the anticipated depth of foundation.

2. The anticipated depth of foundation plus two times the anticipated foundation diameter.
3. 30 feet.

F. Soil boring shall be taken close to each deadend or large angle structure location (within 500 feet). These soil borings count towards the minimum requirement of soil boring quantities.

G. Soil borings shall be taken such that there is no transmission centerline length of greater than 2640 feet between adjacent soil borings.

3.6.5 Transmission Structures

A. Transmission pole structures (single or multi-pole tubular steel structures) shall be designed in accordance with the most current version of ASCE/SEI 48 – Design of Steel Transmission Pole Structures.

B. Transmission lattice structures shall be designed in accordance with the most current version of ASCE 10 - Design of Latticed Steel Transmission Structures.

C. Transmission structures shall be designed at a minimum to withstand the following weather conditions:

1. NESC 250B Warm Island District – Initial Wire Condition
2. NESC 250C Extreme Wind with a 3-sec gust wind speed of 200 mph at 33 ft above ground – Initial Wire Condition
3. Construction Load(s) – Initial Wire Condition
4. Uplift at 65°F – Initial Wire Condition
5. Camber at 80°F – Final Wire Condition
6. NESC Blowout at 6 psf wind and 80°F – Final Wire Condition
7. Stringing at 4 psf wind at 80°F – Initial Wire Condition
8. Maximum Operating Temperature at 194°F – Final Wire Condition

D. Deadend transmission structures shall be designed for a broken conductor condition. All phases and shield wire on the ahead span or back span, whichever results in the largest stresses in the structure. Initial wire condition shall be considered for this condition.

E. Transmission structure types, locations, and design shall be selected to minimize long term outage risk from natural hazards (wind, rain, storms, marine conditions, earthquakes, etc.)

F. Foundation design shall be appropriate for the geotechnical conditions and shall be based on recommendations of the geotechnical engineer. Foundation design loading cases shall be included as part of design criteria.

G. Transmission structure design will use a preferred single pole self-supporting structure type. Additional structure types may be considered and approved by GPA based on application, location, permitting and ROW issues.

H. Depths and diameters of all foundation types shall be calculated using industry standard methods. Calculations may be formulated utilizing industry standard software.

I. Foundation deflection and rotation limits shall be as follows for single pole structures:

1. 3-inch ground line deflection (1.5 inch non-recoverable)
2. 2° ground line rotation (1° non-recoverable).

3.6.6 Conductor and Overhead Ground Wires (OHGW)

A. Phase conductor shall be of type and size as is consistent with that used on existing GPA systems. Conductor selection shall be reviewed with GPA prior to procurement.

B. Current conductor types in use by GPA:

1. 336.4/Tulip AAC 19
2. 927.2 Greeley AAAC37

C. Maximum operating temperature of conductor will be limited to 194°F (90°C) in order to prolong the design life of conductor.

D. Overhead ground wire (OHGW) shall be utilized as transmission shielding wire, and shall be installed on full length of the line.

E. OHGW shall be sized to ensure adequate protection based on fault current.

F. Conductor and OHGW installation work shall be done in accordance with manufacturer's recommendations and IEEE 524 'Guide to the Installation of Overhead Transmission Line Conductors'.

G. Ground wire size will be determined through grounding study and fault analysis.

H. Transmission line shall be designed such that galloping ellipses do not overlap.

3.6.7 Electrical

A. Transmission facility shall be designed to accommodate maximum generation outlet loading levels.

B. Transmission facility voltage shall be 115kV.

C. Transmission facility structures shall be designed to meet a grounding resistance of 5 ohms or less.

D. All phase-to-phase and phase-to-ground clearance, including the mid-span ground clearance, shall be designed according to NESC-C2.

E. Mid-span ground clearance shall meet the standard requirements when the conductor is operating at maximum design temperature and maximum sag conditions.

F. All vertical clearances shall assume, as a minimum, that areas under the line are accessible to vehicles and equipment as specified in NESC-C2.

G. Project Company shall assume a tolerance of +5'/-0" shall be used for vertical clearances.

H. Vegetation clearing under the transmission line shall adhere to the following guidelines:

1. 'Phase Zone' is defined as the area between phase conductors on either side of structure plus five (5) feet on outside of either side.

2. Vegetation directly under 'phase zone' with potential to grow high enough to not meet NESC clearances shall be removed in a manner where re-growth is not practical.

3. Vegetation outside of 'phase zone' shall be removed if potential growth height exceeds a height level determined by contact at ground (0' above ground) at spot vertically down from outside edge of 'phase zone' and then extending outward at a 45° angle from outside edge of 'phase zone'.

I. Lightning performance shall have a target performance level of two (2) outages per year for the length of the entire new transmission line.

J. Insulation levels shall be sufficient for continuous operation at 1.1 per unit voltage.

3.7 Architectural Requirements

3.7.1 Building Codes

A. All buildings and structures shall be designed to meet all applicable building, accessibility, and life safety code requirements.

3.7.2 Building Requirements

A. General

1. All buildings designs are to be approved by GPA. In general, building materials and installation of architectural systems or components shall be as follows:

a. All buildings shall be enclosed and sealed weathertight.

b. All buildings shall be designed to accommodate the planned level of staffing required to operate the facility. Vehicle parking shall be adequate for the planned level of staffing.

c. A guard house shall be provided at each entrance to the facility.

d. Sound attenuation shall be provided for sound absorption as required on walls enclosing equipment.

e. Interior partitions, including fire-rated partitions, shall be non-load bearing.

f. Interior finishes shall be compatible with the intended operational use of each building area.

g. In shop, warehouse and maintenance areas, electrical generating equipment areas, and out buildings, the flooring shall be sealed concrete.

h. Suspended acoustical ceiling systems shall be used in offices and other finished spaces. Shops, warehouse and other unfinished spaces shall be exposed overhead construction which shall be painted. Moisture resistant materials shall be used in toilet rooms and shower rooms.

i. Exterior personnel doors shall be heavy duty galvanized hollow metal doors with fully welded galvanized hollow metal door frames.

j. Interior personnel doors shall be full flush painted hollow metal doors with painted hollow metal door frames.

k. Overhead service doors shall be overhead coiling type of galvanized steel, factory assembled, with factory painted slats and motor operators with manual override operation feature with weather seals and wind locks.

l. Fire exits shall be provided at outside walls as required by code. Exit signs shall be of opening and rating for door, frame, and hardware. Doors shall conform to hollow metal door requirements and have fillers adequate to meet fire rating.

m. Commercial grade standard heavy-duty butts, locksets, latches, panic hardware, closers, thresholds and other miscellaneous hardware items shall be provided as appropriate to the function of the doors. Hinges with non-removable pins and weather seals shall be used for exterior doors. All locks shall have removable cores.

n. The Administration building shall have pass card entry hardware on exterior doors and interior security doors. The interior security doors shall control open public access to the building during meetings.

o. Buildings and building openings (windows, doors) shall be designed to resist airborne debris impact under high wind (typhoon) conditions.

p. Interior windows shall be fixed hollow metal frames with double pane glazing for sound deadening.

q. Signs and graphic designs for identification and directions shall be incorporated into the interior finishes of each area. All exit signs shall follow the applicable building code. All signage shall comply with ADA requirements.

r. Fire extinguishers shall be multi-purpose, surface mounted type. Fire extinguishers shall be provided at locations in accordance with the applicable building and fire codes.

s. Each office, conference room or work area shall be provided with wiring infrastructure including wall mounted jacks for both data and voice communications. Voice communications shall utilize Voice over Internet

Protocol (VOIP) technology. The wiring infrastructure shall be extended back to the central communications switching room located in the Administration building. The Project Company shall be responsible for installation of network switching and computer equipment in this room and for data connections to the outside world.

The communications network shall include as a minimum the Administration Building, warehouse, shop, and maintenance areas or building(s), the power generation building, and the entrance guard house(s). Provisions shall be included for integration of the communications network with the plant paging system. Fiber optic cabling shall be utilized for network wiring between buildings.

B. Power Generation Building

1. The Project Company shall provide dedicated space required for operation of the plant including, but not limited to, an electrical generating equipment (prime mover) area, a control room, a control system equipment storage room, and a low voltage electrical room. The final size and design of the building shall be based on the Project Company's layout of all equipment and equipment foundations that are housed within the building. The layout shall account for adequate clearance requirements for the removal and/or normal maintenance of all equipment contained within the building.
2. The main plant control room, control system equipment room, and SCADA control room shall be located on a 12-inch raised floor.

C. Administration Building

1. The Project Company shall provide reasonable administrative office space for support of the plant.
2. The Administration Building shall be designed in accordance with Americans with Disabilities Act (ADA) regulations.
3. The Administration Building shall include as a minimum the following rooms:
   a. Project managers office
   b. Operations superintendent's office.
   c. Maintenance superintendent's office.
   d. Visitor/spare office.
   e. Entrance lobby/waiting area.
   f. Office supply/storage room.
   g. Conference room.
   h. Reference library/file storage room.
   i. Break room with kitchenette.
   j. Men's restroom.
   k. Women's restroom.

l. Janitors closet.

m. Mechanical equipment room.

n. Electrical equipment room.

o. Communications/telephone equipment closet.

p. Printer/Plotter room.

D. Warehouse / Maintenance Building(s)

1. The Project Company shall provide dedicated space required for operations and maintenance of the plant including, but not limited to, a warehouse, mechanical maintenance area and office, electrical maintenance area and office, instrumentation and controls shop and office, welding shop, tool crib, Unisex toilet room, janitors closet, and warehouse supervisor/receiving office.

E. Building Aesthetics

1. All buildings shall utilize an architectural style, colors, and finishes that are compatible with Guam's island heritage. Exterior colors and finishes shall be selected to blend in with the surrounding countryside and approved by GPA.

2. All exterior and interior exposed surfaces, except factory finished items, shall be painted. Environmentally-friendly products shall be used.

3. Low rise construction shall be used for all buildings except where equipment or operational requirements require structures of greater height.

4 QUALITY ASSURANCE, INSPECTION, COMMISSIONING, AND TESTING

4.1 Quality Assurance

4.1.1 General Quality Requirements

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code.

C. When required by individual Specifications Section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of specific work, until Completion.

D. Abbreviations used in Drawings and Specifications are as specified in ANSI Y1.1 and IEEE 260.

4.1.2 Industry Standards

A. Welding

1. Welding shall be performed by qualified welding operators using procedures which have been qualified in accordance with applicable codes and standards, including but not limited to:
    a. ASME B31 Code for Pressure Piping – Power Piping
    b. ASME Boiler and Pressure Vessel Code.
    c. AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.6, AWS D1.8 Structural Welding Codes.

B. Welding Procedure Qualification
    1. Seller, Subcontractor, or fabricator performing welding under jurisdiction of referenced codes shall be responsible for obtaining and qualifying welding procedures. Structural welding procedures conforming to AWS D1.1 are prequalified as defined in AWS D1.1, Clause 3. Project Company shall maintain records certifying successful completion of procedure qualification tests.

C. Performance Qualification
    1. Seller, Subcontractor, or fabricator performing welding under jurisdiction of referenced codes shall be responsible for testing and qualifying its welding operators in accordance with applicable codes, using qualified procedures.
    2. Welding operator's qualification as specified in code shall be considered as remaining in effect indefinitely unless welder has not engaged in given process of welding for which welding operator is qualified for period of 6 months.

D. Submittals
    1. Except for procedures exempted by AWS D1.1, Clause 3, maintain copies of each welding procedure with certificate demonstrating successful qualification of welding procedures for each welding process performed at Sellers facilities: AWS D1.1 - Form N-1, or ASME QW-483.
    2. Prior to execution of any manual shop welding, maintain copies of welder qualification form for each individual performing welding: AWS D1.1 Form N-4 or ASME QW-484.

4.2 Testing

4.2.1 General

A. Scope of Tests
    1. This section includes quality assurance testing to be completed during construction, during manufacture of equipment, and plant performance tests on completion of construction.
    2. After system or equipment necessary for operation is in operating condition, the Project Company shall supervise operation of the plant for a period sufficient to

assure the proper functioning, and make necessary observations, investigations, and adjustment.

3. The Project Company is responsible for coordination of testing with local, state, and federal environmental authorities as required.
4. The tests mentioned in this section are not intended to form a complete list of the numerous tests which the Project Company would normally perform to ensure equipment quality and Facility reliability.
5. The Project Company shall be responsible for the submission of test certificates and reports to GPA for all the tests described here.
6. GPA or its representatives shall witness tests at the manufacturer's works as agreed with the Project Company. All testing on Site shall be witnessed by GPA or its representative.
7. The Project Company shall notify GPA in writing when tests are to be performed. Unless otherwise specified in the ECA, twenty one (21) days notice shall be given for tests in manufacturer's works, and ten (10) days notice shall be given for tests to be performed on Site.

4.2.2 Tests During Construction and Erection

Testing and inspections during construction shall comply with the requirements of the International Building Code. The Project Company shall satisfy GPA that the construction materials are of the specified quality and that the design figures are being followed. GPA must also be satisfied that electrical and mechanical equipment after erection are still up to the required standard and have not suffered because of storage, handling, construction, or erection.

4.2.3 During Manufacture

A. Equipment Factory Acceptance Tests

1. The Project Company shall be responsible for ensuring the quality of products to be installed in the plant. Reports of factory acceptance tests shall be provided to GPA within thirty (30) days of completion of the test.

4.2.4 Tests During Construction and Erection

A. Compaction

1. Conduct compaction testing in accordance with ASTM D1556 and D1557 for each type and source of material.

B. Welding

1. Welding materials and procedures for piping shall conform to ASME B31.1 and applicable state regulations.
2. Employ certified welders in accordance with Section IX ASME Boiler and Pressure Vessel Code and AWS D1.1.

3. Piping connected to pressure parts under jurisdiction of "Boiler and Pressure Vessel Code": ASME "Boiler and Pressure Vessel Codes."
4. Piping not covered by "Boiler and Pressure Vessel Code": ASME B31.1, "Code for Pressure Piping."
5. The Project Company shall maintain copies for each person, by name, assigned to do field welding of materials installed under this Agreement for review by GPA. Show on certificates that each person has passed tests specified by AWS.

C. Electrical

1. The following electrical systems and components shall be tested in accordance with the standards listed in section 3.2.1:
    1. Electrical ground grid
    2. Electric generator(s) and ancillaries (automatic voltage regulator, excitation system, generator governor, surge capacitors and MOV's, etc.)
    3. Electrical switchgear, motor control centers, switchboards and panel boards
    4. All medium voltage cable and buses
    5. All low voltage cable and buses
    6. Protective relay system shall be designed and set in accordance with the latest Standards. GPA has standardized on utilizing Schweitzer Engineering Laboratories, Inc. protective relays.
        a. Plant Control System
        b. All control system hardware
        c. All control system software

4.2.5 Tests on Completion

A. General

On completion of construction, the Project Company shall undertake a series of tests to demonstrate that the Facility operational capability, performance and reliability are within the limits agreed in the ECA. These tests shall be witnessed by GPA, and as a minimum requirement these tests shall include:

a. Functional Tests
b. Energy Conversion Agreement Tests
c. Performance and Facility Reliability Tests

B. Test Procedures

1. The Project Company shall develop specific test procedures for each test, and shall be provided to GPA for review at least one hundred twenty (120) days prior to the start of the tests.

2. The test procedures shall include, but not be limited to, the following information:

a. Administrative Procedures

b. Test Equipment

c. Test Instrumentation to be installed

d. Station Instrumentation to be used

e. Test Methods

f. Test Standards to be followed

g. Sample Data Sheets

h. Test Calculation Methods

i. Instrument Calibration Sheets

j. Pre-test Uncertainty Calculation

C. Test Results Calculations

1. The Project Company shall be responsible for providing the final test calculations. The test results calculations shall follow the methods as described in the test procedures.

D. Test Measurement Uncertainty

1. The Project Company shall be responsible for pre-test and post-test uncertainty analysis to verify the quality of the test performed. The uncertainty analysis is not to be applied as a commercial test tolerance, allowance, or margin to the test results. No tolerances in calculating Facility performance test results will be permitted for measurement uncertainty.

E. Test Reports

1. The Project Company shall submit to GPA a Preliminary Test Report after completion of each test. Within five (5) business days, GPA shall state whether it concurs, or disputes the results of the test. If GPA disputes the results, it shall provide in detail the reasons for dispute. The test reports shall include the test results, calculations, uncertainty analysis results, and shall also include as an appendices the raw test data, and test procedure that was followed.

2. Within fifteen (15) business days of the conclusion of the test, the Project Company shall submit a Final Test Report, or a notification of a retest in the event of a dispute.

F. Functional Tests

1. The Project Company shall perform the following tests:

a. Test and start-up of auxiliaries

b. Control systems tests

c. Synchronizing checks

d. Electrical Protective devices tests

e. Mechanical protective device tests

f. Stability tests – AVR, Stable minimum load, minimum load while in compliance with emissions, full load rejection test and step load change rejection tests

g. Automatic startup and loading time tests for hot and cold starts

G. Environmental Compliance Tests

1. The environmental compliance test including the air emission, effluent water quality, noise level, and other applicable tests will be performed to demonstrate compliance with the requirements of environmental permits and shall be completed in accordance with the applicable EPA test procedures.

2. For the Fossil Fuel Fired Component, the Bidder shall test the plant for emissions on both ULSD and Natural Gas, when it becomes available, to ensure that it meets the air permit requirements.

H. Heat Rate

The Heat Rate and some other test requirements below are only applicable to the Facilities including Fossil Fuel Fired Component. The specification will be adjusted based on the Facility configuration and technology proposed by the selected Bidder. For the Facilities including Fossil Fuel Fired Component, the Heat Rate and Initial Dependable Capacity Tests shall be conducted on both ULSD and Natural Gas, when it becomes available.

1. A Heat Rate to establish benchmark for the end of term tests and Initial Dependable Capacity Test shall be completed prior to Commercial Operation.

2. The tests shall be done in accordance with the ASME PTC-46 Performance Test Code on Overall Plant Performance, as well as the applicable ASME Performance Test Code relevant to the generation technology.

3. The Project Company shall demonstrate the ability of the plant to achieve the Contracted Facility Capacity established in the ECA and provide to GPA information about the Facility Heat Rate. The performance test results shall be corrected to Site Reference Conditions using the correction curves included in the approved test procedure using the calculation methods provided in such test procedure. Tested Dependable Capacity and Heat Rate corrections shall be allowed for:

   a. Ambient dry bulb temperature

   b. Ambient relative humidity

   c. Barometric Pressure

   d. Generator Power Factor

   e. Fuel Temperature

f. Fuel Heating Value

g. GPA shall have the right to request that the Facility's heat rate be tested concurrently with any Dependable Capacity Test and Project Company shall be obligated to comply with such request.

4. Plant capacity shall be tested at normal maximum capacity without exceeding any manufacturers limitations. The plant must comply with all local, state, and federal environmental permits throughout the duration of the tests. The uncorrected net power output of the plant, in kWh, will be measured at the Delivery Point.

5. The Dependable Capacity (DC) Test shall be undertaken during the Reliability Test, and shall form the basis of the declared Dependable Capacity as defined in the ECA.

6. The duration of the DC Test shall be no less than 6 hours, during which time the plant will operate at its normal Dependable Capacity while supplying the normal station auxiliary power demand. The Facility DC in MW will be determined by dividing the sent out power in MWh (as determined by the revenue meter readings at the start and end of the test and corrected to Site Reference Conditions) by the test duration period in hours.

7. All costs for performance tests will be borne by the Project Company.

8. The Project Company shall perform testing to ensure that the Facility meets functional requirements including Dependable Capacity for Natural Gas, heat rate tests and benchmark heat rate test for end of term tests.

H. Startup Duration Test

1. The Project Company will determine the startup duration, from initiation to full Plant Net Capacity, both cold and warm starts.

I. Reliability Test

1. The Project Company shall conduct a Reliability Test for a continuous seven (7) day (168 hour) test period. During this time the Facility shall operate continuously at Dependable Capacity for at least 72 hours, and for the rest of the period at any other load as may be required by GPA.

2. The equipment is considered available when the generator breaker is closed and the generator is producing positive net power output. Should the equipment become unavailable due to no fault of the Project Company, the 7-day time period will restart at GPA's convenience and the to-date demonstrated availability will be lost.

3. Should any failure occur in any portion of the Facility, due to or arising from faulty design, material, workmanship, or operation which requires or causes the

Facility available capacity to be reduced, a new Reliability Test shall be undertaken after rectification has been completed.

4. The Facility capacity and reliability tests shall be carried out while the Facility is operating in compliance with the specified environmental requirements.

5. All costs associated with equipment repair or correction shall be borne by the Project Company.

J. Partial Commissioning

1. Project Company shall perform tests to demonstrate that generating units can be partially commissioned and operated without negatively impacting site safety and the ongoing construction efforts.

4.2.6 Tests Required Throughout the Life of the Plant

A. Annual Dependable Capacity Test

1. The Project Company shall perform an annual Dependable Capacity Test, to demonstrate the Facility Dependable Capacity. The performance shall be corrected to base conditions by the equipment manufacturer's correction curves, as described in the calculation methods provided in the test procedure. Output and heat rate corrections shall be allowed for:

a. Ambient dry bulb temperature

b. Ambient relative humidity

c. Barometric Pressure

d. Generator Power Factor

e. Fuel Temperature

f. Fuel Heating Value

g. GPA shall have the right to request that the Facility's heat rate be tested concurrently with any Dependable Capacity Test and Project Company shall be obligated to comply with such request.

2. The Project Company shall submit a Test Report in accordance with Section 4.2.1.5.

4.2.7 Tests and Inspections Prior to Facility Turnover to GPA in the End of the Term

1. Project Company shall perform tests one year prior to End of Contract Term to demonstrate the condition and performance of the plant. Tests shall include Dependable Capacity, heat rate, emissions and startup duration.

2. Project Company will allow GPA, or their designated agent, access to inspect and evaluate the plant, facilities and equipment.

3. Project Company shall correct, repair or replace deficiencies found during the turnover tests and inspections.

5 SITE DATA

5.1 Site Location

The land identified as Lot 5010-1NEW, Lot 5042-1 and Lot 5042-R1 in the Municipality of Dededo will be used for the new Guam Power Authority GPA power generation plant. The property was recently approved to be rezoned to M1 by the Guam Legislature. The property site is deemed appropriate for the proposed use barring unforeseen geotechnical issues or other site unknown issues identified in testing.

5.2 Description of the Plot

The property is unimproved with native vegetation existent throughout.

5.3 Site Size and Layout

Property consists of 60 plus acres near Harmon substation in Dededo. The estimated plant footprint is 25 acres. Project Company shall not build in the area outside the plant footprint other than for utility access. Project Company will locate the plant on the property to maintain a vegetation barrier while preserving as much of the remaining acres for future development.

5.4 Climate Data

1. See Appendix D for ASHRAE Guam Climate information
2. The climate of Guam is tropical, with warm weather and little seasonal temperature variation. Generally, low dry bulb temperatures are not below 70 °F. The potential for tropical storms and typhoons is common during the wet season.

5.5 Site Reference Conditions

1. The following are the site reference conditions, to be used for the basis of the plant guarantees:
   a. Ambient Dry Bulb Temperature (°F): 88.9
   b. Barometric Pressure (psia): 14.57
   c. Wet Bulb Temperature (°F): 78.1

5.6 Geotechnical Conditions

GPA will complete a preliminary geotechnical survey to be provided during this procurement period.

5.7 Raw Water Analysis

To be provided in Appendix E

5.8 ULSD Analysis

To be provided in Appendix F

6 PROJECT ADMINISTRATION

6.1 Design and Construction Progress

6.1.1 Monthly Reports

A. The Project Company shall submit to GPA a Monthly Project Report, commencing at the award of Contract, and concluding after the Commercial Operation Date. The Monthly Report shall include the following information:

1. Executive Summary of overall progress, significant issues, etc.
2. List of activities completed in prior month
3. Anticipated activities to be completed in month ahead
4. Updated Project schedule with critical path analysis
5. Engineering report detailing status of Project engineering
6. Construction report detailing status of construction, including generation plant, fuel pipeline, and switchyard.

6.1.2 Schedule Updates.

A. The Project Company shall submit an updated Project Schedule, to be included in the Monthly Project Report. The Project Schedule shall include all Project activities, including status of permits, engineering, procurement, equipment shipment and delivery, construction activities, and commissioning and start-up activities.

6.1.3 Meetings

A. The Project Company shall hold a progress meeting at least once per month with GPA. Until construction begins, the meetings can be held at the Project Company's office, GPA's office, or via teleconference. Once construction on site begins, the meeting to be held on site. The Progress Meeting shall include a review of safety information, schedule updates, review of potential problems and risks, and any coordination issues required with GPA.

B. The Project Company shall submit to GPA meeting minutes, within 5 business days of the meeting. The minutes shall include an action item list with expected date of closure, person requesting, responsible person, status, and actual closure date.

Appendix A: Grey Water Quantity and Analysis

Spreadsheet embedded as an object and printout follows.

NDSS FY-18.xlsx

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD

	MM/DD/YYYY		MM/DD/YYYY
FROM	10/1/2017	TO	10/31/2017

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	6780	8872	lb/day	******	130	177	mg/L		4/31	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	7371	11504	lb/day	******	149	242	mg/L		4/31	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
INFLUENT BOD RESULTS UNAVAILABLE 10/11 & 10/25. SAMPLES DID NOT MEET QC DEPLETION CRITERIA (OVERDEPLETION).

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	10/1/2017	TO	10/31/2017

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	26.1	26.7	deg. C		4/31	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3767	3975	lb/d	******	74	79	mg/L	6	12/31	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	7.7	******	8.5	SU		4/31	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	1046	1527	lb/d	******	21	30	mg/L		12/31	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	1.5	6.1	mL/L	2	4/31	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	2.5	5.8	mg/L	1	3/31	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	6.05	7.20	MGD	******	******	******	******		31/31	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
EFFLUENT BOD RESULTS UNAVAILABLE 10/20. SAMPLES DID NOT MEET QC DEPLETION CRITERIA (UNDERDEPLETION).
BOD (mg/l) WEEKLY MAX (4/4) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE
SETTLEABLE SOLIDS DAILY MAX (1/4) AND MONTHLY AVERAGE
OIL & GREASE NOT ANALYZED ON 10/25. ANALYSIS NOT AVAILABLE DUE TO PENDING SUPPLY ORDER.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	10/1/2017	TO	10/31/2017

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/31	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	76320	173290	MPN/100mL	5	4/31	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	43%	******	******	%	1	2/31	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	86%	******	******	%		4/31	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.3	24.3	mg/L		12/14/16	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD BELOW 85% REMOVAL
ENTEROCOCCI DAILY MAX (4/4) AND MONTHLY AVERAGE
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	11/1/2017	TO	11/30/2017

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	9169	16284	lb/day	******	206	368	mg/L		5/30	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	14236	27525	lb/day	******	319	623	mg/L		5/30	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
INFLUENT BOD RESULTS UNAVAILABLE 11/08 BECAUSE SAMPLES DID NOT MEET QC DEPLETION CRITERIA (OVERDEPLETION)

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	11/1/2017	TO	11/30/2017

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	27.3	28.7	deg. C		5/30	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	2966	3529	lb/d	******	64	74	mg/L	6	9/30	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	7.2	******	8.7	SU	2	5/30	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	811	1061	lb/d	******	17	23	mg/L		10/30	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.0	0.0	mL/L		4/30	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	NODI E	NODI E	mg/L	5	0/30	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.78	6.50	MGD	******	******	******	******		30/30	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
NODI E- OIL & GREASE ANALYSIS NOT CONDUCTED DUE TO PENDING RECEIPT OF ANALYTICAL SUPPLIES
pH ABOVE MAXIMUM (2/5)

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
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GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	11/1/2017	TO	11/30/2017

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/30	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	87712	120330	MPN/100mL	6	5/30	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	69%	******	******	%	1	4/30	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	95%	******	******	%		5/30	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.3	24.3	mg/L		12/14/16	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI DAILY MAX (5/5) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
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LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	12/1/2017	TO	12/31/2017

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	12920	17384	lb/day	******	294	386	mg/L		4/31	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	15728	25400	lb/day	******	381	564	mg/L		4/31	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
INFLUENT BOD RESULTS UNAVAILABLE 12/21 & 12/28. SAMPLES DID NOT MEET QC DEPLETION CRITERIA (OVERDEPLETION)

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	12/1/2017	TO	12/31/2017

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	26.5	27.5	deg. C		4/31	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3141	3768	lb/d	******	68	79	mg/L	7	10/31	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	7.2	******	8.4	SU		4/31	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	569	903	lb/d	******	12	19	mg/L		10/31	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.0	0.0	mL/L		4/31	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	6.3	8.1	mg/L		2/31	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.79	6.80	MGD	******	******	******	******		31/31	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE
OIL & GREASE ANALYSIS NOT AVAILABLE ON 12/06 & 12/13. SAMPLES EXCEEDED HOLDING TIME DUE TO PENDING ANALYTICAL SUPPLIES

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	12/1/2017	TO	12/31/2017

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/31	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	113420	173290	MPN/100mL	5	4/31	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	77%	******	******	%	1	2/31	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	97%	******	******	%		4/31	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI DAILY MAX (4/4) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD

	MM/DD/YYYY		MM/DD/YYYY
FROM	1/1/2018	TO	1/31/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	16149	26151	lb/day	******	380	603	mg/L		5/31	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	14700	21684	lb/day	******	345	505	mg/L		5/31	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	1/1/2018	TO	1/31/2018

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	26.0	28.1	deg. C		5/31	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3430	5196	lb/d	******	73	111	mg/L	7	11/31	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	7.4	******	8.3	SU		5/31	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	621	878	lb/d	******	13	18	mg/L		13/31	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.0	0.0	mL/L		5/31	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	5.9	14.3	mg/L		5/31	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.83	6.20	MGD	******	******	******	******		31/31	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	1/1/2018	TO	1/31/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/31	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	59978	92080	MPN/100mL	6	4/31	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	81%	******	******	%	1	5/31	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	96%	******	******	%		5/31	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI DAILY MAX (5/5) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	2/1/2018	TO	2/28/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	8127	11042	lb/day	******	286	414	mg/L		4/28	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	14245	29123	lb/day	******	477	873	mg/L		4/28	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
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LOCATION: DEDEDO, GU 96912

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PERMIT NUMBER	DISCHARGE NUMBER

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MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	2/1/2018	TO	2/28/2018

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	25.7	27.1	deg. C		4/28	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	2285	4366	lb/d	******	59	90	mg/L	6	10/28	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	7.7	******	8.5	SU		4/28	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	684	1104	lb/d	******	18	23	mg/L		10/28	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.0	0.0	mL/L		4/28	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	15.1	19.9	mg/L	4	4/28	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	4.51	6.30	MGD	******	******	******	******		28/28	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
OIL & GREASE DAILY MAX (3/4) AND MONTHLY AVERAGE

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
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Form Approved.
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GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	2/1/2018	TO	2/28/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/28	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	37618	61310	MPN/100mL	5	4/28	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	79%	******	******	%	1	4/28	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	96%	******	******	%		4/28	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI DAILY MAX (4/4) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	3/1/2018	TO	3/31/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	11618	15148	lb/day	******	273	343	mg/L		4/31	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	8191	14025	lb/day	******	194	317	mg/L		4/31	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
INFLUENT BOD RESULTS UNAVAILABLE 03/14. SAMPLES DID NOT MEET QC DEPLETION CRITERIA (OVERDEPLETION).

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	3/1/2018	TO	3/31/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	25.6	26.7	deg. C		4/31	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3312	3748	lb/d	******	71	80	mg/L	7	12/31	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	6.5	******	9.2	SU	1	4/31	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	545	865	lb/d	******	12	18	mg/L		14/31	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.3	0.8	mL/L		4/31	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	3.0	5.1	mg/L		4/31	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.76	6.30	MGD	******	******	******	******		31/31	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE
pH DAILY MAX (1/4)

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	3/1/2018	TO	3/31/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/31	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	46680	52470	MPN/100mL	4	3/31	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	74%	******	******	%	1	3/31	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	94%	******	******	%		4/31	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI RESULTS UNAVAILABLE 03/28 DUE TO TECH ERROR.
ENTEROCOCCI DAILY MAX (3/3) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	4/1/2018	TO	4/30/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	9731	15421	lb/day	******	252	370	mg/L		4/30	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	39052	120192	lb/day	******	1120	3515	mg/L		4/30	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
INFLUENT BOD SAMPLES UNAVAILABLE 04/04. SAMPLES DID NOT MEET QC DEPLETION CRITERIA (OVERDEPLETION).

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	4/1/2018	TO	4/30/2018

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	24.6	25.2	deg. C		4/30	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3147	4149	lb/d	******	71	104	mg/L	6	10/30	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	6.0	******	7.3	SU	2	4/30	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	819	1138	lb/d	******	18	23	mg/L		12/30	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.5	2.0	mL/L		4/30	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	4.4	7.1	mg/L		4/30	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.89	7.30	MGD	******	******	******	******		30/30	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
pH BELOW MINIMUM (2/4)
BOD (mg/l) WEEKLY MAX (4/4) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	4/1/2018	TO	4/30/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/30	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	105530	>241960	MPN/100mL	5	4/30	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	72%	******	******	%	1	3/30	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	98%	******	******	%		4/30	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD BELOW 85% REMOVAL
ENTEROCOCCI DAILY MAX (4/4) AND MONTHLY AVERAGE
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141 — PERMIT NUMBER
INF-A — DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR
INF/MONTHLY
Influent Structure

MONITORING PERIOD
FROM MM/DD/YYYY 5/1/2018 TO MM/DD/YYYY 5/31/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	10856	11952	lb/day	******	250	287	mg/L		5/31	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	14448	19035	lb/day	******	340	486	mg/L		5/31	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	5/1/2018	TO	5/31/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	26.3	28.4	deg. C		5/31	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	3518	3982	lb/d	******	76	84	mg/L	7	14/31	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	6.8	******	7.7	SU		5/31	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	1076	1608	lb/d	******	23	34	mg/L		14/31	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.1	0.3	mL/L		5/31	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	3.6	5.8	mg/L		5/31	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.68	7.10	MGD	******	******	******	******		31/31	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MIGUEL C. BORDALLO, PE GENERAL MANAGER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		671	300-6885			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE
BOD (lbs/day) MONTHLY AVERAGE

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	5/1/2018	TO	5/31/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/31	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	96352	155310	MPN/100mL	6	5/31	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	70%	******	******	%	1	5/31	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	93%	******	******	%		5/31	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
ENTEROCOCCI DAILY MAX (5/5) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL
NODI (C)- EFFLUENT NOT CHLORINATED

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	INF-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

INF/MONTHLY
Influent Structure

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	6/1/2018	TO	6/30/2018

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	10411	13191	lb/day	******	219	273	mg/L		4/30	COMPOS
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	12682	19486	lb/day	******	265	396	mg/L		4/30	COMPOS
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. MO AVG	Req. Mon. HI WK AV	lb/day	******	Req. Mon. MO AVG	Req. Mon. HI WK AV	mg/L		Weekly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	Month	Day	Year

COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME: GUAM WATERWORKS AUTHORITY
ADDRESS: NORTHERN DISTRICT STP
HARMON ANNEX, GU 96912
FACILITY: NORTHERN DISTRICT STP
LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	6/1/2018	TO	6/30/2018

001/MONTHLY
External Outfall

ATTN: PAUL J. KEMP

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. centigrade	SAMPLE MEASUREMENT	******	******	******	******	26.5	28.2	deg. C		4/30	DISCRT
00010 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	deg. C		Weekly	DISCRT
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	2711	3913	lb/d	******	57	82	mg/L	6	13/30	COMP24
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
pH	SAMPLE MEASUREMENT	******	******	******	6.8	******	7.8	SU		4/30	DISCRT
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 MINIMUM	******	8.5 MAXIMUM	SU		Weekly	DISCRT
Solids, total suspended	SAMPLE MEASUREMENT	1037	1458	lb/d	******	22	31	mg/L		13/30	COMP24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	3002 MO AVG	6760 HI WK AV	lb/d	******	30 MO AVG	45 HI WK AV	mg/L		Weekly	COMP24
Solids, settleable	SAMPLE MEASUREMENT	******	******	******	******	0.5	1.5	mL/L		4/30	DISCRT
00545 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1 MO AVG	2 DAILY MX	mL/L		Weekly	DISCRT
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	3.7	5.5	mg/L		4/30	DISCRT
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	10 MO AVG	15 DAILY MX	mg/L		Weekly	DISCRT
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	5.78	6.60	MGD	******	******	******	******		30/30	METER
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	12 MO AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	METER

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COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
BOD (mg/l) WEEKLY MAX (5/5) AND MONTHLY AVERAGE

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
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LOCATION: DEDEDO, GU 96912

Form Approved.
OMB No. 2040-0004

GU0020141	001-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing ZIP CODE: 96932
MAJOR

001/MONTHLY
External Outfall

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	6/1/2018	TO	6/30/2018

ATTN: PAUL J. KEMP

No Discharge

PARAMETER		QUANTITY OR LOADING			QUANTITY OR CONCENTRATION				NO.EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******	NODI (C)	NODI (C)	mg/L		0/30	DISCRT
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	1.5 MO AVG	2.46 DAILY MX	mg/L		WEEKLY	DISCRT
Enterococci	SAMPLE MEASUREMENT	******	******	******	******	92728	155310	MPN/100mL	5	4/30	DISCRT
61211 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	35 MO AVG	104 DAILY MX	CFU/100mL		WEEKLY	DISCRT
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******	74%	******	******	%	1	4/30	COMP24
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******	92%	******	******	%		4/30	COMP24
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	Req. Mon. MO AV MN	******	******	%		WEEKLY	COMP24
Ammonia & Ammonium Total	SAMPLE MEASUREMENT	******	******	******	******	24.9	24.9	mg/L		12/06/17	COMP24
82230 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. MO AVG	Req. Mon. DAILY MX	mg/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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COMMENT AND EXPLANATION OF ANY VIOLATIONS (See O & M Report)
VIOLATIONS
NODI (C)- EFFLUENT NOT CHLORINATED
ENTEROCOCCI DAILY MAX (4/4) AND MONTHLY AVERAGE
BOD BELOW 85% REMOVAL

Appendix B: ULSD and/or Natural Gas Storage and Pipeline Structure

Appendix B ULSD and/or Natural Gas Storage and Pipeline Structure

DESCRIPTION OF THE WORK

1.1 Existing Systems

The Guam Power Authority (GPA) Bulk Fuel Storage Facility or GPA Bulk Fuel Storage Facility is located in the Municipality of Piti between the Atlantis Submarine and the former Navy power unit on the Piti Channel. See Appendix C. The bulk storage facility is owned by GPA but operated by another company on behalf of GPA.

There are four separate and distinct petroleum handling activities which are conducted at the GPA Bulk Fuel Storage Facility:

1. Storage of fuel oil in bulk storage tanks;
2. Pipeline transfer of fuel oil to and from tanks;
3. Pumping and valve transfer areas; and
4. Storage and processing of oil/water emulsions.

The bulk fuel storage tanks are steel above ground storage tanks with fixed dome roofs. The site contains two tanks with a design capacity of 268,000 barrels, each.

There are several product transfer pipes that connect to both tanks. Except where passing through earthen containment berms, all product transfer piping is located above ground on supports. Secondary containment systems for both tanks consist of an earthen bermed area.

There are two pump transfer areas located at the facility. The Diesel Pump Station controls fuel coming into the facility from the Shell/Navy tie-in. The GPA Fuel Transfer Station delivers fuel going out of the facility to three GPA power generation units: Cabras (to be retired), Piti-MEC and Tanguisson (retired).

Two pipelines connect the GPA Fuel Transfer Station to the power plants. A 6” pipeline connects to the Cabras and Piti-MEC plants and an 8” line connects to the Tanguisson power plant. Internal and external lines are either buried underground or supported aboveground on concrete supports with metal fasteners for thermal expansion.

The 8” fuel oil pipeline extends approximately 17.2 miles from the GPA Fuel Transfer Station to the Tanguisson power plant site. *See Exhibit X (insert overall pipeline routing plan).* The 8” RFO pipeline and the Tanguisson plant have both been de-activated.

1.2 ULSD Scope of Supply

The Project Company will design, permit and construct a pipeline to transport ultra-low sulphur diesel (ULSD) from the Guam Power Authority (GPA) Bulk Fuel Storage Facility located in Piti, Guam to the new power generation plant site identified in Section 5.0 Site Data.

The ULSD pipeline is to be constructed, as much as is reasonably possible, in the existing 8” RFO pipeline easement. The existing 8” pipeline is no longer active and the Project Company is to remove and replace with the new ULSD pipeline. Additional easement will need to be acquired to route the pipeline to the new power generation plant site. New pipeline routing shall follow existing pipeline corridors and access roads where possible.

GPA will assist the Project Company with acquisition of all new easements for the pipeline.

The Fuel Transfer Station is located at the GPA Bulk Fuel Storage Facility Facility. The Fuel Transfer Station is comprised of eight (8) rotary screw pumps, three (3) of which are dedicated to the 8" RFO pipeline system. The Project Company shall review the pump equipment data and station design to validate that the existing pumps have the capability to meet the design conditions of the pipeline. If the existing pumps are not viable, then the Project Company shall be responsible for the design, permitting and construction of new transfer pumps, booster pumps and other associated equipment.

If natural gas is selected as a fuel source, the Project Company will design, permit and construct a pipeline to transport natural gas from the Guam Power Authority (GPA) Bulk Fuel Storage Facility located in Piti, Guam to the new power generation plant site. The plant site has not yet been determined, but the selected site will be located near the Harmon Substation and the Tanguisson power plant site.

The natural gas pipeline is to be constructed, as much as is reasonably possible, in the existing 8" RFO pipeline easement. As with the ULSD pipeline, the existing easement shall be utilized to the extent physically possible. Additional easement will need to be acquired to route the pipeline to the new power generation plant site. New pipeline routing shall follow existing pipeline corridors and access roads where possible. GPA will assist the Project Company with acquisition of all new easements for the pipeline. Project Company will have ultimate responsibility and assumes associated risks.

A new marine LNG receipt and storage facility will be constructed by Others at the GPA Bulk Fuel Storage Facility Facility. Project Company shall assume sufficient storage and supply will be available to support natural gas demand at the Facility. Project Company is responsible for natural gas system beginning at a flange between LNG storage and Project Company's regasification facility.

1.2.1 Engineering

The Project Company will be responsible for the complete engineering and design services for the procurement, construction, and commissioning of the new fuel pipeline and any associated transfer equipment, including modifications to/upgrades of existing GPA Bulk Fuel Storage Facility downstream systems as required for ULSD throughput. The Project Company shall provide engineering, design, drawings, specifications, databases, construction specifications, and equipment information that describes all components of the new generation facility.

1.2.2 Procurement of Equipment

The Project Company will be responsible for all aspects of the procurement of material, equipment, labor, and services for the new pipeline and any new pump equipment, tank modifications, and related existing system repairs or upgrades. Procurement service will include, but not be limited to, purchasing, subcontracting, expediting, inspections and factory testing as applicable, shipping and field services. The Project Company shall maintain a high standard of ethics to ensure the Project reflects positively on GPA, the Project Company, contractors and suppliers.

1.2.3 Construction

The Project Company will be responsible for complete construction of the new ULSD pipeline, including any ULSD supply infrastructure needed to transport

ULSD from the GPA Bulk Fuel Storage Facility to the green-field power generating plant. The Project Company shall develop a construction plan detailing construction procedures, site safety, site security, subcontractor administration, and start-up and commissioning procedures. The construction plan shall address any interfaces necessary at the GPA Bulk Fuel Storage Facility and new power plant site boundary. GPA shall have an opportunity to review and comment on the construction plan no later than six (6) months prior to commencement of construction.

1.2.4 Right-of-Ways

Obtainment of any additional right-of-ways necessary for the pipeline(s) will be the responsibility of the Project Company. However, GPA will assist the Project Company.

1.2.5 ULSD

GPA will procure and supply ULSD to the bulk storage tanks at the GPA Bulk Fuel Storage Facility. GPA will be responsible for the conversion of the two bulk storage tanks from RFO to ULSD.

ULSD shall be defined as meeting the specifications of ASTM D975 Grade No 2 with a maximum sulfur content of 15 ppm.

If Project Company determines that drag reducing, lubricity, or other additives are desirable for the operation of the pipeline and terminal, and do not present negative consequences in the operation of the plant, they shall provide at their own cost.

1.2.6 Natural Gas

If natural gas is selected as a fuel source, GPA will procure and supply LNG to the regasification station at the GPA Bulk Fuel Storage Facility.

Natural Gas shall be defined as merchantable dry gas (as defined by AGA) with minimum BTU value of 950 BTU/scf at 14.7 psi dry, and no more than trace amounts of inert gases and foreign matter. Project Company shall specify if minimum or maximum BTU values are required

Regasification system layout and design shall consider RMP requirements, including but not limited to vapor dispersion modelling and related vapor controls, as well as heat flux and impact zones.

1.2.7 Environmental Permitting

The Project Company will be responsible for procurement of all environmental permits required for construction and operation of the new terminal facilities and pipeline systems, including the Air Permit RMP, Vapor Dispersion modelling, and Heat Flux for the facilities to be constructed by Project Company. The Project shall meet all applicable local, state, and federal environmental regulations and permit conditions.

2.0 DESIGN PHILOSOPHY AND PRINCIPLES

2.1 Design Requirements, Pipeline and Terminal

2.1.1 Engineering

A. General

The design life shall be thirty years with normal required inspection and maintenance. The systems shall be designed for construction and operational safety, as well as ease of maintenance and accessibility.

All design documents must be stamped by a licensed Professional Engineer registered in the Territory of Guam, in the appropriate discipline, in accordance with the Territory of Guam Rules and Regulations.

B. Applicable Codes and Standards

The pipeline and terminal facilities shall be designed and constructed in accordance with all Federal, State, and local codes and standards including the most applicable sections of the codes, standards and regulations of the following organizations. This list of organizations is not complete, and does not relieve the Project Company from complying with any other requirements and regulations applicable to this Project. The effective dates of the Codes and Standards of these organizations shall be the most recent revision prior to the Contract date. Project Company's may offer equivalent European, Japanese and Korean standards. The Project Company must demonstrate equivalency. Only one set of standards shall be applied throughout the Facility.

ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcing Steel Institute
EIA	Electronic Industry Association
EPA	Environmental Protection Agency
ICC	International Code Council
IEEE	Institute of Electrical and Electronics Engineers
ISA	International Society for Automation
MSS	Manufacturers Standardization Society of Valves and Fittings Industry
NACE	National Association of Corrosion Engineers
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association

OSHA Occupational Safety and Health Administration

SSPC Steel Structures Painting Council

UL Underwriters Laboratory

C. Drawings

A complete set of Issue for Construction (IFC) design drawings shall be submitted to GPA at the Commercial Operation Date, in CAD and PDF format. All drawings shall be in English units, or a combination of Metric / English units if the drawing initially only has Metric Units. All CAD drawings shall be maintained in electronic format, and the updated and maintained As-Built versions of the CAD drawings will be provided to GPA at the conclusion of the contract.

D. Documentation and Manuals

Prior to and during construction operations, the Project Company shall submit construction documentation for GPA review/approval. As a minimum, the Project Company shall submit the following documentation:

- Permit applications and/or approvals
- Calculations for temporary works, buoyancy, etc.
- Construction drawings
- Method Statements for the following activities:
    - Pre-Construction Survey
    - Clearing and Grading of ROW
    - Pipe Handling, Storage, Hauling and Stringing
    - Cold Bending
    - Lining Up and Welding
    - Field Joint Coating
    - NDT
    - Trench Excavation and padding
    - Pipeline Lowering-in
    - Backfilling and Berming
    - Tie-ins and Hot Taps
    - Special Crossings
    - Auger Bore
    - Thrust Bore
    - Pipework Fabrication and Installation of Appurtenances
    - Cathodic Protection Facilities
- Procedures for the following operations:
    - Cleaning and Gauging
    - Hydrostatic Testing

- Cleaning/Swabbing
- Drying
- Commissioning
- Baseline Intelligent Pigging Survey

• Radiography weld maps

• Pipe and welding book

• NDT reports (radiography, ultrasonic and MPI)

• Material test results (coating, welding, painting, etc.)

• Material certificates, material receipts, etc.

• Vendor drawings

• Water sample analysis results

Operations and maintenance manuals shall be submitted for all equipment and presented in clear and thorough manner, complete with respect to dimensions, design criteria, materials of construction, and like information to enable reviewer to review information as required. Details shall be identified by reference to sheet and detail shown on Drawings.

Operations and maintenance manuals shall be submitted to GPA in PDF format at the Commercial Operation date. Operation and maintenance manuals for new equipment purchased after the Commercial Operation date shall also be provided to GPA at the time of purchase.

E. Specifications

The Project Company shall be responsible for development of all procurement, construction, installation, start-up, and commissioning specifications required for the construction of the pipeline and pump equipment. The Project Company shall provide a PDF copy of all the conformed specifications to GPA at the Commercial Operation Date.

F. Tagging System

The pipeline shall utilize a tagging system to be determined by the Project Company. The tagging system shall include all equipment, enclosures, cables, pipes, instruments, control devices, valves, and other equipment.

G. As-Built Drawings

As-Built Drawings shall be provided to GPA at the date of Commercial Operation.

2.2 Performance Requirements

2.2.1 Capacity

For ULSD systems the pipeline shall be designed to meet the demand requirements of the Plant Net Capacity matched with associated storage at the plant and marine facilities.

For natural gas systems, the pipeline and related equipment shall be designed to meet the peak demand requirements.

2.2.2 Leak Detection and Integrity Management

For ULSD systems, Leak Detection systems and integrity management shall be utilized for the pipeline via line volume balancing, which shall be implemented in accordance with API RP 1130, and shall meet the requirements of 49 CFR 195.

For natural gas systems, integrity management systems shall be implemented for the pipeline via requirements of 49 CFR 192.

3.0 PIPELINE & TERMINAL DESIGN

3.1 Codes and Standards

Pipeline and terminal systems shall be design, constructed, tested, and operated in accordance with the following at a minimum, including those regulations, standards, and recommended practices included by reference in each:

49 CFR 192 *For PHMSA jurisdictional portions of the gas system*

49 CFR 195 *For PHMSA jurisdictional portions of the system*

40 CFR 112

ASME B&PV Section VIII

ASME B31.3 *For non-PHMSA jurisdictional portions of the system (terminals)*

ASME B31.8 *For PHMSA jurisdictional portions of the gas system*

ASME B31.4 *For PHMSA jurisdictional portions of the system*

ASME/API STD 1104

API STD 2610

API Manual of Petroleum Measurement Standards (MPMS) Chapter 5 “Metering”

API 650

API 5L

API 6D

API RP 500

API RP 651

API RP 1102

API RP 1110

API RP 1162

API RP 2350

NFPA 1

NFPA 30

NFPA 58

NFPA 59

NFPA 70 (NEC)

NFPA 70E

OSHA 1910

ANSI B16.5

ANSI B16.34

International Building Code (IBC) as adopted and modified by the Guam Code Annotated

International Fire Code (IFC) as adopted and modified by the Guam Code Annotated

Project Companies may offer equivalent European, Japanese and Korean standards. The Project Company must demonstrate equivalency. Only one set of standards shall be applied throughout the Facility.

3.2 ULSD Hydraulics and Pipeline Design

Pipeline shall be designed in accordance with design pressures and material properties per 49 CFR 195 and ASME B31.4, and shall be constructed of AP 5L-PSL2 steel line pipe.

Pipeline throughput shall be designed to operate between 7 – 12 fps based on use of API 5L materials, with an MAOP consistent with the existing tank/pump systems. Project Company shall consider optional pump station upgrades at the GPA Bulk Fuel Storage Facility facility where this cost may be capitalized for improved plant economics.

Pipeline wall thickness shall be calculated in accordance with ASME B31.4 as a minimum thickness, and stresses shall not exceed 100% of SMYS at any point along the pipeline, including during hydrostatic testing. Pipeline wall thicknesses will be required to be calculated for external pressures and stresses where the pipeline is installed via HDD or under transportation features (roads, rail).

Appropriate features shall be included in the design of the pipeline system to limit potential surge to those within the allowable stress calculations of the system, at no point exceeding 110% of MOP. Hydrostatic testing of all B31.4 systems shall be performed in accordance with 49 CFR 195 and B31.4, including a minimum of 1.25 times the maximum operating pressure (MOP) at the high point elevation for each test section. Note that multiple test sections may be in the best interest of the Project Company based on pipe line fill, water availability and allowable discharge points.

Non-PHMSA portions of the systems shall be hydrostatically tested per ASME B31.3. Pneumatically testing shall not be allowed without written consent of the GPA.

3.3 Natural Gas Pipeline Design

Pipeline shall be designed in accordance with design pressures and material properties per 49 CFR 192 and ASME B31.8, and shall be constructed of AP 5L-PSL2 steel line pipe.

Pipeline throughput shall be designed to operate between 15 – 60 fps based on use of API 5L materials, with an MAOP consistent with a Class Location study of the pipeline route.

Pipeline wall thickness shall be calculated in accordance with ASME B31.8 as a minimum thickness, and stresses shall not exceed SMYS as required by a Class Location study along the pipeline, including during testing. Pipeline wall thicknesses will be required to be calculated for external pressures and stresses where the pipeline is installed via HDD or under transportation features (roads, rail).

Appropriate features shall be included in the design of the pipeline system to limit potential surge to those within the allowable stress calculations of the system. Testing of all B31.8 systems shall be performed in accordance with 49 CFR 192 and B31.8. Note that multiple test sections may be in the best interest of the Project Company based on pipe line fill, test medium and allowable discharge points.

Non-PHMSA portions of the systems shall be hydrostatically tested per ASME B31.3. Pneumatically testing shall not be allowed without written consent of the GPA.

Pipeline shall be adequately protected against corrosion even if not in use.

3.4 Pipeline Routing and Construction Considerations

New pipeline routing shall follow existing pipeline corridors and access roads where possible. Existing roads shall not be used for construction and maintenance of new pipelines. Due consideration shall also be taken for ease of construction, expansion, commissioning, maintenance, and operation of the facilities.

The route alignment sheets shall contain detailed information with respect to:

route layout, ground profile, topography, soil condition/characteristics, class location (for natural gas), location of existing above ground and buried pipelines, location of existing power cables, overhead lines and other services, and soil resistivity measurement for Cathodic Protection Design.

The route alignment sheets shall also include all construction related details of the pipeline comprising of: line pipe material, grade and wall thickness, design factors, surface/terrain details, road crossings, coating type, burial depth, special items (valves, fittings, hot bends, insulation joints, etc.), type of construction, crossing location, type and reference drawing, hydrostatic test sections, cathodic protection and markers, etc.

Pipeline shall be constructed to allow in-line inspection tool runs, with a minimum bend radius of 3R and utilizing barred tees between pig traps. This shall apply at a minimum for all piping located outside of the fence lines of the GPA Bulk Fuel Storage Facility terminal and the plant facility.

Visual inspections shall be done on all welds. All welding of PHMSA-jurisdictional pipeline shall be per AP 1104, and shall be ultrasonically or radiographically inspected for 100% of their circumference. Any welds that do not meet specifications will be repaired immediately. All welding of non-PHMSA-jurisdictional piping shall be per API 1104 or ASME B31.3, and no less than 10% of pipe welds for aboveground piping shall be radiographically inspected.

Before the pipe will be lowered into the ditch, coatings will be visually inspected and checked with a holiday detector to ensure there is no damage to the coated pipe.

3.5 ULSD Plant Terminal Design and Construction Considerations

The terminal receiving ULSD from the pipeline shall be design ad constructed at a minimum in accordance with API STD 2610.

Civil features shall provide features to ensure the requirements of SPCC and CWA are met at a minimum. The site shall include spill containment in accordance for 40 CFR 112 and NFPA 30, and at a minimum shall provide 100% containment plus a 25-year/24-hour storm event for the single largest vessel. Site shall be designed to ensure post-development storm water flows do not exceed pre-development. If the site is located within a floodplain, measures shall be taken in accordance with FEMA guidelines.

The facility shall include fire detection and suppression systems. Fire detection shall be provided at areas of rotating equipment or where personnel may be present during operations. Fire suppression shall be provided per NFPA 30 at a minimum. Hydrants with suitable flowrate shall be strategically located throughout the facility as negotiated with the local first responders.

Tanks shall be provided with overfill protection compliant with API RP 2350 allowing for unmanned facility operation. Tanks shall also be provided with cathodic protection, a leak prevention barrier (with tell tales), and appropriate gaging, grounding, water draw-off, and access to allow operations and maintenance.

Piping shall be aboveground as a standard. Buried piping systems within the tank terminal shall be avoided. Piping systems and related equipment shall be adequately supported against movement or damage due to weather or seismic activities.

The facility shall include the ability to receive ULSD by tank truck in emergency situations. These facilities shall continue to meet the minimum regulatory requirements.

Terminal shall include space, access, and utilities to all allow a 3rd party testing agency to perform fuel quality testing and record-keeping.

Underground storage shall be avoided wherever possible.

3.6 Pipeline Separation

Pipeline(s) shall be separated from existing parallel pipelines within the right-of-way , and from each other by no less than 5 feet outside-to-outside to allow for location and for future access/construction.

Pipelines and utilities crossing perpendicular to the pipeline(s) shall be separated by no less than 2 feet outside-to-outside.

3.7 Pipeline Depth of Cover

In standard open trenching, pipeline cover shall be no less than 36” at a minimum. Where pipeline is crossing a roadway, the cover shall be increased to no less than 48” at a minimum. Water bodies greater than 100ft wide shall have a cover no less than 15 ft, while dry creeks, ditches, and gullies shall have cover no less than 48”.

Pipeline markers shall be placed along route in a line of sight fashion (one marker is always visible from another).

3.8 Pipeline Coating, Corrosion Protection and Monitoring

Pipeline coatings for buried pipelines shall be appropriate for the installation type. At a minimum, open trench installation will be factory coated with 3M Company, Scotchkote fusion bonded epoxy or equivalent, with field joints and coating repairs using the same manufacturer’s recommended repair and joint kits. Pipeline which will be installed using trenchless methods (slick bore or HDD) shall be factory coated with epoxy based polymer concrete coating or equivalent. All pipeline coatings shall be inspected upon receipt of the piping and as the pipeline is installed. The pipe shall be 100% holiday tested in accordance with the referenced specification.

Aboveground piping will be painted in accordance with industry practice, and shall be no less than 16mil TFT 2-part epoxy.

The pipeline exterior will be protected with impressed current cathodic protection systems located along the route of the pipeline. The design shall be based upon maintaining electrical isolation of the pipeline from power neutral using isolation kits with surge protection at pump stations and block valve locations (if applicable). Cathodic protection design shall account for existing CP systems in the same right-of-way and at crossings, and shall include test stations.

3.9 Electrical Power &Telecommunications

All electrical systems shall be design and installed in accordance with NFPA 70 (NEC), NFPA 70E (Arc Flash), and API RP 500 for hazardous area classifications. Grounding shall be accomplished using standard practice per NEC. The grounding shall serve as both power grounding and static grounding. Transient voltage surge suppression (TVSS) shall be provided to protect electrical equipment from damage due to lightning strikes or other voltage surges. Lightning protection on tankage is not anticipated.

Project Company shall develop and install a Supervisory Control and Data Acquisition (SCADA) system to provide remote monitoring and control of the PHSMA-jurisdictional portions of the ULSD system, as well as inventory control and automation of the terminal facilities. A local virtualized historian shall be utilized to keep instrumentation and other important operational data for technician and engineering troubleshooting and regulatory compliance.

It shall meet the recommendations developed in the National Transportation Safety Board Study NTSB/SS-05/02 “SCADA in Liquid Pipelines” including following API RP 1165. The SCADA system shall manage the leak detection system per the applicable provisions of API RP 1130 Computational Pipeline Monitoring for Liquid Pipelines, including data validation and auditable data recordkeeping. In general, the scan rate shall be fast enough to minimize overpressure conditions, provide responsiveness to abnormal operations, and detect small leaks within the technology limitations of volumetric line balancing.

3.10 Reporting and Records Retention

Project Company shall provide a program of reporting, records retention, and certifications for review by GPA and its technical representatives. At a minimum it shall abide by the requirements of 49 CFR 195, or 49 CFR 192 (as applicable, EPA, and NACE as well as provide an auditable document management system.

Appendix C: ULSD Pipeline Drawings

(four drawings are embedded as an object – click on file and it will open).

GUAM PIPELINE SET
(06.21.2017) Rev 08.(

Appendix D: ASHRAE Guam Climate Information

2013 ASHRAE Handbook - Fundamentals (IP)

NWSO AGANA, Guam

WMO#: 912120

Lat: 13.47N Long: 144.78E Elev: 246 StdP: 14.57 Time Zone: 10 (PCW) Period: 86-10 WBAN: 41415

Annual Heating and Humidification Design Conditions

Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB	
			99.6%			99%			0.4%		1%			
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
(1) 2	73.8	74.8	63.7	89.0	79.3	65.1	93.6	79.7	25.1	83.2	23.2	82.8	7.7	60 (1)

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WS/MCDB						MCWS/PCWD to 0.4% DB	
		0.4%		1%		2%		0.4%		1%		2%			
		DB	MCWB	DB	MCWB	DB	MCWB	WS	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(2) 6	9.6	89.6	78.3	88.9	78.1	88.2	78.0	81.0	86.1	80.5	85.7	80.0	85.3	12.3	90 (2)

Dehumidification DP/MCDB and HR								Enthalpy/MCDB						Hours 8 to 4 & 55/80
0.4%			1%			2%		0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(3) 79.4	153.9	83.7	78.9	151.6	83.4	78.4	148.7	83.1	45.0	86.4	44.4	86.1	43.8	85.3	0 (3)

Extreme Annual Design Conditions

Extreme Annual WS			Extreme Max	Extreme Annual DB				n-Year Return Period Values of Extreme DB							
				Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years	
1%	2.5%	5%	WB	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(4) 22.7	20.5	18.7	90.1	70.7	92.3	1.7	2.9	69.5	94.4	68.5	96.1	67.5	97.7	66.3	99.7 (4)

Monthly Climatic Design Conditions

			Annual (d)	Jan (e)	Feb (f)	Mar (g)	Apr (h)	May (i)	Jun (j)	Jul (k)	Aug (l)	Sep (m)	Oct (n)	Nov (o)	Dec (p)	
(5)	Temperatures, Degree-Days and Degree-Hours	Tavg	81.8	80.5	80.4	81.1	82.3	83.0	83.1	82.3	81.8	81.7	82.1	82.3	81.5	(5)
(6)		Std		1.46	1.37	1.37	1.25	1.24	1.60	1.68	1.87	1.78	1.69	1.50	1.47	(6)
(7)		HDD50	0	0	0	0	0	0	0	0	0	0	0	0	0	(7)
(8)		HDD65	0	0	0	0	0	0	0	0	0	0	0	0	0	(8)
(9)		CDD50	11623	945	850	964	968	1023	993	1001	986	952	996	968	977	(9)
(10)		CDD65	6148	480	430	499	518	558	543	536	521	502	531	518	512	(10)
(11)		CDH74	63790	4351	3754	4760	5477	6286	6270	5841	5493	5184	5623	5553	5158	(11)
(12)		CDH80	18205	941	846	1220	1636	2078	2167	1800	1580	1453	1635	1585	1264	(12)
(13)	Precipitation	PrecAvg	75.9	3.0	2.0	2.6	2.0	4.1	4.8	9.3	10.0	13.6	11.9	8.4	4.2	(13)
(14)		PrecMax	273.1	27.6	34.6	25.3	18.0	22.5	31.7	26.9	58.8	31.1	45.1	32.6	26.8	(14)
(15)		PrecMin	58.1	0.2	0.3	0.8	0.0	1.0	1.3	5.2	3.9	8.7	6.5	4.8	1.9	(15)
(16)		PrecSD	69.3	6.6	7.9	7.4	5.0	6.3	8.1	6.2	15.9	6.0	10.6	9.6	7.1	(16)
(17)	Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	87.9	87.8	88.2	89.4	89.9	90.4	89.8	89.9	89.7	89.6	89.3	88.1	(17)
(18)			MCWB	76.3	75.8	75.7	76.5	77.6	78.0	78.2	79.4	79.5	79.4	78.7	77.7	(18)
(19)		2%	DB	86.4	86.4	87.3	88.2	89.0	89.3	88.6	88.6	88.2	88.4	88.1	87.2	(19)
(20)			MCWB	75.8	75.4	75.5	76.4	77.5	78.1	78.2	79.0	79.2	79.1	78.4	77.4	(20)
(21)		5%	DB	85.6	85.7	86.4	87.6	88.0	88.2	87.8	87.6	87.5	87.7	87.4	86.2	(21)
(22)			MCWB	75.6	75.2	75.2	76.4	77.4	78.0	78.4	78.9	79.0	78.9	78.3	77.2	(22)
(23)		10%	DB	84.6	84.6	85.6	86.6	87.3	87.6	86.8	86.4	86.3	86.6	86.4	85.4	(23)
(24)			MCWB	75.3	74.9	75.1	76.2	77.3	78.0	78.4	78.7	78.9	78.8	78.2	77.0	(24)
(25)	Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	79.5	79.2	79.6	80.0	80.8	81.0	81.0	81.8	81.6	81.8	81.2	80.4	(25)
(26)			MCDB	83.7	84.2	84.1	85.3	85.8	86.3	86.2	87.5	86.9	86.6	85.6	84.5	(26)
(27)		2%	WB	78.1	78.1	78.2	79.0	79.8	80.0	80.1	80.6	80.6	80.7	80.3	79.2	(27)
(28)			MCDB	82.9	83.0	83.3	84.7	85.3	86.0	85.6	86.1	85.9	85.9	85.0	83.9	(28)
(29)		5%	WB	77.3	77.3	77.2	78.2	79.1	79.3	79.6	79.8	79.9	79.9	79.6	78.6	(29)
(30)			MCDB	82.3	82.2	82.9	84.1	84.9	85.5	85.1	85.2	85.1	85.2	84.5	83.5	(30)
(31)		10%	WB	76.6	76.4	76.4	77.6	78.5	78.9	79.0	79.1	79.2	79.2	79.0	78.0	(31)
(32)			MCDB	81.7	81.6	82.4	83.5	84.4	85.2	84.7	84.4	84.4	84.5	84.1	82.9	(32)
(33)	Mean Daily Temperature Range		MDBR	9.3	9.7	10.1	10.1	9.7	9.6	9.6	9.7	9.8	9.7	9.1	8.9	(33)
(34)		5% DB	MCDBR	10.3	10.7	10.8	10.8	10.4	10.4	10.5	11.0	10.9	10.8	9.9	9.6	(34)
(35)			MCWBR	4.7	4.9	4.5	4.2	4.0	4.3	5.0	5.3	5.2	5.0	4.6	4.5	(35)
(36)		5% WB	MCDBR	8.9	9.5	9.7	9.8	9.6	9.7	9.9	10.2	10.1	10.0	9.1	8.6	(36)
(37)			MCWBR	4.8	5.1	4.7	4.4	4.4	4.6	5.2	5.4	5.4	5.3	5.0	4.7	(37)
(38)	Clear Sky Solar Irradiance	taub		0.436	0.424	0.410	0.402	0.384	0.371	0.361	0.370	0.383	0.410	0.428	0.426	(38)
(39)		taud		2.590	2.573	2.556	2.541	2.554	2.576	2.627	2.640	2.664	2.645	2.642	2.645	(39)
(40)		Ebn,noon		275	283	288	287	288	289	292	293	291	283	275	275	(40)
(41)		Edh,noon		31	32	33	34	33	32	30	30	30	30	29	29	(41)

Nomenclature: See separate page

Appendix E: Raw Water Analysis

Primary source is sample 119. Sample 43 and 62 to 65 are backups to sample 119
consider averaging samples 43, 62-65 and 119


GWA Well Water Analysis.pdf

GUAM WATERWORKS AUTHORITY

P.O. BX. 3010 AGANA GU. 96910

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

1ST QUARTER 2018

SAMPLE NO.	57	58	59	60	61	62	63	64	65	66	67	68	69	70
DATE	N/S	01/24/18	01/24/18	N/S	01/24/18	01/24/18	01/24/18	N/S	N/S	01/24/18	03/29/18	01/24/18	N/S	01/24/18
LOCATION	D-10	D-11	D-12	D-13	D-14	D-15	D-16	D-17	D-18	D-19	D-20	D-21	D-22	D-24
TEMPERATURE (0C)	N/S	27.0	27.0	N/S	27.5	28.0	28.0	N/S	N/S	27.0	27.5	27.5	N/S	27.0
pH	N/S	7.36	7.56	N/S	7.27	7.19	7.22	N/S	N/S	7.41	7.04	7.43	N/S	7.59
TURBIDITY (NTU)	N/S	0.09	0.08	N/S	0.08	0.14	0.07	N/S	N/S	0.10	0.12	0.10	N/S	0.09
CONDUCTIVITY (µmho)	N/S	700	421	N/S	622	677	688	N/S	N/S	613	644.0	618	N/S	591
CALCIUM HARDNESS (mg/L $CaCO_3$)	N/S	228.0	182.0	N/S	214.0	224.0	220.0	N/S	N/S	198.0	202.0	208.0	N/S	220.0
TOTAL HARDNESS (mg/L CaCO3)	N/S	256.0	192.0	N/S	226.0	238.0	244.0	N/S	N/S	212.0	232.0	230.0	N/S	246.0
CHLORIDES (Mg/l Cl^-)	N/S	81.0	64.5	N/S	83.0	90.0	215.4	N/S	N/S	94.0	73.5	86.5	N/S	66.0
TOTAL COLIFORM (cfu/100mL)	N/S	POS	NEG	N/S	NEG	NEG	NEG	N/S	N/S	NEG	NEG	NEG	N/S	NEG
FECAL COLIFORM (cfu/100mL)	N/S	NEG	NEG	N/S	NEG	NEG	NEG	N/S	N/S	NEG	NEG	NEG	N/S	NEG
TOTAL ALKALINITY (mg/L CaCO3)	N/S	222	176	N/S	203	219	213	N/S	N/S	186	183.0	201	N/S	202

REMARKS:

Note

Sample 62-65 backup to sample 119
consider averaging sample 43, 62-65 and 119

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER. 22ND ED.

N/S = NO SAMPLE COLLECTED

POS = POSITIVE

NEG= NEGATIVE

CERTIFIED BY: _____

GUAM WATERWORKS AUTHORITY

P.O. BX. 3010 AGANA GU. 96910

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

1ST QUARTER 2018

SAMPLE NO.	43	44	45	46	47	48	49	50	51	52	53	54	55	56
DATE	01/18/18	01/18/18	01/18/18	01/18/18	01/18/18	01/24/18	01/24/18	N/S	01/24/18	N/S	01/24/18	01/24/18	01/24/18	01/24/18
LOCATION	M-18	M-20 A	M-21	M-23	EX-11	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9
TEMPERATURE (0C)	27.5	27.5	27.0	27.0	28.0	27.0	27.0	N/S	27.0	N/S	28.0	27.0	27.0	27.0
pH	7.24	7.20	7.21	7.31	7.47	7.11	7.13	N/S	7.18	N/S	7.13	7.17	7.23	7.00
TURBIDITY (NTU)	0.08	0.10	0.09	0.06	0.09	0.09	0.08	N/S	0.08	N/S	0.13	0.11	0.10	0.12
CONDUCTIVITY (µmho)	559	632	749	486	581	670	674	N/S	595	N/S	638	614	1089	1088
CALCIUM HARDNESS (mg/L $CaCO_3$)	208.0	218.0	222.0	188.0	164.0	200.0	204.0	N/S	206.0	N/S	226.0	218.0	204.0	208.0
TOTAL HARDNESS (mg/L CaCO3)	228.0	250.0	274.0	208.0	248.0	230.0	244.0	N/S	250.0	N/S	252.0	236.0	264.0	274.0
CHLORIDES (Mg/l Cl⁻)	58.5	64.0	93.0	65.0	66.5	81.0	85.0	N/S	67.5	N/S	86.5	73.0	219.9	200.9
TOTAL COLIFORM (cfu/100mL)	NEG	NEG	NEG	NEG	NEG	NEG	POS	N/S	NEG	N/S	POS	NEG	NEG	NEG
FECAL COLIFORM (cfu/100mL)	NEG	NEG	NEG	NEG	NEG	NEG	NEG	N/S	NEG	N/S	NEG	NEG	NEG	NEG
TOTAL ALKALINITY (mg/L CaCO3)	203	220	234	189	204	222	225	N/S	222	N/S	230	215	185	232

REMARKS:

Note

Sample 43 backup to sample 119
consider averaging sample 43, 62-65 and 119

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER. 22ND ED.

N/S = NO SAMPLE COLLECTED

POS = POSITIVE

NEG= NEGATIVE

CERTIFIED BY:_____

GUAM WATERWORKS AUTHORITY

P.O. BX. 3010 AGANA GU. 96910

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

1ST QUARTER 2017

SAMPLE NO.	113	114	115	116	117	118	119	120	121	122	123	124	125	126
DATE	02/01/18	02/01/18	02/01/18	02/01/18	02/01/18	02/01/18	01/18/18	N/S	N/S	N/S	03/01/18	03/01/18	03/01/18	1/11/2018
LOCATION	F-18	F-19	F-20	AG-1	AG-2A	HGC-2	H-1	MJ-1	MJ-5	ASAN	SRSP	FENA	UGUM	NAS-1
TEMPERATURE (^{0}C)	27.0	27.0	27.0	27.0	27.0	27.0	27.0	N/S	N/S	N/S	26.0	27.0	28.0	27.5
pH	7.50	7.50	7.52	7.48	7.47	7.50	7.28	N/S	N/S	N/S	7.35	7.71	7.90	7.00
TURBIDITY (NTU)	0.06	0.11	0.10	0.47	0.06	0.07	0.19	N/S	N/S	N/S	0.07	0.08	0.11	0.06
CONDUCTIVITY (µmho)	209	488	583	263	216	210	938	N/S	N/S	N/S	385	261	155	700.0
CALCIUM HARDNESS (mg/L $CaCO_3$)	210.0	216.0	230.0	212.0	204.0	204.0	220.0	N/S	N/S	N/S	196.0	86.0	32.0	240.0
TOTAL HARDNESS (mg/L CaCO3)	236.0	280.0	292.0	250.0	240.0	220.0	268.0	N/S	N/S	N/S	204.0	104.0	50.0	278.0
CHLORIDES (Mg/l Cl^-)	20.5	183.9	235.9	51.5	40.5	61.0	154.9	N/S	N/S	N/S	13.5	29.5	27.5	81.0
TOTAL COLIFORM (cfu/100mL)	NEG	POS	NEG	NEG	NEG	NEG	NEG	N/S	N/S	N/S	POS	NEG	NEG	NEG
FECAL COLIFORM (cfu/100mL)	NEG	NEG	NEG	NEG	NEG	NEG	NEG	N/S	N/S	N/S	NEG	NEG	NEG	NEG
TOTAL ALKALINITY (mg/L CaCO3)	193	193	195	204	193	196	216	N/S	N/S	N/S	187	96	51	229

REMARKS:

Note

Sample 43 backup to sample 119
consider averaging sample 43, 62-65 and 119
119 is primary source

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER. 22ND ED.

N/S = NO SAMPLE COLLECTED

POS = POSITIVE

NEG= NEGATIVE

CERTIFIED BY:_____

GUAM WATERWORKS AUTHORITY

P.O. BX. 3010 AGANA GU. 96910

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

2ND QUARTER 2018

SAMPLE NO.	113	114	115	116	117	118	119	120	121	122	123	124	125	126
DATE	04/30/18	05/11/17	05/11/17	05/11/17	05/11/17	05/11/17	04/12/18	05/02/18	05/02/18	05/02/18	05/02/18	05/02/18	05/02/18	04/05/18
LOCATION	F-18	F-19	F-20	AG-1	AG-2A	HGC-2	H-1	MJ-1	MJ-5	ASAN	SRSP	FENA	UGUM	NAS-1
TEMPERATURE (0C)	N/S	28.0	27.5	27.0	27.0	27.0	27.0	N/S	N/S	N/S	30.0	30.0	28.5	28.0
pH	N/S	7.32	7.32	7.30	7.38	7.40	7.73	N/S	N/S	N/S	7.34	7.76	7.63	7.52
TURBIDITY (NTU)	N/S	0.10	0.11	0.12	0.08	0.08	0.11	N/S	N/S	N/S	0.13	0.12	0.06	0.06
CONDUCTIVITY (µmho)	N/S	1062	1166	528	428	417	934	N/S	N/S	N/S	380	267	91	720
CALCIUM HARDNESS (mg/L $CaCO_3$)	N/S	208.0	236.0	192.0	196.0	192.0	264.0	N/S	N/S	N/S	184.0	8.0	8.0	264.0
TOTAL HARDNESS (mg/L CaCO3)	N/S	272.0	292.0	216.0	208.0	212.0	280.0	N/S	N/S	N/S	200.0	108.0	26.0	286.0
CHLORIDES (Mg/l Cl^-)	N/S	208.4	238.4	51.5	23.0	20.5	141.4	N/S	N/S	N/S	10.5	24.5	25.0	78.0
TOTAL COLIFORM (cfu/100mL)	N/S	NEG	NEG	NEG	NEG	NEG	POS	N/S	N/S	N/S	POS	NEG	NEG	NEG
FECAL COLIFORM (cfu/100mL)	N/S	NEG	NEG	NEG	NEG	NEG	NEG	N/S	N/S	N/S	NEG	NEG	NEG	NEG
TOTAL ALKALINITY (mg/L CaCO3)	N/S	195	200	207	195	196	211	N/S	N/S	N/S	186	108	22	315

REMARKS:

Note

Sample 43 backup to sample 119
consider averaging sample 43, 62-65 and 119
119 is primary source

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER.

CERTIFIED BY:_____

GUAM WATERWORKS AUTHORITY

P.O. BX. 3010 AGANA GU. 96910

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

2ND QUARTER 2018

SAMPLE NO.	57	58	59	60	61	62	63	64	65	66	67	68	69	70
DATE	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	05/24/18	05/24/18	04/19/18	04/19/18	04/19/18	05/24/18	04/19/18
LOCATION	D-10	D-11	D-12	D-13	D-14	D-15	D-16	D-17	D-18	D-19	D-20	D-21	D-22	D-24
TEMPERATURE (0C)	N/S	28.0	27.0	N/S	27.5	27.0	N/S	28.0	28.0	28.0	28.0	28.0	28.0	27.0
pH	N/S	6.99	7.31	N/S	7.09	7.08	N/S	6.99	7.75	7.59	7.50	7.30	7.59	7.58
TURBIDITY (NTU)	N/S	0.08	0.07	N/S	0.07	0.10	N/S	0.09	0.08	0.08	0.08	0.08	0.09	0.07
CONDUCTIVITY (µmho)	N/S	713	422	N/S	613	659	N/S	470	680	597	650	624	444	581
CALCIUM HARDNESS (mg/L $CaCO_3$)	N/S	230.0	184.0	N/S	214.0	222.0	N/S	226.0	220.0	198.0	202.0	208.0	210.0	220.0
TOTAL HARDNESS (mg/L CaCO3)	N/S	270.0	206.0	N/S	240.0	250.0	N/S	240.0	266.0	220.0	240.0	242.0	220.0	236.0
CHLORIDES (Mg/l Cl^-)	N/S	84.5	22.5	N/S	72.0	71.0	N/S	7.5	79.5	70.0	80.5	71.5	25.0	61.5
TOTAL COLIFORM (cfu/100mL)	N/S	POS	NEG	N/S	NEG	NEG	N/S	NEG	NEG	NEG	NEG	NEG	NEG	NEG
FECAL COLIFORM (cfu/100mL)	N/S	NEG	NEG	N/S	NEG	NEG	N/S	NEG	NEG	NEG	NEG	NEG	NEG	NEG
TOTAL ALKALINITY (mg/L CaCO3)	N/S	223	180	N/S	200	218	N/S	213	212	183	198	200	201	202

REMARKS:

Note

Sample 62-65 backup to sample 119
consider averaging sample 43, 62-65 and 119

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER.

CERTIFIED BY:_____

GUAM WATERWORKS AUTHORITY

QUARTERLY CHEMICAL DEEPWELL ANALYSIS

2ND QUARTER 2018

SAMPLE NO.	43	44	45	46	47	48	49	50	51	52	53	54	55	56
DATE	04/12/18	04/12/18	04/12/18	04/12/18	04/12/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18	04/19/18
LOCATION	M-18	M-20 A	M-21	M-23	EX-11	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9
TEMPERATURE (0C)	27.5	27.5	27.5	27.5	27.5	27.5	27.5	N/S	28.0	N/S	27.0	27.5	27.0	N/S
pH	7.79	7.71	7.74	7.89	7.80	6.98	6.93	N/S	6.97	N/S	6.89	6.92	6.99	N/S
TURBIDITY (NTU)	0.08	0.20	0.10	0.06	0.08	0.06	0.08	N/S	0.08	N/S	0.09	0.10	0.12	N/S
CONDUCTIVITY (µmho)	566	613	724	485	576	665	666	N/S	584	N/S	625	604	1052	N/S
CALCIUM HARDNESS (mg/L $CaCO_3$)	230.0	240.0	252.0	210.0	190.0	196.0	198.0	N/S	204.0	N/S	234.0	212.0	206.0	N/S
TOTAL HARDNESS (mg/L CaCO3)	260.0	268.0	260.0	248.0	250.0	254.0	260.0	N/S	252.0	N/S	256.0	242.0	254.0	N/S
CHLORIDES (Mg/l Cl)	55.5	63.5	94.5	41.0	55.5	83.5	79.0	N/S	51.5	N/S	61.0	64.5	199.9	N/S
TOTAL COLIFORM (cfu/100mL)	NEG	NEG	NEG	NEG	NEG	NEG	POS	N/S	POS	N/S	NEG	NEG	POS	N/S
FECAL COLIFORM (cfu/100mL)	NEG	NEG	NEG	NEG	NEG	NEG	NEG	N/S	NEG	N/S	NEG	NEG	NEG	N/S
TOTAL ALKALINITY (mg/L CaCO3)	199	218	231	187	202	218	221	N/S	222	N/S	229	211	184	N/S

REMARKS:

Note

Sample 43 backup to sample 119
consider averaging sample 43, 62-65 and 119

ANALYZED IN ACCORDANCE WITH STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER.

CERTIFIED BY:_____

Appendix F: ULSD Analysis

Appendix F - Jul 2018 DFO COQ.pdf

DIESEL FUEL Oil No. 2

Property	ASTM Test Method [B]	Alternate Method ASTM	Unit of Measure	Limits
Flash Point	D93		°C	60 Min
Water & Sediment	D2709		% vol	0.05 Max
Distillation Temp, °C 90%, recovered	D86		°C	282 Min 360 Max
Kinematic Viscosity	D-445		mm^2 at 40°C	1.9 Min 4.1 Max
Total Aromatic Hydrocarbons	IP 391		% mass	15 Min 35 Max
Polycyclic Aromatic Hydrocarbons	IP 391		% mass	11 Max
Ash	D482		% mass	0.01 Max
Sulfur	D5453	D-7039	ppm (µg/g)	14 Max
Sulfur Mercaptan	D3227		ppm (µg/g)	3 Max
Copper Strip Corrosion Rating (3hrs min at 50°C)	D130			No.1 Max
Cetane Index	D 613	D976-80 D 4737		46 Min
Aromaticity	D1319		% vol	15 Min 35 Max
Micro Carbon Residue on 10% distillation residue	D524	D4530 D6371	% mass	0.20 Max
Lubricity, HFRR @ 60°C	D6079		Micron	400 Max
Conductivity	D2624	D4308	pS/m	100 Min

				600 Max
Density @ 15°C	D1298	D4052	Kg/m³	820 Min 850 Max
Gravity, API @ 60°F	D1295	D4052		35 Min 41 Max
Color	D1500		ASTM	2.0 Max
Hydrogen Sulfide in Liquid	IP 570A		Mg/kg	2.0 Max
Strong Acid No.	D974		mg KOH/g	NIL
Total Acid No.	D974		mg KOH/g	0.20 Max
Stability (Oxidation), 16Hrs	D2274		mg/L	25 Max
Appearance @ ambient temp	Visual			Report
Haze Rating	D4176		Haze Rating	1 Max
Particulate Matter	D6217		mg/L	10 Max
Filter Blocking Tendency (FBT)	D2068	IP 387		1.35 Max
Fatty Acid Methyl Ester (FAME)	D 7371-14	EN 14078	% vol	0.1 Max
Guaranteed Heating Value (HHV)	D240		MMBTU/bbl	5.70 Min
Static Dissipation Additives (Stadis 450)	Declared		Mg/L	Report
Lubricity Additive	Declared		Mg/kg	Report

Appendix G: GPA Grid Stability and Reliability Standards

Guam Power Authority

Grid Stability and Reliability Standards

To: RELIABILITY STANDARDS HOLDERS/READERS

From: Manager of Engineering

Subject: GPA Grid Stability and Reliability Standards, Introduction, Objective, Format, Procedures for Use and Updating

INTRODUCTION

GPA Authority Policy AP-*** has established the Electric Reliability Organization (ERO) to develop, publish, and enforce Reliability Standards for the bulk-power system on Guam. Per the Authority Policy, this group is composed of the GPA General Manager, AGMETS, AGMO, General Managers of Independent Power Producers (IPPs) and Performance Management Contractors (PMCs), and GPA Managers from the following divisions: Engineering, Generation, IT, PSCC, SPORD, and T&D. GPA Engineering Division is the Custodian of the Reliability Standards tasked with updating and issuing the standards as approved by the ERO. Engineering shall monitor standards issued by North American Electric Reliability Corporation (NERC) and reliability groups from Alaska and Hawaii and determine applicability to Guam. Proposed standards shall be presented to the ERO for review and adoption. Once approved, the standards shall be issued by the Engineering Division to relevant holders of the Standards.

The Reliability Standards function similarly to those required by the United States Federal Energy Regulatory Commission under Section 215 of the Federal Power Act. Reliability standards provide for "Reliable Operation" of the bulk-power system. The term includes requirements for the operation of existing bulk- power system facilities, including cyber-security protection, and the design of planned additions or modifications to such facilities to the extent necessary to provide for Reliable Operation of the bulk-power system, but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity. The Reliability Standards shall be grouped into 12 topical categories, each designated by a three-letter code as shown below:

- *Resource and Demand Balancing (BAL)*
- *Critical Infrastructure Protection (CIP)*
- *Communications (COM)*
- *Emergency Preparedness and Operations (EOP)*
- *Facilities Design, Connections, and Maintenance (FAC)*
- *Interconnection Reliability Operation and Coordination (IRO)*
- *Modeling, Data, and Analysis (MOD)*
- *Personnel Performance, Training, and Qualifications (PER)*
- *Protection and Control (PRC)*
- *Transmission Operations (TOP)*
- *Transmission Planning (TPL)*
- *Transmission Planning (TPL)*
- *Voltage and Reactive Control (VAR)*

OBJECTIVE

These Standards are issued to provide for the safe and reliable operation of the power system in terms of power generation, transmission, and interconnecting into the power grid.

FORMAT

The Standards conform to the format as described below.

A. General
   a. Title: a phrase that describes the topic of the Reliability Standard
   b. Number: a unique identification number that starts with GPA, then three letters to identify the group followed by a dash and a three-digit number, followed by a dash and the version number, e.g. GPA-PRC-014-0.
   c. Purpose: one or more sentences that explicitly states the outcome to be achieved by the adoption of the Reliability Standard.
   d. Applicability: each entity that must comply with the Reliability Standard, such as "Generator Owner".

B. Requirements – enumerated by "R1, R2. etc.", a listing of explicitly stated technical, performance and preparedness requirements and who is responsible for achieving them.

C. Measures- enumerated by "M1, M2, etc.", a listing of the factors and the process the Reliability Organization will use to assess performance and outcomes in order to determine non-compliance, and who is responsible for achieving the measures. Measures are evidence that must be presented to show "compliance" with a standard and are not intended to contain the quantitative metrics for determining satisfactory performance.

D. Compliance
   a. Compliance Monitoring Responsibility: explanation of who is responsible for assessing performance outcomes.
   b. Compliance Monitoring Period and Reset Timeframe: the timeframe for each compliance monitoring period before it is reset for the next period.
   c. Data Retention: how long compliance documentation needs to remain on file.
   d. Additional Compliance Information: any information relating to compliance.

<u>UPDATING OF STANDARDS</u>

Each Reliability Standards holder is responsible for ensuring that his/her manual is up-to-date. If in doubt, please contact the Manager of Engineering.

All holders are urged to evaluate the usefulness of the standards and to suggest to the Engineering Division or the ERO any improvements or changes which may result in improved safety and system performance and in promoting compliance.

JOVEN G. ACOSTA, P.E.

Table of Contents

G U A M P O W E R A U T H O R I T Y **AUTHORITY POLICY**	Prepared By: Joven G. Acosta, P.E. _____ Engineering Manager Signature
	Concurred By: John J. Cruz, Jr _____ AGMETS Signature Melinda C. Mafnas _____ AGMO Signature
RELIABILITY STANDARDS	
NO: AP- Supersedes: Dated: Page 1 of ??	Approved by: _____ Dated: _____ John M. Benavente, P.E. General Manager (Interim)

1.0 PURPOSE

The purpose of this policy is to ensure the reliability of the Guam Power Authority Bulk Power System by holding entities accountable for compliance with mandatory reliability standards and acting as a catalyst for positive change within the industry.

2.0 SCOPE

This policy applies to generating plants, PMC's, IPP's, and renewable generating plants.

3.0 DEFINITIONS

3.1 Accredited Capacity - The capacity of a generating unit or group of generating units with a single point of interconnection to the GPA. Determined by the Intertie Management Committee or its designee. Used in determining Reserve Capacity Obligation and Total Operating Reserve requirement.

3.2 Actual Disturbance Recovery Period - The actual duration of time for the period, in minutes from the time of the initiating event to the time the frequency is restored to within acceptable frequency limits of 60.3 to 59.7 Hz for single contingency events and for excess contingency events off of nominal 60 Hz.

3.3 Adequacy - The ability of the electric system to supply the aggregate electrical demand and energy requirements of the end-use customers at all times, taking into accountscheduled and reasonably expected unscheduled outages of system elements.

3.4 Adjacent Balancing Authority - A Balancing Authority Area that is interconnected another Balancing Authority Area either directly or via a multi-party agreement or transmission tariff.

3.5 Adverse Reliability Impact - The impact of an event that results in frequency-related instability; voltage collapse; unplanned tripping of load or generation; or uncontrolled separation or cascading outages that affects a widespread area of the Interconnection.

3.6 After the Fact (ATF) - A time classification assigned to an RFI when the submittal time is greater than one hour after the start time of the RFI.

3.7 Agreement - A contract or arrangement, either written or verbal and sometimes enforceable bylaw.

3.8 Alternative Interpersonal Communication - Any Interpersonal Communication that is able to serve as a substitute for, and does not utilize the same infrastructure (medium) as, Interpersonal Communication used for day-to- day operation.

3.9 Altitude Correction Factor - A multiplier applied to specify distances, which adjusts the distances to account forthe change in relative air density (RAD) due to altitude from the RAD used to determine the specified distance.

Altitude correction factors apply to both minimum worker approach distances and to minimum vegetation clearance distances.

3.10 Ancillary Service - Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Service Provider's transmission system in accordance with good utility practice. (From FERC order 888-A.)

3.11 Anti-Aliasing Filter - An analog filter installed at a metering point to remove the high frequency components of the signal over the AGC sample period.

3.12 Area Control Error (ACE) - The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, if taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction term is abbreviated (ATEC).

3.13 Area Interchange Methodology - The Area Interchange methodology is characterized by determination of incremental transfer capability via simulation, from which Total Transfer Capability (TTC) can be mathematically derived. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from the TTC, and Postbacks and counterflows are added, to derive Available Transfer Capability. Under the Area Interchange Methodology, TTC results are generally reported on an area to area basis.

3.14 Arranged Interchange - The state where the Interchange Authority has received the Interchange information (initial or revised).

3.15 Automatic Generation Control (AGC) - Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction.

3.16 Available Flowgate Capability (AFC) - A measure of the flow capability remaining on a Flowgate for further commercial activity over and above already committed uses. It is defined as TFC less Existing Transmission Commitments (ETC), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, and plus counterflows.

3.17 Available Transfer Capability (ATC) - A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. It is defined as Total Transfer Capability less Existing Transmission Commitments (including retail customer service), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, plus counterflows.

3.18 Available Transfer Capability Implementation Document (ATCID) - A document that describes the implementation of a methodology for calculating ATC or AFC, and provides information related to a Transmission Service Provider's calculation of ATC or AFC.

3.19 ATC Path - Any combination of Point of Receipt and Point of Deliver for which ATC is calculated; and any Posted Path.

3.20 Balancing Authority or Load Balancing Authority (BA or LBA) - The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

3.21 Balancing Authority Area or Load Balancing Area - The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.

3.22 Base Load - The minimum amount of electric power delivered or required over a given period at a constant rate.

3.23 BES Cyber Asset - A Cyber Asset that if rendered unavailable, degraded, or misused would, within 15 minutes of its required operation, misoperation, or non-operation, adversely impact one or more Facilities, systems, or equipment, which, if destroyed, degraded, or otherwise rendered unavailable when needed, would affect the reliable operation of the Bulk Electric System. Redundancy of affected Facilities, systems, and equipment shall not be considered when determining adverse impact. Each BES Cyber Asset is included in one or more BES Cyber Systems. (A Cyber Asset is not a BES Cyber Asset if, for 30 consecutive calendar days or less, it is directly connected to a network within an ESP, a Cyber Asset within an ESP, or to a BES Cyber Asset, and it is used for data transfer, vulnerability assessment, maintenance, or troubleshooting purposes.)

3.24 BES Cyber System - One or more BES Cyber Assets logically grouped by a responsible entity to perform one or more reliability tasks for a functional entity.

3.25 BES Cyber System Information - Information about the BES Cyber System that could be used to gain unauthorized access or pose a security threat to the BES Cyber System. BES Cyber System Information does not include individual pieces of information that by themselves do not pose a threat or could not be used to allow unauthorized access to BES Cyber Systems, such as, but not limited to, device names, individual IP addresses without context, ESP names, or policy statements. Examples of BES Cyber System Information may include, but are not limited to, security procedures or security information about BES Cyber Systems, Physical Access Control Systems, and Electronic Access Control or Monitoring Systems that is not publicly available and could be used to allow unauthorized access or unauthorized distribution; collections of network addresses; and network topology of the BES Cyber System.

3.26 Blackstart Capability Plan - A documented procedure for a generating unit or station to go from a shutdown condition to an operating condition delivering electric power without assistance from the electric system. This procedure is only a portion of an overall system restoration plan.

3.27 Blackstart Resource - A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System or is designed to remain energized without connection to the remainder of the System, with the ability to energize a bus, meeting the TransmissionOperator's restoration plan needs for real and reactive power capability, frequency and voltage control, and that has been included in the Transmission Operator's restoration plan.

3.28 Block Dispatch - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, the capacity of a given generator is segmented into loadable “blocks,” each of which is grouped and ordered relative to other blocks (based on characteristics including, but not limited to, efficiency, run of river or fuel supply considerations, and/or “must-run” status).

3.29 Bulk Electric System (BES) - As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment,

generally operated at voltages of 69 kV or higher. This is refers to the Island Wide Power System (IWPS).

3.30 Bulk-Power System - (A) Facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (B) Electric energy from generation facilities needed to maintain transmission system reliability. The term does not include facilities used in the local distribution of electric energy.

3.31 Burden - Operation of the Bulk Electric System that violates or is expected to violate a System Operating Limit or Interconnection Reliability Operating Limit in the Interconnection, or that violates any other NERC, Regional Reliability Organization, or local operatingreliability standards or criteria.

3.32 Business Practices - Those business rules contained in the Transmission Service Provider's applicable tariff, rules, or procedures; associated Regional Reliability Organization or regional entity business practices; or NAESB Business Practices.

3.33 Bus-tie Breaker - A circuit breaker that is positioned to connect two individual substation bus configurations.

3.34 Capacity Benefit Margin (CBM) - The amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose loads are located on that Transmission Service Provider's system, to enable access by the LSEs to generation from interconnected systems to meet generation reliability requirements. Preservation of CBM for an LSE allows that entity to reduce its installed generating capacity below that which may otherwise have been necessary without interconnections to meet its generation reliability requirements. The transmission transfer capability preserved as CBM is intended to be used by the LSE only in times of emergency generationdeficiencies.

3.35 Capacity Benefit Margin Implementation Document (CBMID) - A document that describes the implementation of a Capacity Benefit Margin methodology.

3.36 Capacity Emergency - A capacity emergency exists when a Balancing Authority Area's operating capacity, plus firm purchases from other systems, to the extent available or limited by transfer capability, is inadequate to meet its demand plus it’s regulating requirements.

3.37 Cascading - The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread electric service interruption that cannot be restrained from sequentially spreading beyond an area predetermined by studies.

3.38 Cascading Outages - The uncontrolled successive loss of Bulk Electric System Facilities triggered by an incident (or condition) at any location resulting in the interruption of electric service that cannot be restrained from spreading beyond a pre-determined area.

3.39 Catastrophic Contingency Event - Any contingency event (greater than the N-1 Contingency Criteria) whose total requirements exceed the Contingency Reserve criteria plus Protection Reserve criteria within the Balancing Authority Area.

3.40 Critical Infrastructure Protection (CIP) Exceptional Circumstance - A situation that involves or threatens to involve one or more of the following, or similar, conditions that impact safety or BES reliability: a risk of injury or death; a natural disaster; civil unrest; an imminent or existing hardware, software, or equipment failure; a Cyber Security Incident requiring emergency assistance; a response by emergency services; the enactment of a mutual assistance agreement; or an impediment of large scale workforce availability.

3.41 CIP Senior Manager - A single senior management official with overall authority and responsibility for leading and managing implementation of and continuing adherence to the requirements within the GPA CIP Standards.

3.42 Clock Hour - The 60-minute period ending at :00. All surveys, measurements, and reports are based on Clock Hour periods unless specifically noted.

3.43 Cogeneration - Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.

3.44 Compliance Monitor - The entity that monitors, reviews, and ensures compliance of responsible entities with reliability standards.

3.45 Compliance Enforcement Authority - Entity with Statutory power to enforce operating and Planning Standards and enforce the findings of the Compliance Monitor.

3.46 Confirmed Interchange - The state where the Interchange Authority has verified the Arranged Interchange.

3.47 Congestion Management Report - A report that the Interchange Distribution Calculator issues when a Reliability Coordinator initiates the Transmission Loading Relief procedure. This report identifies the transactions and native and network load curtailments that must be initiated to achieve the loading relief requested by the initiating Reliability Coordinator.

3.48 Consequential Load Loss - All Load that is no longer served by the Transmission system as a result of Transmission Facilities being removed from service by a Protection System operation designed to isolate the fault.

3.49 Constrained Facility - A transmission facility (line, transformer, breaker, etc.) that is approaching, is at, or is beyond its System Operating Limit or Interconnection Reliability Operating Limit.

3.50 Contingency - The unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.

3.51 Contingency Reserve - The provision of capacity deployed by the Balancing Authority to meet the Disturbance Control Standard (DCS) and other Regional Reliability Organization contingencyrequirements.

3.52 Contingency Reserve Restoration Period - The time in minutes required to re-establish the Contingency Reserves utilized during the Disturbance Recovery Period such that the system can sustain another contingency. The Contingency Reserve Restoration Period is 120.

3.53 Contract Path - An agreed upon electrical path for the continuous flow of electrical power between the parties of an Interchange Transaction.

3.54 Control Center - One or more facilities hosting operating personnel that monitor and control the BulkElectric System (BES) in real- time to perform

the reliability tasks, including their associated data centers, of: 1) a Reliability Coordinator, 2) a Balancing Authority, 3) a Transmission Operator for transmission Facilities at two or more locations, or 4) a Generator Operator for generation Facilities at two or more locations.

3.55 Control Performance Standard (CPS) - The reliability standard that sets the limits of a Balancing Authority's Area Control Error over a specified time period.

3.56 Corrective Action Plan - A list of actions and an associated timetable for implementation to remedy specific problem.

3.57 Cranking Path - A portion of the electric system that can be isolated and then energized to deliver electric power from a generation source to enable the startup of one or more other generating units.

3.58 Critical Assets - Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System.

3.59 Critical Cyber Assets - Cyber Assets essential to the reliable operation of Critical Assets.

3.60 Curtailment - A reduction in the scheduled capacity or energy delivery of an Interchange Transaction.

3.61 Curtailment Threshold - The minimum Transfer Distribution Factor which, if exceeded, will subject an Interchange Transaction to curtailment to relieve a transmission facility constraint.

3.62 Cyber Assets - Programmable electronic devices and communication networks including hardware, software, and data.

3.63 Cyber Security Incident - Any malicious act or suspicious event that:

- Compromises, or was an attempt to compromise, the Electronic Security Perimeter or Physical Security Perimeter of a Critical Cyber Asset or,
- Disrupts, or was an attempt to disrupt, the operation of a Critical Cyber Asset.

3.64 Declared Capability - Declared Generating Unit Capability not less than the load (MW) on the unit at any point in time and not more than the temperature compensated maximum amount of load (MW) the unit is capable of supplying for a two-hour period or immediately supplying through the actions of AGC. In the case of multiple units connected to the Grid through a single point of interconnection (regardless of RAS applications) the sum of the Declared Generating Unit Capabilities subject to outage of the single point of interconnection.

3.65 Delayed Fault Clearing - Fault clearing consistent with correct operation of a breaker failure protection system and its associated breakers, or of a backup protection system with an intentional time delay.

3.66 Demand - 1) The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time, 2) The rate at which energy is being used by the customer.

3.67 Demand-Side Management (DSM) - The term for all activities or programs undertaken by Load- Serving Entity or its customers to influence the amount or timing of electricity they use.

3.68 Dial-up Connectivity - A data communication link that is established when the communication equipment dials a phone number and negotiates a connection with the equipment on the other end of the link.

3.69 Direct Control Load Management (DCLM) - Demand-Side Management that is under the direct control of the system operator. DCLM may control the electric supply to individual appliances or equipment on customer premises. DCLM as defined here does not include Interruptible Demand.

3.70 Dispatch Order - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, each generator is ranked by priority.

3.71 Dispersed Load by Substations - Substation load information configured to represent a system for power flow or system dynamics modeling purposes, or both.

3.72 Distribution Factor (DF) - The portion of an Interchange Transaction, typically expressed in per unit that flows across a transmission facility (Flowgate).

3.73 Distribution Provider (DP) - Provides and operates the “wires” between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distributionfunction at any voltage.

3.74 Disturbance - 1) An unplanned event that produces an abnormal system condition, 2) Any perturbation to the electric system, 3) The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.

3.75 Disturbance Control Standard (DCS) - The reliability standard that sets the time limit following a Disturbance within which a Balancing Authority must return its Area Control Error to within a specified range.

3.76 Disturbance Monitoring Equipment (DME) - Devices capable of monitoring and recording system data pertaining to a Disturbance. Such devices include the following categories of recorders:

- Sequence of event recorders which record equipment response to the event
- Fault recorders, which record actual waveform data replicating the system primary voltages and currents. This may include protective relays
- Dynamic Disturbance Recorders (DDRs), which record incidents that portray power system behavior during dynamic events such as low-frequency (0.1 Hz – 3 Hz) oscillations and abnormal frequency or voltage excursions

3.77 Dynamic Interchange Schedule or Dynamic Schedule - A telemetered reading or value that is updated in real time and used as a schedule in the AGC/ACE equation and the integrated value of which is treated as a schedule for interchange accounting purposes. Commonly used for scheduling jointly owned generation to or from another Balancing Authority Area.

3.78 Dynamic Transfer - The provision of the real-time monitoring, telemetering, computer software, hardware, communications, engineering, energy accounting (including inadvertent interchange), and administration required to electronically move all or a portion of the real energyservices associated with a generator or load out of one Balancing Authority Area into another.

3.79 Economic Dispatch (EDC) - The allocation of demand to individual generating units on line to effect the most economical production of electricity.

3.80 Electronic Access Control or Monitoring Systems - Cyber Assets that perform electronic access control or electronic access monitoring of the Electronic Security Perimeter(s) or BES Cyber Systems. This includes Intermediate Devices.

3.81 Electronic Access Point (EAP) - A Cyber Asset interface on an Electronic Security Perimeter that allows routable communication between Cyber Assets outside an Electronic Security Perimeter andCyber Assets inside an Electronic Security Perimeter.

3.82 Electrical Energy - The generation or use of electric power by a device over a period of time, expressed in kilowatthours (kWh), megawatthours (MWh), or gigawatthours (GWh).

3.83 Electronic Security Perimeter (ESP) - The logical border surrounding a network to which Critical Cyber Assets areconnected and for which access is controlled.

3.84 Element - Any electrical device with terminals that may be connected to other electrical devices such as a generator, transformer, circuit breaker, bus section, ortransmission line. An element may be comprised of one or more components.

3.85 Emergency or BES Emergency - Any abnormal system condition that requires automatic or immediate manual actionto prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the Bulk Electric System.

3.86 Emergency Rating - The rating as defined by the equipment owner that specifies the level of electrical loading or output, usually expressed in

megawatts (MW) or Mvar or other appropriate units, that a system, facility, or element can support, produce, or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved. The rating may reflect thermal capability and sag/terrain conditions, potential stability or out of step conditions related to subsequent events or other limiting conditions.

3.87 Emergency Request for Interchange (Emergency RFI) - Request for Interchange to be initiated for Emergency or Energy Emergency conditions.

3.88 Energy Emergency - A condition when a Load-Serving Entity has exhausted all other options and can no longer provide its customers' expected energy requirements.

3.89 Equipment Rating - The maximum and minimum voltage, current, frequency, real and reactive power flows on individual equipment under steady state, short-circuit and transient conditions, as permitted or assigned by the equipment owner.

3.90 Electric Reliability Organization (ERO) - An organization with Statutory Authority to regulate reliability.

3.91 External Routable Connectivity - The ability to access a BES Cyber System from a Cyber Asset that is outside of its associated Electronic Security Perimeter via a bi-directional routable protocol connection.

3.92 Facility - A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.).

3.93 Facility Rating - The maximum or minimum voltage, current, frequency, or real or reactive power flow through a facility that does not violate the applicable equipment rating of any equipment comprising the facility.

3.94 Fault - An event occurring on an electric system such as a short circuit, a broken wire, or an intermittent connection.

3.95 Fire Risk - The likelihood that a fire will ignite or spread in a particular geographic area.

3.96 Firm Demand - That portion of the Demand that a power supplier is obligated to provide except when system reliability is threatened or during emergency conditions.

3.97 Firm Transmission Service - The highest quality (priority) service offered to customers under a filed rate schedule that anticipates no planned interruption.

3.98 Flashover - An electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space.

3.99 Flowgate - A designated point on the transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions.

3.100 Flowgate Methodology - The Flowgate methodology is characterized by identification of key Facilities as Flowgates. Total Flowgate Capabilities are determined based on Facility Ratings and voltage and stability limits. The impacts of Existing Transmission Commitments (ETCs) are determined by simulation. The impacts of ETC, Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) are subtracted from the Total Flowgate Capability, and Postbacks and counterflows are added, to determine the Available Flowgate Capability (AFC) value for that Flowgate. AFCs can be used to determine Available Transfer Capability (ATC).

3.101 Forced Outage - 1) The removal from service availability of a generating unit, transmission line, or other facility for emergency reasons, 2) The condition in which the equipment is unavailable due to unanticipated failure.

3.102 Frequency Bias - A value, usually expressed in megawatts per 0.1 Hertz (MW/0.1 Hz), associated with a Balancing Authority Area that approximates the Balancing Authority Area's response to Interconnection frequency error.

3.103 Frequency Bias Setting - A value, usually expressed in MW/0.1 Hz, set into a Balancing Authority ACE algorithm that allows the Balancing Authority to contribute its frequency response to the Interconnection. The algebraic sign of Frequency Bias is negative.

3.104 Frequency Deviation - A change in Interconnection frequency.

3.105 Frequency Error - The difference between the actual and scheduled frequency. (FA – FS)

3.106 Frequency Regulation - The ability of a Balancing Authority to help the Interconnection maintain Scheduled Frequency. This assistance can include both turbine governor response and Automatic Generation Control.

3.107 Frequency Response - (Equipment) The ability of a system or elements of the system to react or respond to a change in system frequency. (System) The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz). Thealgebraic sign of frequency response is negative.

3.108 Frequency Response Measure (FRM) - The median of all the Frequency Response observations reported annually by Balancing Authorities or Frequency Response Sharing Groups for frequency events specified by the ERO (Electric Reliability Organization). This will be calculated as MW/0.1Hz.

3.109 Frequency Response Obligation (FRO) - The Balancing Authority's share of the required Frequency Response needed for thereliable operation of an Interconnection. This will be calculated as MW/0.1Hz.

3.110 Frequency Response Sharing Group (FRSG) - A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating resources required to jointly meet the sum of the Frequency Response Obligations of its members.

3.111 Generator Operator (GOP) - The entity that operates Generating Assets and performs the functions of supplying energy and Interconnected Operations Services.

3.112 Generator Owner (GO) - Entity that owns and maintains Generating Assets. This may include IPP's (Conventional and Renewable), PMC's, and GPA.

3.113 Generator Shift Factor (GSF) - A factor to be applied to a generator's expected change in output to determine the amount of flow contribution that

change in output will impose on an identified transmission facility or Flowgate.

3.114 Generator-to-Load Distribution Factor (GLDF) - The algebraic sum of a Generator Shift Factor and a Load Shift Factor to determine the total impact of an Interchange Transaction on an identified transmission facility or Flowgate.

3.115 Generating Assets (GA) - Primarily refers to machines synchronously connected to the GPA Grid providing real and reactive power. In some specialized instances these may include assets that are asynchronously connected to the GPA. Or, devices that provide only reactive power (Synchronous condensers, SVC's, Cables, Wind Turbines, FACTS etc.).

3.116 Generation Capability Import Requirement (GCIR) - The amount of generation capability from external sources identified by a Load- Serving Entity (LSE) or Resource Planner (RP) to meet its generation reliability or resource adequacy requirements as an alternative to internal resources.

3.117 Good Utility Practice - From FERC Pro-Forma OATT-1.15 Good Utility Practice: Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light ofthe facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region, including those practices required by Federal Power Act section 215(a)(4).

3.118 GPA (GPA Grid, GPA Interconnect) - The interconnected generation and transmission system of Guam, currently.

3.119 GPA Entity - Any entity owning, operating or maintaining any electrical facilities which separately or in aggregate are capable of measurably and meaningfully influencing the GPA Grid's frequency or voltage profile. This term is to beinterpreted in the broadest sense in the context of preserving GPA Grid Reliability.

3.120 Host Balancing Authority – 1) A Balancing Authority that confirms and implements Interchange Transactions for a Purchasing Selling Entity that operates generation or serves customers directly within the Balancing Authority's metered boundaries, 2) The Balancing Authority within whose metered boundaries a jointly owned unit is physically located.

3.121 Hourly Value - Data measured on a Clock Hour basis.

3.122 Implemented Interchange - The state where the Balancing Authority enters theConfirmed Interchange into its Area Control Error equation.

3.123 Inadvertent Interchange - The difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange. ($I_A - I_S$)

3.124 Independent Power Producer (IPP) - Any entity that owns or operates an electricity generating facility that is not included in an electric utility's rate base. This term includes, but is not limited to, cogenerators and small power producers and all other nonutility electricity producers, such as exempt wholesale generators, who sell electricity.

3.125 Independent System Operator (ISO) - An Entity with characteristics and functions substantially similar to and RTO recognized but not necessarily authorized by the RCA. The entity either has not formally petitioned the RCA for status as an RTO, or does not fully meet the requirements of an RTO. Often developed around the framework of anexisting power pool.

3.126 Institute of Electrical and Electronics Engineers, Inc. (IEEE)

3.127 Interactive Remote Access - User-initiated access by a person employing a remote access client or other remote access technology using a routable protocol. Remote access originates from a Cyber Asset that is not an Intermediate Device and not located within any of the Responsible Entity's Electronic Security Perimeter(s) or at a defined Electronic Access Point (EAP). Remote access may be initiated from: 1) Cyber Assets used or owned by the Responsible Entity, 2) Cyber Assets used or owned by employees, and 3) Cyber Assets used or owned by vendors, contractors, or consultants. Interactive remote access does not include system-to-system process communications.

3.128 Interchange - Energy transfers that cross Balancing Authority boundaries.

3.129 Interchange Authority (IA) - The responsible entity that authorizes implementation of valid and balanced Interchange Schedules between Balancing Authority Areas, and ensures communication of Interchange information for reliability assessment purposes.

3.130 Interchange Distribution Calculator (IDC) - A mechanism used by Reliability Coordinators in the Eastern Interconnection to calculate the distribution of Interchange Transactions over specific Flowgates. Itincludes a database of all Interchange Transactions and a matrix of the Distribution Factors for the Interconnection.

3.131 Interchange Schedule - An agreed-upon Interchange Transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of power and energy between the Source and Sink Balancing Authorities involved in the transaction.

3.132 Interchange Transaction - An agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area boundaries.

3.133 Interchange Transaction Tag or Tag - The details of an Interchange Transaction required for its physical implementation.

3.134 Interconnected Operations Service - A service (exclusive of basic energy and transmission services) that is required to support the reliable operation of interconnected Bulk Electric Systems.

3.135 Interconnection - When capitalized, any one of the three major electric system networks in NorthAmerica: Eastern, Western, and ERCOT and the minor interconnections of Hawaii, Alaska and Guam.

3.136 Interconnection Reliability Operating Limit (IROL) – The value (such as MW, MVar, Amperes, Frequency or Volts) derived from, or a subset of the System Operating Limits, which if exceeded, could expose a widespread area of the Bulk Electric System to instability, uncontrolled separation(s) or cascading outages.

3.137 Interconnection Reliability Operating Limit Tv (IROL Tv) - The maximum time that an Interconnection Reliability Operating Limit can be violated before the risk to the interconnection or other Reliability Coordinator

Area(s) becomes greater than acceptable. Each Interconnection Reliability Operating Limit's T_V shall be less than or equal to 30 minutes.

3.138 Interconnected Value - The technical value of a generating asset to the GPA Grid and its subdivisions (LSE's, BAL's etc.) in terms of dispatch-ability, real and reactive power output and absorption, inertia, system response, operating and non-operating reserves, etc.

3.139 Intermediate Balancing Authority - A Balancing Authority Area that has connecting facilities in the Scheduling Path between the Sending Balancing Authority Area and Receiving Balancing Authority Area and operating agreements that establish the conditions for the use of such facilities.

3.140 Intermediate System - A Cyber Asset or collection of Cyber Assets performing access control to restrict Interactive Remote Access to only authorized users. The Intermediate System must not be located inside the Electronic Security Perimeter.

3.141 Interpersonal Communication - Any medium that allows two or more individuals to interact, consult, or exchange information.

3.142 Interruptible Load or Interruptible Demand - Demand that the end-use customer makes available to its Load-Serving Entity via contract or agreement for curtailment.

3.143 Largest Single Contingency (LSC) - The largest single source (either transmission or generation) which can be removed from the area under study by a single system level event i.e. opening of a transmission line or breaker etc.

3.144 Largest Single Generation Contingency (LSGC) - The Declared Capability of largest generating unit contingency (or combination of units with a single point of interconnection forming a single contingency regardless of RAS applications) interconnected to the GPA Grid.

3.145 Limiting Element - The element that is 1) Either operating at its appropriate rating, or, 2) Would be following the limiting contingency. Thus, the Limiting Element establishes a system limit.

3.146 Load - An end-use device or customer that receives power from the electric system.

3.147 Load Shift Factor (LSF) - A factor to be applied to a load's expected change in demand to determine theamount of flow contribution that change in demand will impose on an identified transmission facility or monitored Flowgate.

3.148 Load-Serving Entity (LSE) - Secures energy and transmission service (and related Interconnected Operations Services) to serve the electrical demand and energy requirements of its end-use customers.

3.149 Long-Term Transmission Planning Horizon - Transmission planning period that covers years six through ten or beyond when required to accommodate any known longer lead time projects that may take longer than ten years to complete.

3.150 Market Flow - The total amount of power flowing across a specified Facility or set of Facilities due to a market dispatch of generation internal to the market to serve load internal tothe market.

3.151 Maximum N-1 Contingency Criteria - The maximum loss of generation contingency reserves for the BA shall be calculated by the greatest of the following two values: 1) the maximum amount of generation capacity that can be lost following any single event, including the impact of waste heat generation following the loss of the primary generation unit or 2) the maximum amount of generation that can be lost by any single failure of a single transmission component. The maximum loss of load contingency reserves shall be calculated by the loss of load on the largest single transformer or load serving transmission line on the system.

3.152 Minimum Vegetation Clearance Distance (MVCD) - The calculated minimum distance stated in feet (meters) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages.

3.153 Misoperation

- Any failure of a Protection System element to operate within the specified time when a fault or abnormal condition occurs within a zone of protection.

- Any operation for a fault not within a zone of protection (other than operation as backup protection for a fault in an adjacent zone that is not cleared within a specified time for the protection for that zone).
- Any unintentional Protection System operation when no fault or other abnormal condition has occurred unrelated to on-site maintenance and testing activity.

3.154 Native Load - The end-use customers that the Load-Serving Entity is obligated to serve.

3.155 Near-Term Transmission Planning Horizon - The transmission planning period that covers Year One through five.

3.156 Net Actual Interchange - The algebraic sum of all metered interchange over all interconnections between two physically Adjacent Balancing Authority Areas.

3.157 Net Energy for Load - Net Balancing Authority Area generation, plus energy received from other Balancing Authority Areas, less energy delivered to Balancing Authority Areas through interchange. It includes Balancing Authority Area losses but excludes energy required for storage at energy storage facilities.

3.158 Net Interchange Schedule - The algebraic sum of all Interchange Schedules with each Adjacent Balancing Authority.

3.159 Net Scheduled Interchange - The algebraic sum of all Interchange Schedules across a given path or between Balancing Authorities for a given period or instant in time.

3.160 Network Integration Transmission Service - Service that allows an electric transmission customer to integrate, plan, economically dispatch and regulate its network reserves in a manner comparable to that in which the Transmission Owner serves Native Load customers.

3.161 Non-Consequential Load Loss - Non-Interruptible Load loss that does not include: 1) Consequential Load Loss, 2) the response of voltage sensitive Load, or 3) Load that is disconnected from the System by end-user equipment.

3.162 Non-Firm Transmission Service - Transmission service that is reserved on an as-available basis and is subject to curtailment or interruption.

3.163 Non-Spinning Reserve – 1) That generating reserve not connected to the system but capable of serving demand within a specified time, 2) Interruptible load that can be removed from the system in a specified time.

3.164 Normal Clearing - A protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection systems.

3.165 Normal Rating - The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or element can support or withstand through the daily demand cycles without loss of equipment life.

3.166 Obligated Entity - A GPA Entity who is obligated to provide operating and or non-operating reserves or reserve capacity under AKRES-001-0; usually but not always a Generation owner operator, a Load Serving Entity or its Balancing Authority.

3.167 Off-Peak - Those hours or other periods defined by North American Energy Standards Board (NAESB) business practices, contract, agreements, or guides as periods of lower electrical demand.

3.168 On-Peak - Those hours or other periods defined by NAESB business practices, contract, agreements, or guides as periods of higher electrical demand.

3.169 Open Access Same Time Information Service (OASIS) - An electronic posting system that the Transmission Service Provider maintains for transmission access data and that allows all transmission customers to view the data simultaneously.

3.170 Operating Plan - A document that identifies a group of activities that may be used to achieve some goal. An Operating Plan may contain Operating Procedures and Operating Processes. A company-specific system restoration plan that includes an Operating Procedure for black-starting

units, Operating Processes for communicating restoration progress with other entities, etc., is an example of an Operating Plan.

3.171 Operating Procedure - A document that identifies specific steps or tasks that should be taken by one or more specific operating positions to achieve specific operating goal(s). The steps in an Operating Procedure should be followed in the order in which they are presented, and should be performed by the position(s) identified. A document that lists the specific steps for a system operator to take in removing a specific transmission line from service is an example of an Operating Procedure.

3.172 Operating Process - A document that identifies general steps for achieving a generic operating goal. An Operating Process includes steps with options that may be selected depending upon Real- time conditions. A guideline for controlling high voltage is an example of an Operating Process.

3.173 Operating Reserve - That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.

3.174 Operating Reserve Spinning - The portion of Operating Reserve consisting of:

- Generation synchronized to the system and fully available to serve load within the Disturbance Recovery Period following the contingency event; or
- Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

3.175 Operating Reserve Supplemental - The portion of Operating Reserve consisting of:

- Generation (synchronized or capable of being synchronized to the system) that is fully available to serve load within the Disturbance Recovery Period following the contingency event; or
- Load fully removable from the system within the Disturbance Recovery Period following Disturbance Recovery Period following the contingency event.

3.176 Operating Voltage - The voltage level by which an electrical system is designated and to which certain operating characteristics of the system are related; also, the effective (root-mean- square) potential difference between

any two conductors or between a conductor and the ground. The actual voltage of the circuit may vary somewhat above or below this value.

3.177 Operational Planning Analysis - An analysis of the expected system conditions for the next day's operation. (That analysis may be performed either a day ahead or as much as 12 months ahead.) Expected system conditions include things such as load forecast(s), generation output levels, and known system constraints (transmission facility outages, generator outages, equipmentlimitations, etc.).

3.178 Outage Transfer Distribution Factor (OTDF) - In the post-contingency configuration of a system under study, the electric Power Transfer Distribution Factor (PTDF) with one or more system Facilities removed from service (outaged).

3.179 Overlap Regulation Service - A method of providing regulation service in which the Balancing Authority providing the regulation service incorporates another Balancing Authority's actual interchange, frequency response, and schedules into providing Balancing Authority's AGC/ACE equation.

3.180 Participation Factors - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, generators are assigned a percentage that they will contribute to serve load.

3.181 Peak Demand – 1) The highest hourly integrated Net Energy for Load within a Balancing AuthorityArea occurring within a given period (e.g., day, month, season, or year), 2) The highest instantaneous demand within the BalancingAuthority Area.

3.182 Performance-Reset Period - The time period that the entity being assessed must operate without any violations to reset the level of non-compliance to zero.

3.183 Physical Access Control Systems (PACS) - Cyber Assets that control, alert, or log access to the Physical Security Perimeter(s), exclusive of locally mounted hardware or devices at the Physical Security Perimeter such as motion sensors, electronic lock control mechanisms, and badge readers.

3.184 Physical Security Perimeter (PSP) - The physical border surrounding locations in which BES Cyber Assets, BES Cyber Systems, or Electronic Access Control or Monitoring Systems reside, and for which access is controlled.

3.185 Planning Assessment - Documented evaluation of future Transmission system performance and Corrective Action Plans to remedy identified deficiencies.

3.186 Planning Authority (PA) - The responsible entity that coordinates and integrates transmission facility and service plans, resource plans, and protection systems.

3.187 Planning Coordinator (PC) – See Planning Authority.

3.188 Planning Reserve Margin - The ratio of the total amount of planned available Firm Generation capacity divided by the Forecasted Peak Demand of the system minus 1.0, expressed in %. The Planning Reserve Margin requirement must be calculated by each BA by system analysis.

3.189 Point of Delivery (POD) - A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction leaves or a Load-Serving Entity receivesits energy.

3.190 Point of Receipt (POR) - A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction enters or a Generator delivers its output.

3.191 Point to Point Transmission Service (PTP) - The reservation and transmission of capacity and energy on either a firm or non-firm basis from the Point(s) of Receipt to the Point(s) of Delivery.

3.192 Postback - Positive adjustments to ATC or AFC as defined in Business Practices. Such Business Practices may include processing of redirects and unscheduled service.

3.193 Power Transfer Distribution Factor (PTDF) - In the pre-contingency configuration of a system under study, a measure of theresponsiveness or change in electrical loadings on transmission system Facilities due to a

change in electric power transfer from one area to another, expressed in percent (up to100%) of the change in power transfer.

3.194 Pro Forma Tariff - Usually refers to the standard OATT and/or associated transmission rights mandated by the U.S. Federal Energy Regulatory Commission Order No. 888.

3.195 Protected Cyber Assets (PCA) - One or more Cyber Assets connected using a routable protocol within or on an Electronic Security Perimeter that is not part of the highest impact BES Cyber System within the same Electronic Security Perimeter. The impact rating of Protected Cyber Assets is equal to the highest rated BES Cyber System in the same ESP. A Cyber Asset is not a Protected Cyber Asset if, for 30 consecutive calendar days or less, it is connected either to a Cyber Asset within the ESP or to the network within the ESP, and it is used for data transfer, vulnerability assessment, maintenance, or troubleshooting purposes.

3.196 Protection Reserves - The resources under the control of the Under Frequency Load Shedding System designed to protect the system against single or multiple contingency events.

3.197 Protection System - Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.

3.198 Protection System Maintenance Program (PSMP) - An ongoing program by which Protection System components are kept in working order and proper operation of malfunctioning components is restored. A maintenance program for a specific component includes one or more of the following activities:

- Verify - Determine that the component is functioning correctly.
- Monitor - Observe the routine in-service operation of the component.
- Test - Apply signals to a component to observe functional performance or output behavior, or to diagnose problems.
- Inspect - Examine for signs of component failure, reduced performance or degradation.
- Calibrate - Adjust the operating threshold or measurement accuracy of a measuring element to meet the intended performance requirement.

3.199 Pseudo-Tie - A telemetered reading or value that is updated in real time and used as a "virtual" tie line flow in the AGC/ACE equation but for which no physical tie or energy metering actually exists. The integrated value is used as a metered MWh value for interchange accounting purposes.

3.200 Purchasing-Selling Entity (PSE) - The entity that purchases or sells, and takes title to, energy, capacity, and Interconnected Operations Services. Purchasing-Selling Entities may be affiliated or unaffiliated merchants and may or may not own generating facilities.

3.201 Ramp Rate or Ramp - (Schedule) The rate, expressed in megawatts per minute, at which the interchange schedule is attained during the ramp period. (Generator) The rate, expressed in megawatts per minute, that a generator changes its output.

3.202 Rated Electrical Operating Conditions - The specified or reasonably anticipated conditions under which the electrical system or an individual electrical circuit is intend/designed to operate.

3.203 Rating - The operational limits of a transmission system element under a set of specified conditions.

3.204 Rated System Path Methodology - The Rated System Path Methodology is characterized by an initial Total Transfer Capability (TTC), determined via simulation. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from TTC, and Postbacks and counterflows are added as applicable, to derive Available Transfer Capability. Under the Rated System Path Methodology, TTC results are generally reported as specific transmission path capabilities.

3.205 Reactive Power (VARS) - The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is usually expressed in kilovars (kvar) or megavars (Mvar).

3.206 Real Power (WATTS) - The portion of electricity that supplies energy to the load.

3.207 Reallocation - The total or partial curtailment of Transactions during TLR to allow Transactions using higher priority to be implemented.

3.208 Real-Time - Present time as opposed to future time. (From Interconnection Reliability Operating Limits standard).

3.209 Real-Time Assessment - An examination of existing and expected system conditions, conducted by collecting and reviewing immediately available data.

3.210 Receiving Balancing Authority - The Balancing Authority importing the Interchange.

3.211 Regional Coordinating Council – The responsible entity that enforces, coordinates, and integrates reliability standards used by the RRO.

3.212 Regional Reliability Organization (RRO) – 1) An entity that ensures that a defined area of the Bulk Electric System is reliable, adequate and secure, 2) A RCA recognized or authorized Regional Reliability Organization can serve as the Compliance Monitor. This includes the CCU, GPA, IPP's, and PMC's.

3.213 Regional Reliability Plan - The plan that specifies the Reliability Coordinators and Balancing Authorities within the Regional Reliability Organization, and explains how reliability coordination will be accomplished.

3.214 Regional Transmission Organization (RTO) - An organization formed with the approval of the PUC to coordinate, control and monitor operation of the Electric Power System within a given region of the State.

- Characteristics:
  - a) Independence from market participants;
  - b) Appropriate scope and regional configuration;
  - c) Possession of operational authority for all transmission facilities under the RTO'scontrol; and
  - d) Exclusive authority to maintain short-term reliability.
- Functions:
  - a) Administer its own tariff and employ a transmission pricing system that will integrate reliability costs into transmission pricing, promote efficient use and expansion of transmission and generation facilities;

b) Create market mechanisms to manage transmission congestion;
c) Develop and implement procedures to address parallel path flow issues;
d) Serve as a supplier of last resort for all ancillary services (Similar to the requirements in FERC Order No. 888 and subsequent FERC orders);
e) Operate a single OASIS site for all transmission facilities under its control with responsibility for independently calculating TTC and ATC;
f) Monitor markets to identify design flaws and market power;
g) Plan and coordinate necessary transmission additions and upgrades; and
h) Perform region wide security constrained economic dispatch of real and reactive resources, often dispatched through existing Load Balancing Authorities.

3.215 Regulating Reserve - An amount of reserve responsive to Automatic Generation Control, which issufficient to provide normal regulating margin; above and beyond the spinning reserve requirement.

3.216 Regulating Service - The process whereby one Balancing Authority contracts to provide corrective response to all or a portion of the ACE of another Balancing Authority. The Balancing Authority providing the response assumes the obligation of meeting allapplicable control criteria as specified by NERC for itself and the Balancing Authority for which it is providing the Regulation Service.

3.217 Reliability Adjustment RFI - Request to modify an Implemented Interchange Schedule for reliability purposes.

3.218 Reliability Coordinator (RC) - The entity that is the highest level of authority who is responsible for the reliableoperation of the Bulk Electric System, has the Wide Area view of the Bulk ElectricSystem, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systemsbeyond any Transmission Operator's vision.

3.219 Reliability Coordinator Area - The collection of generation, transmission, and loads within the boundaries of the Reliability Coordinator. Its boundary coincides with one or more Balancing Authority Areas.

3.220 Reliability Coordinator Information System (RCIS) - The system that Reliability Coordinators use to post messages and share operating information in real time.

3.221 Reliability Directive - A communication initiated by a Reliability Coordinator, Transmission Operator, or Balancing Authority where action by the recipient is necessary to address an Emergency or Adverse Reliability Impact.

3.222 Remedial Action Scheme (RAS) - See “Special Protection System”.

3.223 Reportable Cyber Security Incident - A Cyber Security Incident that has compromised or disrupted one or more reliability tasks of a functional entity.

3.224 Reliability Standard - A standard similar in function to those required by the United States Federal Energy Regulatory Commission under Section 215 of the Federal Power Act, adopted by a regional utility body and approved or recognized by an applicable authority in jurisdiction not regulated by FERC. Reliability standards provide for “Reliable Operation” of the bulk-power system “Bulk- Power System”. The term includes requirements for the operation of existing bulk- power system facilities, including cyber-security protection, and the design of planned additions or modifications to such facilities to the extent necessary to provide for reliable operation Reliable Operation of the bulk-power system, but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity.

3.225 Reliable Operation - Operating the elements of the bulk-power system “Bulk- Power System” within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cyber-security incident, or unanticipated failure of system elements.

3.226 Reportable Excess Contingency Disturbance - Any series of events, or multiple contingency events which exceed the maximum N-1

contingency event which occur in a manner that causes System frequency to exceed the limits of +/- 0.3 Hz in the Balancing Authority's area. The excess contingency events occur prior to the contingency reserves being re-established following a single contingency disturbance or for multiple contingency events which exceed the reserve requirements of the single largest contingency.

3.227 Reportable Single Contingency Disturbance - Any single event that causes System frequency to exceed the limits of +/- 0.3 Hz in the Balancing Authority's area.

3.228 Request for Interchange (RFI) - A collection of data as defined in the NAESB RFI Datasheet, to be submitted to the Interchange Authority for the purpose of implementing bilateral Interchange between a Source and Sink Balancing Authority.

3.229 Reserve Margin - The ratio of the actual total amount of available Firm Generation capacity, expressed in %, between the total available Firm Generation capacities divided by the Peak Demand of the system minus 1.0, expressed in %.

3.230 Reserve Sharing Group (RSG) - A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating reserves required for each Balancing Authority's use in recovering from contingencies within the group. Scheduling energy from an Adjacent Balancing Authority to aid recovery need not constitute reserve sharing provided the transaction is ramped in over a period the supplying party could reasonably be expected to load generation in (e.g., ten minutes). If the transaction is ramped in quicker (e.g., between zero and ten minutes) then, for the purposes of Disturbance Control Performance, the Areas become a Reserve Sharing Group.

3.231 Resource Planner (RP) - The entity that develops a long-term (generally one year and beyond) plan for the resource adequacy of specific loads (customer demand and energy requirements) within a Planning Authority Area.

3.232 Response Rate - The Ramp Rate that a generating unit can achieve under normal operating conditions expressed in megawatts per minute (MW/Min).

3.233 Right-of-Way (ROW) - The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the Transmission Owner's legal rights but may be less based on the aforementioned criteria.

3.234 Scenario – Possible event.

3.235 Schedule - (Verb) To set up a plan or arrangement for an Interchange Transaction. (Noun) An Interchange Schedule.

3.236 Scheduled Frequency - 60.0 Hertz, except during a time correction.

3.237 Scheduling Entity - An entity responsible for approving and implementing Interchange Schedules.

3.238 Scheduling Path - The Transmission Service arrangements reserved by the Purchasing-Selling Entity for a Transaction.

3.239 Sending Balancing Authority - The Balancing Authority exporting the Interchange.

3.240 Share - The proportionate share of a Joint Owned Generating Unit (or combination of units with a single point of interconnection regardless of RAS applications) belonging to a single entity.

3.241 Sink Balancing Authority - The Balancing Authority in which the load (sink) is located for an Interchange Transaction. (This will also be a Receiving Balancing Authority for the resultingInterchange Schedule).

3.242 Source Balancing Authority - The Balancing Authority in which the generation (source) is located for anInterchange Transaction. (This will also be a Sending Balancing Authority for the resulting Interchange Schedule).

3.243 Special Protection System or Remedial Action Scheme (SPS) - An automatic protection system designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition

to the isolation of faulted components to maintain system reliability. Such action may include changes in demand, generation (MW and Mvar), or system configuration to maintain system stability, acceptable voltage, or power flows. An SPS does not include (a) underfrequency or undervoltage load shedding or (b) fault conditions that must be isolated or (c) out-of-step relaying (not designed as an integral part of an SPS). Also called Remedial Action Scheme.

3.244 Spinning Reserve - Unloaded generation that is synchronized and ready to serve additional demand.

3.245 Spinning Reserve Largest Contingency Ratio (SRLCR) - The ratio of an individual Entities' Largest Generating Contingency to the sum of the Largest Generating Contingencies of all the GPA entities.

3.246 Stability - The ability of an electric system to maintain a state of equilibrium during normal and abnormal conditions or disturbances.

3.247 Stability Limit - The maximum power flow possible through some particular point in the system while maintaining stability in the entire system or the part of the system to which the stability limit refers.

3.248 Standard Disturbance Recovery Period - The time, in minutes set as the target goal in the standard to allow restoration of the frequency from the time of the initiating event to the time the frequency is restored to within acceptable limits of 60.3 to 59.7 Hz for single contingency events off and for excess contingency events off of nominal 60 Hz.

3.249 Supervisory Control and Data Acquisition (SCADA) - A system of remote control and telemetry used to monitor and control the transmission system.

3.250 Supplemental Regulation Service - A method of providing regulation service in which the Balancing Authority providing the regulation service receives a signal representing all or a portion of the other Balancing Authority's ACE.

3.251 Surge - A transient variation of current, voltage, or power flow in an electric circuit or across an electric system.

3.252 Sustained Outage - The de-energized condition of a transmission line resulting from a fault or disturbance following an unsuccessful automatic reclosing sequence and/or unsuccessful manual reclosing procedure.

3.253 System - A combination of generation, transmission, and distribution components.

3.254 System Operating Limit (SOL) - The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to:

- Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
- Transient Stability Ratings (Applicable pre- and post- Contingency Stability Limits)
- Voltage Stability Ratings (Applicable pre- and post- Contingency Voltage Stability)
- System Voltage Limits (Applicable pre- and post- Contingency Voltage Limits)

3.255 System Operator - An individual at a control center (Balancing Authority, Transmission Operator, Generator Operator, Reliability Coordinator) whose responsibility it is to monitor and control thatelectric system in real time.

3.256 System Reserve Basis (SRB) - The amount of Spinning Reserve required to prevent first stage load-shed. Generally determined by system studies of the frequency response of the system under various conditions for the loss of the Largest Single Contingency.

3.257 Telemetering – The process by which measurable electrical quantities from substations and generating stations are instantaneously transmitted to the control center, and by which operating commands from the control center are transmitted to the substations and generating stations.

3.258 Thermal Rating - The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating or before it sags to the point that it violates public safety requirements.

3.259 Tie Line - A circuit connecting two Balancing Authority Areas.

3.260 Tie Line Bias - A mode of Automatic Generation Control that allows the Balancing Authority to: 1) Maintain its Interchange Schedule and 2) Respond to Interconnection frequencyerror.

3.261 Time Error - The difference between the Interconnection time measured at the Balancing Authority(ies) and the time specified by the National Institute of Standards and Technology. Time error is caused by the accumulation of Frequency Error over a given period.

3.262 Time Error Correction - An offset to the Interconnection's scheduled frequency to return the Interconnection's Time Error to a predetermined value.

3.263 TLR Log - Report required to be filed after every Transmission Load Reduction Level 2 or higher in a specified format. Initiating Balancing Authority prepares the report. The report is electronically filed on the IOC reliability web site.

3.264 Total Flowgate Capability (TFC) - The maximum flow capability on a Flowgate, is not to exceed its thermal rating, or in the case of a flowgate used to represent a specific operating constraint (such as a voltage or stability limit), is not to exceed the associated System Operating Limit.

3.265 Total Operating Reserve (TOR) - The Total Operating Reserve for the GPA is 150% of the largest generatingunit contingency in operation on the GPA Interconnection. (further described in agreement entitled “Addendum H” of the separate amended and restated“Guam Intertie Agreement”).

3.266 Total Transfer Capability (TTC) - The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.

3.267 Transaction – See Interchange Transaction.

3.268 Transfer Capability - The measure of the ability of interconnected electric systems to move or transfer power in a reliable manner from one area to another over all transmission lines (or paths) between those areas under specified system conditions. The units of transfer capability are in terms of

electric power, generally expressed in megawatts (MW). The transfer capability from “Area A” to “Area B” is not generally equal to the transfer capability from “Area B” to “AreaA”.

3.269 Transfer Distribution Factor – See Distribution Factor.

3.270 Transmission - An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it istransformed for delivery to customers or is delivered to other electric systems. Generally operated at or above 69kV.

3.271 Transmission Constraint - A limitation on one or more transmission elements that may be reached during normal or contingency system operations.

3.272 Transmission Customer – 1) Any eligible customer (or its designated agent) that can or does execute atransmission service agreement or can or does receive transmission service, 2) Any of the following responsible entities: Generator Owner, Load-Serving Entity, or Purchasing-Selling Entity.

3.273 Transmission Line - A system of structures, wires, insulators and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at relatively high voltages varying from 69 kV up to 765 kV, and are capable of transmitting large quantities of electricity over long distances.

3.274 Transmission Operator (TOP) - The entity responsible for the reliability of its “local” transmission system, and that operates or directs the operations of the transmission facilities.

3.275 Transmission Operator Area - The collection of Transmission assets over which the Transmission Operator is responsible for operating.

3.276 Transmission Owner (TO) - The entity that owns and maintains transmission facilities. This refers to Guam Power Authority.

3.277 Transmission Planner (TP) - The entity that develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the

interconnected bulk electric transmission systems within its portion of the Planning Authority Area.

3.278 Transmission Reliability Margin (TRM) - The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

3.279 Transmission Reliability Margin Implementation Document (TRMID) - A document that describes the implementation of a Transmission Reliability Margin methodology, and provides information related to a Transmission Operator's calculation of TRM.

3.280 Transmission Service - Services provided to the Transmission Customer by the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery.

3.281 Transmission Service Provider (TSP) - The entity that administers the transmission tariff and provides Transmission Service to Transmission Customers under applicable transmission service agreements.

3.282 Vegetation - All plant material, growing or not, living or dead.

3.283 Vegetation Inspection - The systematic examination of vegetation conditions on a Right-of-Way and those vegetation conditions under the applicable Transmission Owner's or applicable Generator Owner's control that are likely to pose a hazard to the line(s) prior to the next planned maintenance or inspection. This may be combined with a general line inspection.

3.284 Wide Area - The entire Reliability Coordinator Area as well as the critical flow and status information from adjacent Reliability Coordinator Areas as determined by detailed system studies to allow the calculation of Interconnected Reliability Operating Limits.

3.285 Year One - The first twelve month period that a Planning Coordinator or a Transmission Planner is responsible for assessing. For an assessment started in a given calendar year, Year One includes the forecasted peak Load period for one of the following two calendar years. For example, if a

Planning Assessment was started in 2011, then Year One includes the forecasted peak Load period for either 2012 or 2013.

4.0 STANDARDS

GPATPL-001-4: Transmission Planning Performance Requirements

GPABAL-001: Real Power Balancing Control Performance

GPA-BAL-001-1

GPABAL-002: Disturbance Control Performance

GPA-BAL-002-1

GPABAL-003: Frequency Response and Bias

GPABAL-005: Automatic Generation Control

GPABAL-502: Planning Resource Adequacy Analysis, Assessment and Documentation

GPAMOD-025: Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

GPAMOD-026: Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

GPAMOD-027: Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

GPAMOD-032: Data for Power System Modeling and Analysis

GPAMOD-033: Steady-State and Dynamic System Model Verification

GPAPRC-006: Automatic Underfrequency Load Shedding

GUAM POWER AUTHORITY
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GRID STABILITY and RELIABILITY STANDARDS

GPA-BAL-001-0

FOR

REAL POWER BALANCING CONTROL PERFORMANCE

REAL POWER BALANCING CONTROL PERFORMANCE

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- A. Introduction

1. Purpose:
   To maintain system steady-state frequency within defined limits by balancing real power demand and supply in real-time.

2. Applicability:

   Balancing Authority (BA)

3. Exclusions:

   The BA shall be excluded from meeting this standard for extraordinary contingencies. Extraordinary Contingency shall mean any act of God, actions by a non-affiliated third party, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, earthquake, explosion, accident to or breakage, failure or malfunction of machinery or equipment, or any other cause beyond the Reliability Entity's reasonable control; provided that prudent industry standards (e.g., maintenance, design, operation) have been employed; and provided further that no act or cause shall be considered an Extraordinary Contingency, including but not limited to transmission and distribution events if such act or cause results in any contingency contemplated in any GPA Reliability Standard(e.g., the "Most Severe Single Contingency" as defined in the GPA Reliability Criteria or any lesser contingency).

B. Requirements

R1. The BA shall operate such that the Compliance Population 1 (CP1%) expressed in percent, on a rolling 12-month basis, of the absolute value of the frequency error from the actual frequency minus the nominal frequency is above 98.3% as defined in the equations below.

The equation for frequency error (ΔF) is:

$$\Delta F = FA - FS$$

Where:

- FA is the actual frequency Hz.
- FS is defined as the normal frequency target of 60.000 Hz. (Scheduled frequency other than 60.000 Hz shall be treated as 60.000 for reporting and measurement purposes)

Compliance Population in percent (CP1%) is:

$$CP1\% = \frac{\sum_{number\ of\ samples\ meeting\ criteria} |\Delta F| < "x"}{n_{total\ valid\ sample}} \times 100$$

Where:

- The minimum acceptable population of samples within the control region boundary is 98.3%.

- "x" is 0.055 Hz and represents the control region boundary from the normal frequency target.
- |ΔF| is the absolute value of the frequency error measured in Hz for valid samples.
- "n" is the total number of valid samples[1]

R2. The BA shall operate such that the Compliance Population 2 (CP2%) expressed in percent, on a 24-hour basis, of the absolute value of the frequency error from the actual frequency minus the nominal frequency is above 98.3% as defined in the equations below.

The equation for frequency error (ΔF) is:

$$\Delta F = FA - FS$$

Where:

- FA is the actual frequency Hz.
- FS is defined as the normal frequency target of 60.000 Hz. (Scheduled frequency other than 60.000 Hz shall be treated as 60.000 for reporting and measurement purposes)

Where:

Compliance Population in percent (CP2%) is:

$$CP2\% = \frac{\sum_{number\ of\ samples\ meeting\ criteria} |\Delta F| < "y"}{n_{total\ valid\ sample}} \times 100$$

Where:

- "y" is 0.055 Hz and represents the control region boundary from the normal frequency target.
- The minimum acceptable population of samples within the control region boundary is 98.3%.
- |ΔF| is the absolute value of the frequency error measured in Hz for valid samples.
- "n" is the total number of valid samples [2]

Each day that does not meet the CP2% compliance will be counted as a violation. The summation of the violations for the calendar month shall not exceed 10.

R3. The BA shall maintain the Monthly Total Number (MTN) in percent of valid samples of not less than 99.9% of the maximum total number of samples per month based on the scan rate. The expected sample rate is to be not greater than a 2 second scan rate. (For purposes of the test standard, 12-month historical 2 second data will be used to determine frequency performance).

R3.1. The BA shall maintain Regulating Reserve to meet the Requirements R1 and R2.

R3.2. The BA shall provide adequate and reliable backup power supplies and shall periodically test these supplies at the BA's control center and other critical locations to ensure

continuous operation of regulation control and vital data recording equipment during loss of the normal power supply.

R3.3. The BA shall provide redundant and independent frequency measuring equipment that shall automatically activate upon detection of failure of the primary source.

R3.4. The BA shall at least annually check and calibrate its time error and frequency devices against a common reference. The BA shall adhere to the minimum values for measuring devices as listed below:

Device	Accuracy
Digital frequency transducer	≤ 0.001 Hz
Remote terminal unit[3]	≤ 0.25 % of full scale

C. Measures

M1. The BA shall achieve, as a minimum, Requirement 1 (CP1%) Compliance Population of 98.3%. The BA shall be able to re-calculate and store each number of samples where |ΔF|<"x" and the total number of valid samples, for each clock-hour, as well as for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400). Each sample shall have a date-time stamp to uniquely identify each sample.

M2. The BA shall achieve, as a minimum, Requirement 2 (CP2%) Compliance Population of 98.3%. The calculation will be the same as M1 except “y” in lieu of “x” and the period will be 24-hours. Then, each day that does not meet the CP2% compliance will be counted as a violation. The summation of the violations for the calendar month shall not exceed 10.

M3. The BA shall achieve, as a minimum, Requirement 3 (MTN) Monthly Total Number of 99.9%. The Monthly Total Number shall be the total number of valid samples ($n_{total\ valid\ sample}$) divided by the total available of samples possible in the calendar month expressed in percent.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Authority

Guam Power Authority (or designee)

1.2. Compliance Monitoring Period and Reset Time Frame

One calendar month

1.3. Data Retention

The data that supports the calculation of CP1%, CP2% and MTN are to be retained in electronic form for at least a two year period. If the data for the Balancing Authority Area is

undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved.

1.4. Additional Compliance Information

None

2. Levels of Non-Compliance – CP1%

2.1. Level 1

The Balancing Authority Area's value of CP1% is less than 98.3% but greater than or equal to 98.1%.

2.2. Level 2

The Balancing Authority Area's value of CP1% is less than 98.1%.

3. Levels of Non-Compliance – CP2%

3.1. Level 1

The Balancing Authority Area's value of number of day that CP2% is in violation is less than 12 but greater than or equal to 10.

3.2. Level 2

The Balancing Authority Area's value of the number of days that CP2% is in violation is greater than 12.

4. Levels of Non-Compliance - MNT

4.1. Level 1

The Balancing Authority Area's value of MNT is less than 99.9% but greater than or equal to 99.8%.

4.2. Level 2

The Balancing Authority Area's value of MNT is less than 99.8%.

E. Footnotes

[1]All samples during the disturbance recovery period, as defined in GPA-BAL-002, shall be considered not valid samples and excluded from the CPS1% and CPS2% calculation.

[2]Ibid

[3]Requirement if Remote Terminal Unit used for frequency measurement for Requirement R1 and R2.

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GRID STABILITY and RELIABILITY STANDARDS

GPA-BAL-002-0

FOR

DISTURBANCE CONTROL PERFORMANCE

DISTURBANCE CONTROL PERFORMANCE

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- A. Introduction

4. Purpose:
   This purpose of the Disturbance Control Standard (DCS) is to ensure the Balancing Authority is able to utilize its Contingency Reserve to balance resources and demand and return System frequency within defined limits following a Reportable Disturbance. Both loss of generation and loss of load events are significant and both up and down reserves are required. Contingency Reserve activation applies to the loss of load as well as the loss of supply.
5. Applicability:
   Balancing Authority (BA)
6. Exclusions:

   6.1 Catastrophic Contingency Event: Any contingency event (greater than the Maximum N-1 Contingency Criteria event) whose total requirements exceed the total amount of Contingency Reserves plus Protection Reserves within the Balancing Authority Area.

   6.2 Variable Generation Contingency: Contingency Reserves utilized to cover unforecasted, unscheduled and/or unanticipated ramping events of renewable generation that do not trigger a reportable event shall not be counted as Contingency Reserve deficiency in reporting requirements.

B. Requirements

R1. The BA shall have access to and/or operate Contingency Reserve to respond to disturbances. Contingency Reserve may be supplied from generation, controllable load resources, under frequency load shedding, and storage devices. The BA shall specify its Contingency Reserve criteria. As a minimum, the BA shall carry at least enough Contingency Reserve to cover the most severe single contingency of generation and/or transmission that impact Contingency Reserve requirements. The requirements of the under frequency load shedding (UFLS) protection system shall define the amount of load shed at each stage and the contingency utilized to define the requirements of each stage. Up to 100% of the Contingency Reserve may be supplied by a portion of the UFLS Protection Reserves however; in no instance shall Contingency Reserves utilize 100% of the protection reserves.[1]

R2. Following a Reportable Single Contingency Disturbance, the BA shall activate sufficient Contingency Reserve to return frequency to between 60.3 and 59.7 Hz, within the Disturbance Recovery Period for 100% of Reportable Single Contingency Disturbances.

R6.1. In general, the frequency recovery period shall be less than the damage and trip points for all generation resources within the Balancing Authority Area such that no generation resource is damaged or lost due to the lack of frequency recovery. The Actual Disturbance Recovery Period shall be defined as the actual time required to restore the frequency from the time of the initiating event to the time the frequency is within the frequency limits of 60.3 to 59.7 Hz. The Standard Disturbance Recovery Period (R_{SDRP1}) for single-contingency events is 10 minutes.

R3. The Reportable Single Contingency Disturbance events the BA shall fully restore its Contingency Reserves within the Contingency Reserve Restoration Period for 100% of the Reportable Single Contingency Disturbances.

R7.1. The Contingency Reserve Restoration Period begins at the end of the Actual Disturbance Recovery Period and is the time required to fully restore the Contingency Reserve following the Disturbance Recovery Period. The Contingency Reserve Restoration Period is defined as the period required to re-establish the Contingency Reserves utilized during the Actual Disturbance Recovery Period such that the system can sustain another contingency event under R2. Frequency deviations caused by the restoration of loads during the Contingency Reserve Restoration Period shall not constitute a new event under R2.1. The Standard Contingency Reserve Restoration Period is 120 minutes.

R4. Following a Reportable Excess Contingency Disturbance, the BA shall activate sufficient controls or actions to return frequency to 60.5 or 59.5 Hz, within the Disturbance Recovery Period for 100% of Reportable Excess Contingency Disturbances. The Standard Excess Contingency Disturbance Recovery Period (R_{SDRP2}) for excess contingency disturbance events is 10 minutes.

R8.1. The general, the frequency recovery period shall be less than the damage, trip points and control instability regions for all generation resources within the Balancing Authority Area such that no generation resource is damaged or lost due to the lack of frequency recovery. The Actual Disturbance Recovery Period is defined as the actual time required to restore the frequency from the time of the initiating multi-contingency event or the last in a series of contingency events to the time the frequency is within the frequency limits of 60.5 to 59.5Hz.

R5. For Reportable Excess Contingency Disturbance events the BA is not required to fully restore its Contingency Reserves until such a time that the BA determines that additional reserves are available and under the control of the BA to initiate the restoration of Contingency Reserves. For Reportable Excess Contingency Reserve events there will be no maximum required Contingency Reserve Restoration Period.

C. Measures

M1. The BA must have documentation that it maintained 100% of the Contingency Reserve levels based upon data integrated over each clock hour except within the period of time determined by the sum of the Disturbance Recovery Period, plus the Contingency Reserve Restoration Period following the start of a Reportable Single Event Disturbance or a Reportable Excess Contingency Disturbance. For each hour the BA shall have and provide upon written request by the Regional Reliability Organization (or designee) their Contingency Reserve requirement in MW, the calculations that define the reserve requirement in accordance with the reserve criteria, and the amount of Contingency Reserve available in MW from each Contingency Reserve resource.

M2. The BA shall have documentation that the system returned to the frequency range of 60.3 to 59.7 Hz, within the Actual Disturbance Recovery Period following each Reportable Single Contingency Disturbance. The Disturbance Control Standard for Reportable Single Contingency Disturbance(s) is measured as the monthly average recovery time in percent of the Standard Recovery Period.

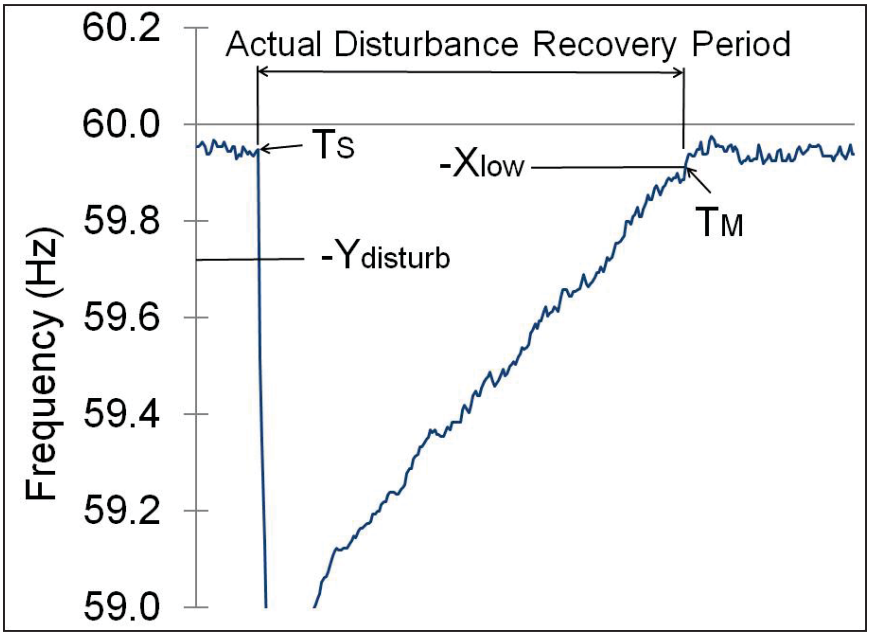
The equation for Actual Disturbance Recovery Period (ΔT_{f1}) is:

$$\Delta T_{f1} = T_M - T_S$$

Where:

T_M is the time when system frequency returned to the respective limit, 60.3 or 59.7 Hz following the initial reportable disturbance.

T_S is the time at the start of the reportable disturbance



Reportable Single Contingency Disturbance

The monthly average Disturbance recovery time ($Rf1_{avg}$) in percent of the Standard Recovery Period is:

$$Rf1_{avg} = \frac{100 * \sum_{number\ of\ events} \Delta T_{f1}}{R_{SDRP1} * n_{total\ events}}$$

Where:

ΔT_{f1} is the Disturbance recovery time in minutes for each disturbance.

R_{SDRP1} is the Standard Recovery Period in minutes for a Single Contingency Disturbance.

"n" is the total number of reportable events per month.

The BA shall have records that indicate the number of Single contingency events and the number of events whose individual Actual Contingency Recovery period was greater than the Standard Contingency Recovery Period in each reporting interval (months).

M3. The BA shall have documentation to determine the Contingency Reserve Restoration Period to restore Contingency Reserve after the reportable disturbance:

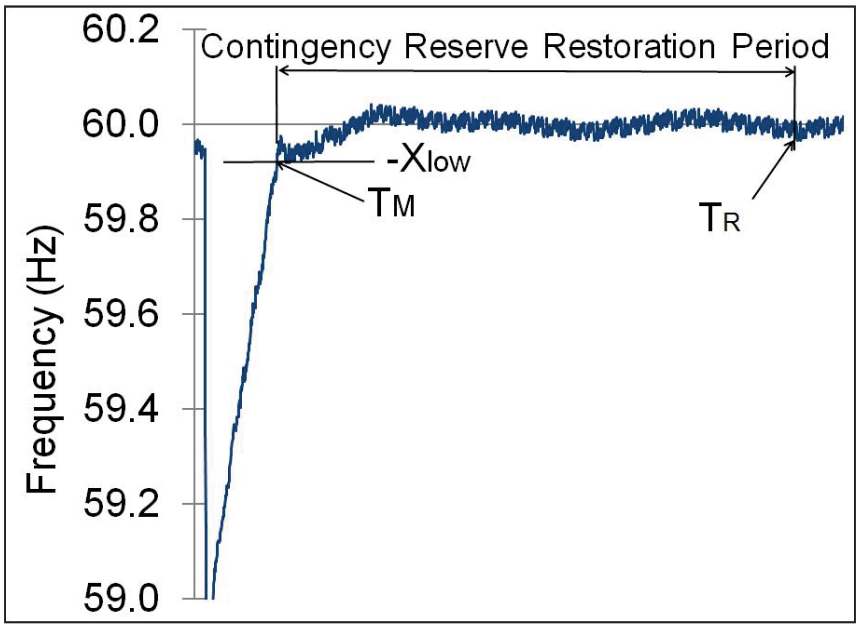
The equation for Contingency Reserve Restoration Period (ΔT_{CR}) is:

$$\Delta T_{CR} = T_R - T_M$$

Where:

T_M is the time when system frequency returned to the respective limit, 60.3 or 59.7 Hz following the start of the reportable disturbance.

T_R is the time when the Contingency Reserve has been restored.



Reportable Single Contingency Disturbance

The monthly average Contingency Reserve restoration recovery period ($Rcrrp_{avg}$) in percent of the Standard Contingency Reserve Restoration Period is:

$$Rcrrp_{avg} = \frac{\sum_{number\ of\ events} \Delta T_{CR}}{1.2 * n_{total\ events}}$$

Where:

ΔT_{CR} is the Contingency Reserve Restoration Period in minutes for each disturbance.

The Standard Contingency Reserve Restoration Period is 120 minutes.

"*n*" is the total number of reportable events per month

M4. The BA shall have documentation that the system returned to the frequency range of 60.5 to 59.5 Hz, within the Disturbance Recovery Period following each Reportable Excess Contingency Disturbance. The Disturbance Control Standard for Reportable Excess Contingency Disturbance(s) is measured as the monthly average recovery time in percent of the Standard Recovery Period.

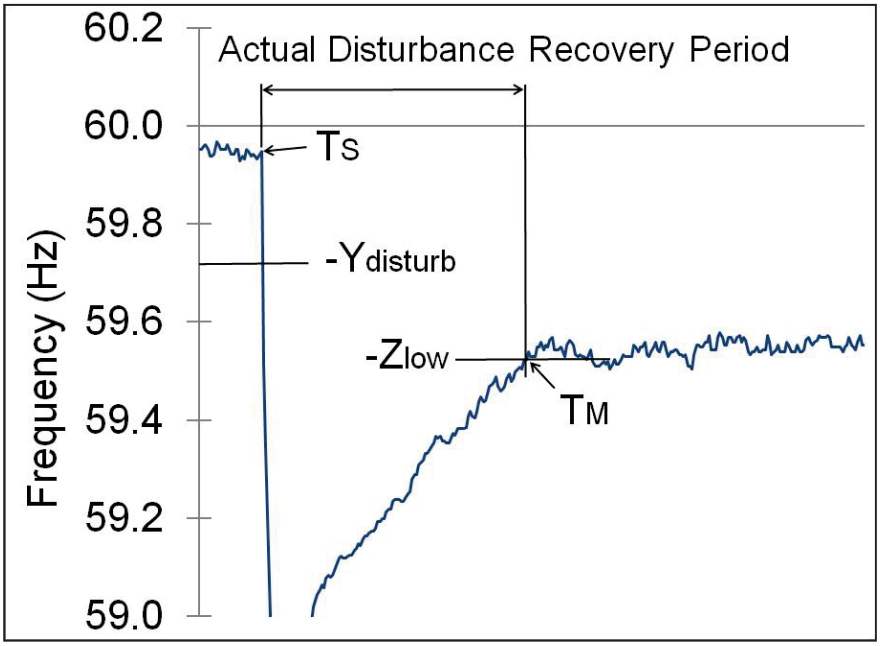
The equation for Actual Reportable Excess Disturbance Recovery Period (ΔT_{f2}) is:

$$\Delta T_{f2} = T_M - T_S$$

Where:

T_M is the time when system frequency returned to the respective limit, 60.5 to 59.5 Hz following the initial reportable disturbance.

T_S is the time at the start of the reportable disturbance



Reportable Excess Contingency Disturbance

The monthly average Excess Contingency Disturbance Recovery Period in ($Rf2_{avg}$) in percent is:

$$Rf2_{avg} = \frac{100 * \sum_{number\ of\ events} \Delta T_{f2}}{R_{SDRP2} * n_{total\ events}}$$

Where:

ΔT_{f2} is the Disturbance recovery time in minutes for each disturbance.

R_{SDRP2} is the Standard Recovery Period in minutes for an Excess Contingency Disturbance.

"n" is the total number of reportable events per month.

The BA shall have records that indicate the number of Excess contingency events and the number of events whose individual Actual Contingency Recovery period was greater than the Standard Contingency Recovery Period in each reporting interval (months).

D. Compliance

5. Compliance Monitoring Process

Compliance with the DCS shall be measured in percent as set forth in the measures M2, M3 and M4 above.

The BA shall submit a Disturbance Control Standard Report to the Regional Reliability Organization (or designee) no later than the 10th day following the end of the calendar month.

5.1. Compliance Monitoring Authority

Guam Power Authority (or designee)

5.2. Compliance Monitoring Period and Reset Time Frame

Compliance for DCS will be evaluated for each reporting period. Reset is one calendar month without a violation.

5.3. Compliance Monitoring and Enforcement Processes:

- Compliance Audits
- Self-Certifications
- Spot Checking
- Compliance Violation Investigations
- Self-Reporting
- Complaints

5.4. Data Retention

The data that support the calculation of DCS are to be retained in electronic form for at least a two-year period. If the DCS data for the Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved.

6. Levels of Non-Compliance

The BA not meeting the DCS during a given calendar month shall initiate a study to increase its contingency reserve obligation or decrease the events creating the disturbances to achieve compliance in the following month.

A representative from the BA that was non-compliant in the calendar month most recently completed shall provide written documentation verifying that the BA will provide a report to the Regional Reliability Organization (or designee) outlining what positive measures have been taken to increase the level of compliance into agreement with the standard. The written

documentation shall accompany the monthly Disturbance Control Standard Report when the BA is non-compliant.

7. Levels of Non-Compliance for Requirement R1, Measure M1

   7.1. Level 1 - The BA failed to meet one of the following conditions for Requirement R1 and Measurement M1:

      7.1.1 Failed to meet the Contingency Reserve requirement 100% of the time but greater than 95%;

      7.1.2 Failed to provide the required calculations that define the reserve requirement in accordance with the reserve criteria; and

      7.1.3 Failed to provide the amount of Contingency Reserve available in MW from each Contingency Reserve resource.

8. Levels of Non-Compliance for Requirement R2, Measure M2

   8.1. Level 1 - The BA achieved a monthly average Disturbance recovery time ($Rf1_{avg}$) greater than or equal to 100% but was less than 105%. (to be evaluated following monitoring period)

   8.2. Level 2 - The BA failed to meet all the requirements of Level 1 for Requirement R2 and Measurement M2.

9. Levels of Non-Compliance for Requirement R3, Measure M3

   9.1. Level 1 - The BA achieved a monthly average Actual Contingency Disturbance Reserve recovery period ($Rcrrp_{avg}$) greater than or equal to 100% but was less than 105%. (to be evaluated following monitoring period)

   9.2. Level 2 - The BA failed to meet all the requirements of Level 1 for Requirement R3 and Measurement M3.

10. Levels of Compliance for Requirement R4, Measure M4

   10.1. Level 1 - The BA achieved a monthly average Excess Contingency Disturbance Recovery Period ($Rf2_{avg}$) greater than or equal to 100% but was less than 105%. (to be evaluated following monitoring period)

   10.2. Level 2 - The BA failed to meet all the requirements of Level 1 for Requirement R4 and Measurement M4.

E. Footnotes

[1]The purpose of the UFLS system is to protect the system from an instantaneous imbalance between load and generation, including the supply in part or in whole of required contingency reserves.

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GRID STABILITY and RELIABILITY STANDARDS

GPA-BAL-003-0

FOR

FREQUENCY RESPONSE AND BIAS

FREQUENCY RESPONSE AND BIAS

- TABLE OF CONTENTS

- A. Introduction

7. Purpose:
   This standard provides a consistent method for calculating the Frequency Bias component of ACE.
8. Applicability:
   Balancing Authority (BA)

B. Requirements

R1. The BA shall review its unit droop settings by January 1 of each year to reflect any change in the Frequency Response of the Balancing Authority Area.

R12.1. The BA may change its Frequency Bias Setting, and the method used to determine the setting, whenever any of the factors used to determine the current bias value change.

R12.2. The BA shall report its Frequency Bias Setting, and method for determining that setting, to the Regional Reliability Organization (or designee).

R12.3. The BA shall establish and maintain a Frequency Bias Setting that is as close as

C. Measures

M2. The BA shall utilize the Frequency Response calculations to update the Frequency Bias Setting at the beginning of each hour. The Frequency Bias Setting shall be between 105% and 125% of the Calculated Frequency Response. The BA shall have documentation that includes the Frequency Bias Setting and all data used in its calculation. The Frequency Bias Setting shall be calculated as follows:

$$B = \sum_{i=1}^{N} \frac{MW_i}{10*60\ Hz*R_i} * X\%$$

Where:

B = Frequency Bias Setting (MW / 0.1 Hz)

MW_i = Unit capacity in MW for units with scheduled headroom

R_i = Unit droop in per-unit

$X\%$ = 105% to 125%

The Frequency Bias Settings shall be greater than or equal to 1% of the BA's estimated maximum yearly peak demand or 1% of the estimated maximum generation level per 0.1 Hz change, whichever is greater when the calculation results in a Frequency Bias Setting that is less than 1% of the yearly peak demand or 1% of the estimated generation level per 0.1 Hz change.

D. Compliance

11. Compliance Monitoring Process

11.1. Compliance Monitoring Authority

Guam Power Authority (or designee)

11.2. Compliance Monitoring Period and Reset Time Frame

Yearly

11.3. Data Retention
The documentation required in M1 shall be retained for at least one calendar year. The calculated Frequency Bias Setting and data used to calculate the Frequency Bias Setting shall be retained in digital format for at least one calendar year.

11.4. Additional Compliance Information

None

12. Levels of Non-Compliance

12.1. Levels of Non-Compliance for Requirement R1, Measure M1

3.1.1. Level 1 - The BA failed to retain dated evidence showing its review of its unit droop settings by January 1 or within 1 quarter of the request by the Regional Reliability Organization (or designee).

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GRID STABILITY and RELIABILITY STANDARDS

GPA-BAL-005-0

FOR

AUTOMATIC GENERATION CONTROL

AUTOMATIC GENERATION CONTROL

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- A. Introduction

9. Purpose:
This standard establishes requirements for Balancing Authority Automatic Generation Control (AGC) necessary to calculate Area Control Error (ACE) and to routinely deploy the Regulating Reserve.

10. Applicability:

10.1 Balancing Authority (BA)

10.2 Generator Operators

10.3 Transmission Operator

10.4 Load Serving Entity

B. Requirements

R1. The BA shall maintain Regulating Reserve that can be controlled by AGC to meet the Control Performance Standard.

R2. The BA shall ensure that data acquisition for and calculation of ACE occur at least every four seconds.

R2.1. The BA shall provide redundant and independent frequency metering equipment that shall automatically activate upon detection of failure of the primary source. This overall installation shall provide a minimum availability of 99.95%.

R3. The BA shall provide its operating personnel with sufficient instrumentation and data recording equipment to facilitate monitoring of control performance, generation response, and after-the-fact analysis of area performance.

R4. The BA shall provide adequate and reliable backup power supplies and shall periodically test these supplies at the BA's control center and other critical locations to ensure continuous operation of AGC and vital data recording equipment during loss of the normal power supply.

R5. BA shall at least annually check and calibrate its time error and frequency devices against a common reference. The BA shall adhere to the minimum values for measuring devices as listed below:

Device	Accuracy
Digital frequency transducer	≤ 0.001 Hz
MW, MVAR, and voltage transducer	≤ 0.25% of full scale
Remote terminal unit	≤ 0.25% of full scale
Potential transformer	≤ 0.30% of full scale

Current transformer ≤ 0.50% of full scale

C. Measures

Not specified.

D. Compliance

13. Compliance Monitoring Process

13.1. Compliance Monitoring Authority

Guam Power Authority (or designee)

13.2. Compliance Monitoring Responsibility

The BA shall be prepared to supply data to the Regional Reliability Organization (or designee) in the format defined below:

4.2.1. Within one week upon request, Balancing Authorities shall provide the Regional Reliability Organization (or designee) AGC source data in daily CSV files with time stamped averages of: 1) ACE and 2) Frequency Error for the requested period

4.2.2. Within one week upon request, Balancing Authorities shall provide the Regional Reliability (or designee) DCS source data in CSV files with time stamped scan rate values for: 1) ACE and 2) Frequency Error for a time period of two minutes prior to 15 minutes after a Reportable Disturbance.

13.3. Data Retention

4.3.1. The BA shall retain its ACE, actual frequency, Scheduled Frequency, actual Regulating Reserve and Frequency Bias Setting data in digital format at the same scan rate at which the data is collected for at least one year.

4.3.2. The BA shall retain documentation of the magnitude of each Reportable Disturbance as well as the ACE charts and/or samples used to calculate BA disturbance recovery values. The data shall be retained for one year following the reporting quarter for which the data was recorded

14. Levels of Non-Compliance

14.1. Levels of Non-Compliance for Requirement R1

5.1.1. Level 1 - The BA failed to retain documentation showing it maintained Regulating Reserve to meet the Control Performance Standard.

5.1.2. Level 2 - The BA failed to maintain Regulating Reserve that can be controlled by AGC to meet the Control Performance Standard.

14.2. Levels of Non-Compliance for Requirement R2

5.2.1. Level 1 - The BA failed to ensure that data acquisition for and calculation of ACE occurred at least every four seconds

5.3. Levels of Non-Compliance with Requirement R3

5.3.1. Level 1 - The BA failed to provide its operating personnel with sufficient instrumentation and data recording equipment to facilitate monitoring of control performance, generation response, and after-the-fact analysis of area performance.

5.4. Levels of Non-Compliance with Requirement R4

5.4.1. Level 1- The BA failed to periodically test the backup power supplies at the BA's control center and other critical locations.

5.4.2. Level 2 - The BA failed to provide adequate and reliable backup power supplies at the BA's control center and other critical locations.

5.5. Levels of Non-Compliance with Requirement R5

5.5.1. Level 1 - The BA failed to check and calibrate its time error and frequency devices against a common reference.

5.5.2. Level 2 - The BA failed to adhere to the minimum values for measuring devices as listed in Requirement R5.

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GRID STABILITY and RELIABILITY STANDARDS

GPA-BAL-502-0

FOR

PLANING RESOURCE ADEQUACY ANALYSIS, ASSESMENT AND DOCUMENTATION

PLANING RESOURCE ADEQUACY ANALYSIS, ASSESMENT AND DOCUMENTATION

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- A. Introduction

11. Purpose:
To establish common criteria for GPA for a planning methodology based on the single largest unit contingency and an appropriate reserve margin or reserve criteria. The analysis, assessment, and documentation of Resource Adequacy, shall include Planning Reserve Margins for meeting system load both real and reactive within the GPA System.

12. Applicability:

12.1 Balancing Authority (BA)

12.2 Planning Coordinators

- B. Requirements

R1. The goal of the Resource Adequacy analysis is to plan the system to meet the following requirements annually.

R2.2. The BA shall perform and document a Resource Adequacy analysis using one of the following two methods.

Method 1: The total capability of each Balance Authority's system plus the total amount of interruptible loads must be equal to or greater than the summation of the following:

- The capacity needed to serve the Forecasted Peak Demand for each period.
- The capacity of the unit(s) scheduled for maintenance for each period; and
- The capacity that would be lost by the Forced Outage of the largest unit/resource in service.

$$\sum_{i=1}^{N} N_i + L_{DR} \geq (L_{Peak} * F_{RM} + \sum_{m=1}^{N} N_m + N_{FO})$$

Where:

- N_i is the Normal Net Capability of available units.
- L_{DR} is the amount of Interruptible Demand designated and measureable for the BA's interruption that can be interrupted for the entire period of the expected capacity shortfall.
- L_{Peak} is the estimated system peak load and losses served from the available generation.
- N_m is the Normal Net Capability of units on scheduled maintenance.

- N_{FO} is the Normal Net Capability of the largest available unit(s) lost by Forced Outage
- F_{RM} is the Reserve Margin multiplier and the BA must give consideration to using X percent (1.X) based on the reserve net capability. The Planning Coordinator shall set the required Reserve Margin multiplier (FRM) for use in the Resource Adequacy analysis using Method 1. However, in no case shall the selection of F_RM in relationship to Normal Net Capability of the largest available unit(s) cause a shortage to serve the estimated system peak load and losses.

Method 2: Calculate a Planning Reserve Margin that will result in the sum of the probabilities for the loss of Load for the integrated peak hour for all days of each planning year analyzed being equal to 0.X. (This is comparable to a "one day in X year" criterion). The Planning Coordinator shall set the minimum Loss of Load Expectation in days per year for use in the Resource Adequacy analysis using Method 2.

R2.3. The Resource Adequacy analysis must document that the BA has developed a resource plan that meets the requirements of R1.1 Method 1 or R1.1 Method 2.
- R2.3.1. The utilization of Interruptible Demand must not contribute to the loss of Load probability.
- R2.3.2. The Planning Reserve Margin developed from R1.1 must be expressed as a percentage of the median forecast peak Net Internal Demand (Planning Reserve Margin).

R2.4. Be performed or verified separately for each of the following planning years:
- R2.4.1. Perform an analysis for Year One.
- R2.4.2. Perform an analysis or verification at a minimum for one year in the 2 through 5 year period and at a minimum one year in the 6 through 10 year period.
- R2.4.3. If the analysis is verified, the verification must be supported by current or past studies for the same planning year.

R2.5. Include the following subject matter and documentation of its use:
- R2.5.1. Load forecast characteristics:
  - Median forecast peak Load.
  - Load forecast uncertainty (reflects variability in the Load forecast due to weather and regional economic forecasts).
  - Load diversity.
  - Seasonal Load variations.
  - Daily demand modeling assumptions (firm, interruptible).
  - Contractual arrangements concerning curtailable/Interruptible Demand.
  - Load response to frequency and short and long-term changes in voltage.
- R2.5.2. Resource characteristics:
  - Historic resource performance and any projected changes.
  - Seasonal resource ratings.

- Resource planned outage schedules, deratings, and retirements.
- Modeling assumptions of intermittent and energy limited resource such as wind, PV, and cogeneration.
- Criteria for including planned resource additions in the analysis
- Starting/loading time if resources are to be used as Contingency Reserves
- Frequency response characteristics
- Inertia response characteristics
- Frequency ride-through characteristics
- Voltage ride-through characteristics
- Short circuit current characteristics
- Dispatch characteristics (ramp rate, minimum values, regulation, etc)
- Mitigation resources required due to generation capacity resource characteristics

R2.5.3. Transmission limitations that prevent the delivery of generation resources

R1.4.3.1. Criteria for including planned Transmission Facility additions in the analysis

R1.4.3.2. Criteria for remedial action systems employed in lieu of Transmission improvements

R1.4.3.3. Resource additions to eliminate or increase transfer capacity between areas or through a transmission path.

R2.6. Consider the following resource availability characteristics and document how and why they were included in the analysis or why they were not included:

- Availability and deliverability of fuel.
- Common mode outages that affect resource availability
- Environmental or regulatory restrictions of resource availability.
- Any other demand (Load) response programs not included in R1.3.1.
- Sensitivity to resource outage rates.
- Impacts of extreme weather/drought conditions that affect unit availability.
- Modeling assumptions for emergency operation procedures used to make reserves available.
- Market resources not committed to serving Load (uncommitted resources) within the Balance Authority's Control Area.

R2.7. Consider Transmission maintenance outage schedules and document how and why they were included in the Resource Adequacy analysis or why they were not included

R2.8. Document that capacity resources are appropriately accounted for in its Resource Adequacy analysis.

R2.9. Document that all Load in the Balance Authority's Area is accounted for in its Resource Adequacy analysis.

R2.10. Provide a Corrective Action Plan to meet the Planning Reserve Margin where Resource Adequacy Analysis shows a shortfall.

R2.10.1. Corrective Action Plan should consider transmission constraints when a generation asset is recommended.

R2.10.2. The Corrective Action Plan should consider Transmission improvements to remove generation constraints.

R1.9.2.1. If transmission improvements are part of the Resource Adequacy Corrective Action Plan, the Transmission improvements must be included in the appropriate Corrective Action Plan for the transmission system

R2. Every five years the BA must document the projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis.

R4.1. This documentation must cover each of the years selected for analysis or verification in R1.3.1 and R1.3.2.

R4.2. This documentation must include the Planning Reserve Margin calculated per requirement R1.1 for each of the three years in the analysis.

R4.3. The documentation must include sufficient studies to show that the characteristics of proposed capacity addition do not result in a degradation of system performance.

- C. Measures

M3. The BA must possess the documentation that a valid Resource Adequacy analysis was performed or verified in accordance with R1 Method 1 or R1 Method 2.

M4. The BA must possess the documentation of its projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis on an annual basis in accordance with R2. The documentation must include sufficient studies to determine that the characteristics of the proposed resource additions do not degrade system performance or reliability.

- D. Compliance

15. Compliance Monitoring Process

15.1. Compliance Monitoring Authority

Guam Power Authority (or designee)

15.2. Compliance Monitoring Period and Reset Timeframe

One calendar year

15.3. Data Retention

The BA must retain information from the current analysis and the most recent analysis. The Regional Reliability Organization (or designee) will retain any audit data for five years.

16. Levels of Non-Compliance for Requirement R1, Measure M1

16.1. Level 1 - The BA met one of the following conditions for Requirement R1 and Measurement M1

7.1.1. The BA Resource Adequacy analysis failed to consider 1 or 2 of the Resource availability characteristics subcomponents under R1.4 and documentation of how and why they were included in the analysis or why they were not included.

7.1.2. The BA Resource Adequacy analysis failed to consider 1 or 2 of the Resource availability characteristics subcomponents under R1.5 and documentation of how and why they were included in the analysis or why they were not included.

7.1.3. The BA Resource Adequacy analysis failed to consider Transmission maintenance outage schedules and document how and why they were included in the analysis or why they were not included per R1.6.

7.1.4. The Planning Authority did not provide the minimum Reserve Margin multiplier or the minimum Loss of Load Expectation.

16.2. Level 2 - The BA failed to meet all the requirements of Level 1 for Requirement R1 and Measurement M1

17. Levels of Non-Compliance for Requirement R2, Measure M2

3.1. Level 1 – The BA failed to publicly post the documents as specified per requirement R2.1 and R2.2 later than 30 calendar days prior to the beginning of Year One per R2.3 for Requirement R2 and Measurement M2.

3.2. Level 2 - The BA failed to meet all the requirements of Level 1 for Requirement R2 and Measurement M2.

- E. Footnotes

- [1]The median forecast is expected to have a 50% probability of being too high and 50% probability of being too low (50:50).

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GRID STABILITY and RELIABILITY STANDARDS

GPA-MOD-025-0

FOR

VERIFICATION AND DATA REPORTING OF GENERATOR REAL AND REACTIVE POWER CAPABILITY AND SYNCHRONOUS CONDENSER REACTIVE POWER CAPABILITY

VERIFICATION AND DATA REPORTING OF GENERATOR REAL AND REACTIVE POWER CAPABILITY AND SYNCHRONOUS CONDENSER REACTIVE POWER CAPABILITY

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- A. Introduction

13. Purpose:

To ensure that accurate information on generator gross and net Real and Reactive Power capability and synchronous condenser Reactive Power capability is available for planning models used to assess Bulk Electric System (BES) reliability.

14. Applicability:

14.1 Functional Entities:

14.1.1 Generator Owner

14.1.2 Transmission Planner

14.1.3 Transmission Owner

14.2 Facilities:

For the purpose of the requirements contained herein, Facilities that are directly connected to the Bulk Electric System (BES) will be collectively referred to as an "applicable unit" that meet the following:

14.2.1 Generation in the Interconnection with the following characteristics:

14.2.1.1 Individual generating unit greater than 5 MVA (gross nameplate rating).

14.2.1.2 Individual generating plant consisting of multiple generating units that are directly connected at a common BES bus with total generation greater than 5 MVA (gross aggregate nameplate rating).

14.2.2 Synchronous condenser greater than 5 MVA (gross nameplate rating) directly connected to the Bulk Electric System.

14.2.3 Power Electronics Transmission Assets with Real Power capabilities greater than 1 MVA directly connected to the Bulk Electric System.

B. Requirements

R1. Each Generator Owner or Transmission Owner shall provide any Transmission Planner with verification of the Real Power capability of its applicable Facilities as follows:

R4.4. Verify, in accordance with Attachment 1, (i) the Real Power capability of its generating units and (ii) the Real Power capability of its Power Electronics Transmission Assets.; and

R4.5. Submit a completed Attachment 2 (or a form containing the same information as identified in Attachment 2) to any Transmission Planner within 60 calendar days of either (i) the date the data is recorded for a staged test; or (ii) the date the data is selected for verification using historical operational data; or

R4.6. Submit a completed Attachment 3 (or a form containing the same information as identified in Attachment 3) to any Transmission Planner within 60 calendar days of either (i) the date the data is recorded for a staged test; or (ii) the date the data is selected for verification using historical operational data for Temperature Sensitive Units.

R2. Each Generator Owner or Transmission Owner shall provide any Transmission Planner with verification of the Reactive Power capability of its applicable Facilities as follows:

R5.1. Verify, in accordance with Attachment 1, (i) the Reactive Power capability of its generating units, (ii) the Reactive Power capability of its synchronous condenser units, and (iii) the Reactive Power capability of its Power Electronics Transmission Assets.

R5.2. Submit a completed Attachment 2 (or a form containing the same information as identified in Attachment 2) to any Transmission Planner within 60 calendar days of either (i) the date the data is recorded for a staged test; or (ii) the date the data is selected for verification using historical operational data.

C. Measures

M3. Each Generator Owner or Transmission Owner will have evidence that it performed the verification, such as a completed Attachment 2 or 3 or the Generator Owner or Transmission Owner form with the same information or dated information collected and used to complete attachments, and will have evidence that it submitted the information within 60 days to any Transmission Planner; such as dated electronic mail messages or mail receipts in accordance with Requirement R1. Each Generator Owner or Transmission Owner will have evidence that the Real Power capability was verified within the periodicity specified in Attachment 1.

M4. Each Generator Owner or Transmission Owner will have evidence that it performed the verification, such as a completed Attachment 2 or the Generator Owner or Transmission Owner form with the same information, or dated information collected and used to complete attachments and will have evidence that it submitted the information within 60 days to any Transmission Planner; such as dated electronic mail messages or mail receipts in accordance with Requirement R2. Each Generator Owner or Transmission Owner will have evidence that the Reactive Power capability was verified within the periodicity specified in Attachment 1.

D. Compliance

4. Compliance Monitoring Process

4.1. Compliance Enforcement Authority

Regional Coordinating Council

4.2. Data Retention

The following evidence retention periods identify a period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention specified below is shorter than the time since the last compliance audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The Generator Owner and Transmission Owner shall each keep the data or evidence to show compliance as identified below, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- The Generator Owner shall retain the latest GPAMOD-025 Attachment 2 or 3 and the data behind Attachment 2 or 3 or Generator Owner form with equivalent information and submittal evidence for Requirements R1 and R2, Measures M1 and M2 for the time period since the last compliance audit.
- The Transmission Owner shall retain the latest GPAMOD-025 Attachment 2 and the data behind Attachment 2 or Transmission Owner form with equivalent information and submittal evidence for Requirements R3 and R4, Measure M3 and M4 for the time period since the last compliance audit.
- The Generator Owner or Transmission Owner shall retain the information/data request and provided response evidence of Requirements R3, and R4 Measures M3 and M4 for 3 calendar years from the date the document was provided.

If a Generator Owner or Transmission Owner is found noncompliant, it shall keep information related to the noncompliance until mitigation is complete or for the time specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

4.3. Compliance

Compliance Audit

Self-Certification

Spot Checking

Compliance Investigation

Self-Reporting

Complaint

5. Levels of Non-Compliance

5.1. Levels of Non-Compliance for Requirement R1, Measure M1

5.1.1 Level 1 – The Generator Owner or Transmission Owner failed to provide any Transmission Planner with verification of the Real Power capability verification of its applicable Facilities within 60 days.

5.1.2 Level 1 – The Generator Owner or Transmission Owner failed to meet the periodicity requirements of Attachment 1 for verification of its applicable Facilities.

5.1.3 Level 2 – The Generator Owner or Transmission Owner failed to retain evidence that it performed the Real Power capability verification of its applicable Facilities as required by Requirement R1.

5.2. Levels of Non-Compliance for Requirement R2, Measure M2

5.2.1 Level 1 – The Generator Owner or Transmission Owner failed to provide any Transmission Planner with verification of the Reactive Power capability of its applicable Facilities within 60 days.

5.2.2 Level 1 – The Generator Owner or Transmission Owner failed to meet the periodicity requirements of Attachment 1 for verification of its applicable Facilities.

5.2.3 Level 2 – The Generator Owner or Transmission Owner failed to retain evidence that it performed the Reactive Power capability verification of its applicable Facilities as required by Requirement R2.

GPAMOD-025 Attachment 1 – Verification of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

Periodicity for conduction of a new verification:

The periodicity for performing Real and Reactive Power capability verification is as follows:

1. For staged verification; verify each applicable Facility at least every five years or as approved by the RRO (with no more than 66 calendar months between verifications), or within 6 calendar months of the discovery of a change that affects its Real Power or Reactive Power capability by more than 10 percent of the last reported verified capability and is expected to last more than six months. The first verification for each applicable Facility under this standard must be a staged test.
2. For verification using operational data; verify each applicable Facility at least every calendar year or as approved by the RRO (with no more than 18 calendar months between verifications), or within 3 calendar months following the discovery that its Real Power or Reactive Power capability has changed by more than 10 percent of the last reported verified capability and is expected to last more than six months. For temperature sensitive units, verification of Real Power capability using operational data may require data over the course of several months. Operational data should be obtained within a string of consecutive months if allowable by ambient temperatures. If data for different points is recorded on different months, designate the earliest of those dates as the verification date, and report that date as the verification date on GPAMOD-025, Attachment 2 for periodicity purposes. Units whose real power is verified using operational data shall confirm its Reactive Power using staged verifications.

For either verification method, verify each new applicable Facility within 6 calendar months of its commercial operation date or within a timeline approved by the RRO. Existing units that have been in long term shut down and have not been tested for more than five years shall be verified within 6 calendar months or within a timeline approved by the RRO if the units are scheduled to return to regular service.

It is intended that Real Power testing be performed at the same time as full load Reactive Power testing, however separate testing is allowed for this standard. For synchronous condensers, perform only the Reactive Power capability verifications as specified below. For all Power Electronics Transmission Assets perform Reactive Power capability verifications and perform real power verifications for Power Electronics Transmission Assets with real power capability.

If the Reactive Power capability is verified through test, it is to be scheduled at a time advantageous for the unit being verified to demonstrate its Reactive Power capabilities while the Transmission Operator takes measures to maintain the plant's system bus voltage at the scheduled value or within acceptable tolerance of the scheduled value.

Generators that have a current average Net Capacity Factor over the most recent three calendar years, beginning on January 1 and ending on December 31, of 5% or less are exempt. The equations for calculating the Net

Capacity Factor are listed in GPAMOD-027 Attachment 1 Note 4. The Generator Owner shall verify the capability within one year of the date of the capacity factor exemption expiration. The verification can be done by either a staged test or using operational data following the expiration of the capacity factor exemption.

Verification specifications for applicable Facilities:

1. For generating units of 5 MVA or less that are part of a plant greater than 5 MVA in aggregate connected through a single contingency condition, record data either on an individual unit basis or as a group. Perform verification individually for every generating unit or synchronous condenser greater than 5 MVA (gross nameplate rating). Perform verification individually for every Power Electronics Transmission Asset greater than 1 MVA.
2. Verify all auxiliary equipment needed for expected normal operation is in service for both the Real Power and Reactive Power capability verification. Perform verification with the automatic voltage regulator in service for the Reactive Power capability verification. Operational data from within the 18 months prior to the verification date is acceptable for the verification of either the Real Power or the Reactive Power capability, as long as a) that operational data meets the criteria in 2.1 through 2.4 below and b) the operational data demonstrates at least 90 percent of a previously staged test that demonstrated at least 50 percent of the Reactive capability shown on the associated thermal capability curve (D-curve). If the previously staged test was unduly restricted (so that it did not demonstrate at least 50 percent of the associated thermal capability curve) by unusual generation or equipment limitations (e.g., capacitor or reactor banks out of service), then the next verification will be by another staged test, not operational data:
    - 2.1. Verify Real Power capability and Reactive Power capability over-excited (lagging) of all applicable Facilities at the applicable Facilities' normal (not emergency) expected maximum Real Power output at the time of the verifications.
        - 2.1.1. Verify synchronous generating unit's maximum Real Power for one hour and lagging Reactive Power for a minimum of fifteen minutes.
        - 2.1.2. Verify Power Electronics Transmission Asset maximum Real Power. The verification should use greater than 20% of the rated energy at the rated Real Power output. The verification may use less than 20% of the rated energy with approval from the Regional Reliability Organization.
            - 2.1.2.1. Verify that Power Electronics Transmission Assets used for Contingency Reserve have the capability to provide Contingency Reserve at the Real Power level for the expected duration.
            - 2.1.2.2. Verification of Power Electronics Transmission Assets used for Contingency Reserve may include staged tests or operational data.
        - 2.1.3. Verify variable generating units, such as wind, solar, and run of river hydro, at the maximum Real Power output the variable resource can provide at the time of the

verification. Perform verification of Reactive Power capability of wind turbines and photovoltaic inverters with at least 90 percent of the wind turbines or photovoltaic inverters at a site on-line. If verification of wind turbines or photovoltaic inverter Facility cannot be accomplished meeting the 90 percent threshold, document the reasons the threshold was not met and test to the full capability at the time of the test. Reschedule the test of the facility within six months of being able to reach the 90 percent threshold. Maintain, as steady as practical, Real and Reactive Power output during verifications.

2.2. Verify Reactive Power capability of all applicable Facilities, other than wind and photovoltaic, for maximum overexcited (lagging) and under-excited (leading) reactive capability for the following conditions:

2.2.1. At the minimum Real Power output at which they are normally expected to operate collect maximum leading and lagging reactive values as soon as a limit is reached. The Reactive Power capability of Power Electronics Transmission Assets shall be verified at a Real Power output of zero if such devices are expected to provide reactive support.

2.2.2. At maximum Real Power output collect maximum expected leading and lagging Reactive Power for 15 minutes.

2.3. For hydrogen-cooled generators, perform the verification at normal operating hydrogen pressure.

2.4. Calculate the Generator Step-Up (GSU) transformer losses if the verification measurements are taken from the high side of the GSU transformer. GSU transformer real and reactive losses may be estimated, based on the GSU impedance, if necessary.

3. Record the following data for the verifications specified above:

3.1. The value of the gross Real and Reactive Power generating capabilities at the end of the verification period.

3.2. The voltage schedule provided by the Transmission Operator, if applicable.

3.3. The voltage at the high and low side of the GSU and/or system interconnection transformer(s) at the end of the verification period. If only one of these values is metered, the other may be calculated.

3.4. The ambient conditions, if applicable, at the end of the verification period that the Generator Owner requires to perform corrections to Real Power for different ambient conditions such as:

- Ambient air temperature
- Relative humidity
- Cooling water temperature
- Other data as determined to be applicable by the Generator Owner to perform corrections for ambient conditions.

3.5. The date and time of the verification period, including start and end time in hours and minutes.

3.6. The existing GSU and/or system interconnection transformer(s) voltage ratio and tap setting.

3.7. The GSU transformer losses (real or reactive) if the verification measurements were taken from the high side of the GSU transformer.

3.8. Whether the test data is a result of a staged test or if it is operational data.

4. Develop a simplified key one-line diagram (refer to GPAMOD-025, Attachment 2) showing sources of auxiliary Real and Reactive Power and associated system connections for each unit verified. Include GSU and/or system Interconnection and auxiliary transformers. Show Reactive Power flows, with directional arrows.
   4.1. If metering does not exist to measure specific Reactive auxiliary load(s), provide an engineering estimate and associated calculations. Transformer Real and Reactive Power losses will also be estimates or calculations. Only output data are required when using a computer program to calculate losses or loads.
5. If an adjustment is requested by the Transmission Planner, then develop the relationships between test conditions and generator output so that the amount of Real Power that can be expected to be delivered from a generator can be determined at different conditions, such as peak summer conditions. Adjust MW values tested to the ambient conditions specified by the Transmission Planner upon request and submit them to the Transmission Planner within 60 days of the request or the date the data was recorded/selected whichever is later.

Note 1: Under some transmission system conditions, the data points obtained by the MVAr verification required by the standard will not duplicate the manufacturer supplied thermal capability curve (D-curve) or power electronics capability curves. However, the verification required by the standard, even when conducted under these transmission system conditions, may uncover applicable Facility limitations; such as rotor thermal instability, improper tap settings or voltage ratios, inaccurate AVR operation, etc., which could be further analyzed for resolution. The MVAr limit level(s) achieved during a staged test or from operational data may not be representative of the unit's reactive capability for extreme system conditions. See Note 2.

Note 2: While not required by the standard, it is desirable to perform engineering analyses to determine expected applicable Facility capabilities under less restrictive system voltages than those encountered during the verification. Even though this analysis will not verify the complete thermal capability curve (D-curve) or power electronics capability curves, it provides a reasonable estimate of applicable Facility capability that the Transmission Planner can use for modeling.

Note 3: The Reactive Power verification is intended to define the limits of the unit's Reactive Power capabilities. If a unit has no leading capability, then it should be reported with no leading capability; or the minimum lagging capability at which it can operate.

Note 4: Synchronous Condensers and Power Electronics Transmission Assets without Real Power capability only need to be tested at two points (one over-excited point and one under-excited point) since they have no Real Power output.

GPAMOD-025 Attachment 2

One-line Diagram, Table, and Summary for Verification Information Reporting

Note: If the configuration of the applicable Facility does not lend itself to the use of the diagram, tables, or summaries for reporting the required information, changes may be made to this form, provided that all required information (identified in GPAMOD-025, Attachment 1) is reported.

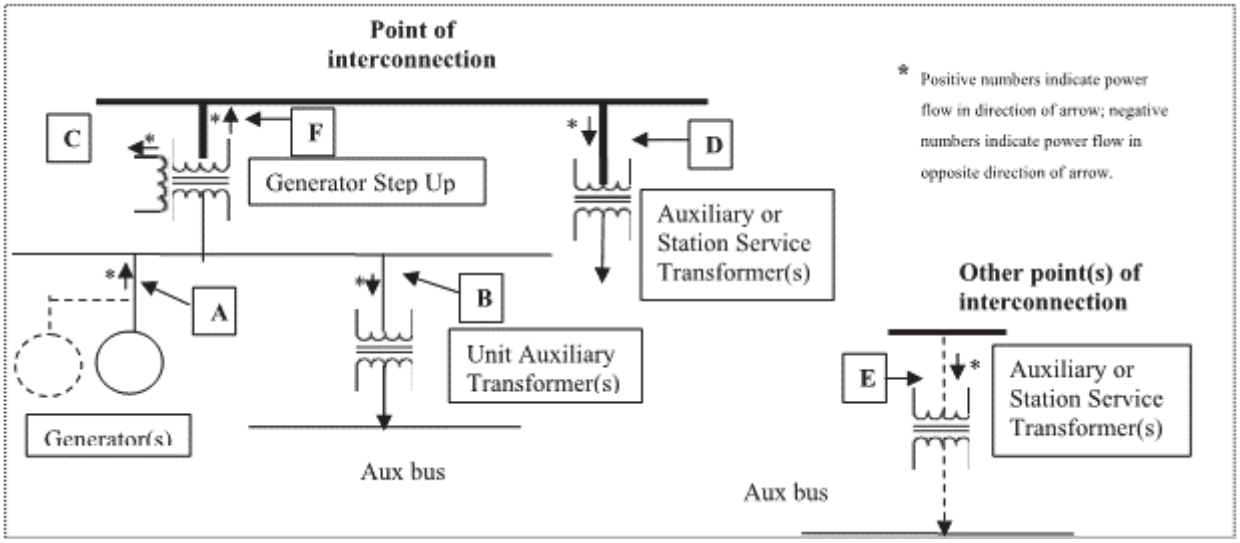
Company: **Reported By (name):**

Plant: **Unit No.:** **Date of Report:**

Check all that apply:

- ☐ Over-excited Full Load Reactive Power Verification
- ☐ Under-excited Full Load Reactive Power Verification
- ☐ Over-excited Minimum Load Reactive Power Verification
- ☐ Under-excited Minimum Load Reactive Power Verification
- ☐ Real Power Verification
- ☐ Staged Test Data
- ☐ Operational Data

Simplified one-line diagram showing plant auxiliary Load connections and verification data:


Point of interconnection
C
F
Generator Step Up
D
Auxiliary or Station Service Transformer(s)
A
B
Unit Auxiliary Transformer(s)
Generator(s)
Aux bus
* Positive numbers indicate power flow in direction of arrow; negative numbers indicate power flow in opposite direction of arrow.
Other point(s) of interconnection
E
Auxiliary or Station Service Transformer(s)
Aux bus

Point	Voltage	Real Power	Reactive Power	Comment
A	**kV**	**MW**	**Mvar**	Sum multiple generators that are verified together or are part of the same unit. Report individual unit values separately whenever the verification measurements were taken at the individual unit. Individual values are required for units or synchronous condensers > 5 MVA or Power Electronics Transmission Assets > 1 MVA.
Identify calculated values if any:				
B	**kV**	**MW**	**Mvar**	Sum multiple unit auxiliary transformers.
Identify calculated values if any:				
C	**kV**	**MW**	**Mvar**	Sum multiple tertiary Loads, if any.
Identify calculated values if any:				
D	**kV**	**MW**	**Mvar**	Sum multiple auxiliary and station service transformers.
Identify calculated values if any:				
E	**kV**	**MW**	**Mvar**	If multiple points of Interconnection, describe these for accurate modeling; report points individually (sum multiple auxiliary transformers).
F	**kV**	**MW**	**Mvar**	Net unit capability
Identify calculated values if any:				

GPAMOD-025 – Attachment 2 (continued)

Verification Data

Provide data by unit or Facility as appropriate

Data Type	Data Recorded	Last Verification (Previous Data; will be blank for the initial verification)
Gross Reactive Power Capability (*Mvar)		
Aux Reactive Power (*Mvar)		
Net Reactive Power Capability (*Mvar) equals Gross Reactive Power Capability (*Mvar) minus Aux Reactive Power connected at the same bus (*Mvar) minus tertiary Reactive Power connected at the same bus(*Mvar)		
Gross Real Powr Capability (*MW)		
Aux Real Power (*MW)		
Net Real Power Capability (*MW) equals Gross Real Power Capability (*MW) minus Aux Real Power connected at the same bus (*MW) minus tertiary Real Power connected at the same bus (*MW)		
* Note: Enter values at the end of the verification period.		
GSU losses (only required if verification measurements are taken on the high side of the GSU - Mvar)		

Summary of Verification

- Date of Verification _____, Verification Start Time _____, Verification End Time _____
- Scheduled Voltage _____
- Transformer Voltage Ratio: GSU _____, Unit Aux _____, Station Aux _____, Other Aux _____
- Transformer Tap Setting: GSU _____, Unit Aux _____, Station Aux _____, Other Aux _____
- Ambient conditions at the end for the verification period:
  Air Temperature: _____

Humidity: _____

Cooling water temperature: _____

Other data as applicable: _____

- Generator hydrogen pressure at time of test (if applicable) _____

Date that data shown in last verification column in table above was tGPAen _____

Remarks :

Note: If the verification value did not reach the thermal capability curve (D-curve), describe the reason.

GPAMOD-025 – Attachment 3

The Real Power capability verification for Temperature Sensitive Units shall be performed as follows:

1. The Real Power capability verification for Temperature Sensitive Units shall occur annually or as approved by the RRO.
2. Real Power verification shall be performed for generating units 5 MVA or larger or generating units smaller than 5 MVA that are part of a plant greater than 5 MVA in aggregate connected through a single contingency condition.
3. Verify with all auxiliary equipment needed for expected normal operation in service for the Real Power capability verification.
   - 3.1. Verify Real Power capability of all applicable Facilities at the applicable Facilities' maximum Real Power output for the ambient air temperature at the time of the verification.
     - 3.1.1. Verify Temperature Sensitive Unit's maximum real power for a minimum of fifteen minutes.
     - 3.1.2. Verification shall be performed at ambient air temperature increments of 10 degrees Fahrenheit from annual minimum temperature to the annual maximum temperature at the unit location.
     - 3.1.3. Verification data shall include the Temperature Sensitive Unit's maximum real power, the temperature in Fahrenheit, and the time and date of test.
4. Record the following data for the verifications specified above:
   - 4.1. The value of the gross Real Power generating capabilities at the end of the verification period.
   - 4.2. The auxiliary power, temperature, date, and time of test for applicable Temperature Sensitive Unit.

Data Type	Data Recorded	Temperature	Date	Time
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________
Gross Power Capability, Aux Power	_______ MW, _______ MW	_______°F	_________	_________

GUAM POWER AUTHORITY
- P.O. BOX 2977

AGANA, GUAM 96932

GRID STABILITY and RELIABILITY STANDARDS

GPA-MOD-026-0

FOR

VERIFICATION OF MODELS AND DATA FOR GENERATOR EXCITATION CONTROL SYSTEM OR PLANT VOLT/VAR CONTROL FUNCTIONS

VERIFICATION OF MODELS AND DATA FOR GENERATOR EXCITATION CONTROL SYSTEM OR PLANT VOLT/VAR CONTROL FUNCTIONS

- TABLE OF CONTENTS

- A. Introduction

15. Purpose:

To verify that the generator excitation control system or plant volt/var control function[1] model (including the power system stabilizer model and the impedance compensator model) and the model parameters used in dynamic simulations accurately represent the generator excitation control system or plant volt/var control function behavior when assessing Bulk Electric System (BES) reliability.

16. Applicability:

16.1 Functional Entities:

16.1.1 Generator Owner

16.1.2 Transmission Planner

16.1.3 Transmission Owner

16.2 Facilities:

For the purpose of the requirements contained herein, Facilities that are directly connected to the Bulk Electric System (BES) will be collectively referred to as an "applicable unit" that meet the following:

16.2.1 Generation in the Interconnection with the following characteristics:

16.2.1.1 Individual generating unit greater than 5 MVA (gross nameplate rating).

16.2.1.2 Individual generating plant consisting of multiple generating units that are directly connected at a common BES bus with total generation greater than 5 MVA (gross aggregate nameplate rating).

16.2.2 Synchronous condenser greater than 5 MVA (gross nameplate rating) directly connected to the Bulk Electric System.

16.2.3 Power Electronics Transmission Assets with Real Power capabilities greater than 1 MVA directly connected to the Bulk Electric System.

B. Requirements

R1. Each Transmission Planner shall provide the following information to the Generator Owner or Transmission Owner within 30 calendar days of receiving a written request:

- Instructions on how to obtain the list of excitation control system or plant volt/var control function models that are acceptable to the Transmission Planner for use in dynamic simulation,

- Instructions on how to obtain the dynamic excitation control system or plant volt/var control function model library block diagrams and/or data sheets for models that are acceptable to the Transmission Planner, or
- Model data for any of the Generator Owner's or Transmission Owner's existing applicable unit specific excitation control system or plant volt/var control function contained in the Transmission Planner's dynamic database from the current (in-use) models, including generator MVA base.
- It is noted that digital governors with multiple modes of control and operation may require the Generation Owner or Transmission Owner to develop custom models to simulate the response of the unit. Such models will be based on standard models provided by the Transmission Planner to the extent possible.

R2. Each Generator Owner shall provide for each applicable unit, a verified generator excitation control system or plant volt/var control function model, including documentation and data (as specified in Part 2.1) to any Transmission Planner in accordance with the periodicity specified in GPAMOD-026 Attachment 1. Transmission Owners shall provide the same documentation and data for applicable Power Electronics Transmission Assets.

R7.1. Each applicable unit's model shall be verified by the Generator Owner or Transmission Owner using one or more models acceptable to the Transmission Planner. Verification for individual units less than 5 MVA (gross nameplate rating, 1 MVA for Power Electronics Transmission Assets) in a generating plant (per Section 4.2.1.2) may be performed using either individual unit or aggregate unit model(s), or both. Each verification shall include the following:

R7.1.1. Documentation demonstrating the applicable unit's model response matches the recorded response for a voltage excursion from either a staged test or a measured system disturbance,

R7.1.2. Manufacturer, model number (if available), and type of the excitation control system including, but not limited to static, AC brushless, DC rotating, and/or the plant volt/var control function (if installed),

R7.1.3. Model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia, or equivalent data for the generator,

R7.1.4. Model structure and data for the excitation control system, including the closed loop voltage regulator if a closed loop voltage regulator is installed or the model structure and data for the plant volt/var control function system,

R7.1.5. Compensation settings (such as droop, line drop, differential compensation), if used, and

R7.1.6. Model structure and data for power system stabilizer, if so equipped,

R7.1.7. Representation of the real power response effects of outer loop controls (such as operator set point controls, and load control but excluding AGC control) that would override the governor response (including blocked or nonfunctioning governors or modes of operation that limit Frequency Response), if applicable.

R7.2. Each Generator Owner or Transmission Owner shall provide model structure, data, and source code (if available) for any excitation control system or plant volt/var control function that requires a custom model that is not in the model list provided by the Transmission Planner.

R7.2.1. The Generator Owner or Transmission Owner shall document the need for using a custom model and provide the documentation to the Transmission Planner.

R.3 Each Generator Owner or Transmission Owner shall provide a written response to any Transmission Planner within 60 calendar days of receiving one of the following items for an applicable unit.

- Written notification, from any Transmission Planner (in accordance with Requirement R6) that the excitation control system or plant volt/var control function model is not usable,
- Written comments from any Transmission Planner identifying technical concerns with the verification documentation related to the excitation control system or plant volt/var control function model, or
- Written comments and supporting evidence from any Transmission Planner indicating that the simulated excitation control system or plant volt/var control function model response did not match the recorded response to a transmission system event.

The written response shall contain either the technical basis for maintaining the current model, the model changes, or a plan to perform model verification[2] (in accordance with Requirement R2).

R.4 Each Generator Owner or Transmission Owner shall provide revised model data or plans to perform model verification (in accordance with Requirement R2) for an applicable unit to any Transmission Planner within 60 calendar days of making changes to the excitation control system or plant volt/var control function that alter the equipment response characteristic[3].

R.5 Each Generator Owner and Transmission Owner shall provide a written response to any Transmission Planner, within 60 calendar days following receipt of a technically justified[4] unit request from the Transmission Planner to perform a model review of a unit or plant that includes one of the following:

- Details of plans to verify the model (in accordance with Requirement R2), or
- Corrected model data including the source of revised model data such as discovery of manufacturer test values to replace generic model data or updating of data parameters based on an on-site review of the equipment.

R.6 Each Transmission Planner shall provide a written response to the Generator Owner or Transmission Owner within 30 calendar days of receiving the verified excitation control system or plant volt/var control function model information in accordance with Requirement R2 that the model is usable (meets the criteria specified in Parts 6.1 through 6.3) or is not usable.

R11.1. The excitation control system or plant volt/var control function model initializes to compute modeling data without error,

R11.2. A no-disturbance simulation results in negligible transients, and

R11.3. For an otherwise stable simulation, a disturbance simulation results in the excitation control and plant volt/var control function model exhibiting positive damping.

If the model is not usable, the Transmission Planner shall provide a technical description of why the model is not usable

C. Measures

M5. The Transmission Planner must provide the dated request for instructions or data, the transmitted instructions or data, and dated evidence of a written transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) as evidence that it provided the request within 30 calendar days in accordance with Requirement R1.

M6. The Generator Owner or Transmission Owner must provide dated evidence it verified each generator excitation control system or plant volt/var control function model according to Part 2.1 for each applicable unit and a dated transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) as evidence it provided the model, documentation, and data to any Transmission Planner, in accordance with Requirement R2.

M7. Evidence for Requirement R3 must include the Generator Owner's or Transmission Owner's dated written response containing the information identified in Requirement R3 and dated evidence of transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) of the response.

M8. Evidence for Requirement R4 must include, for each of the Generator Owner's or Transmission Owner's applicable units for which system changes specified in Requirement R4 were made, a dated revised model data or plans to perform a model verification and dated evidence (e.g., electronic mail message, postal receipt, or confirmation of facsimile) it provided the revised model and data or plans within 60 calendar days of making changes.

M9. Evidence for Requirement R5 must include the Generator Owner's or Transmission Owner's dated written response containing the information identified in Requirement R5 and dated evidence (e.g., electronic mail message, postal receipt, or confirmation of facsimile) it provided a written response within 30 calendar days following receipt of a technically justified request.

M10. Evidence of Requirement R6 must include, for each model received, the dated response indicating the model was usable or not usable according to the criteria specified in Parts 6.1 through 6.3 and for a model that is not usable, a technical description; and dated evidence of transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) that the Generator Owner or Transmission Owner was notified within 30 calendar days of receipt of model information.

D. Compliance

6. Compliance Monitoring Process

6.1. Compliance Enforcement Authority

Regional Coordinating Council

6.2. Data Retention

The evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The Generator Owner, Transmission Owner, and Transmission Planner shall each keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- The Transmission Planner shall retain the information/data request and provided response evidence of Requirements R1 and R6, Measures M1 and M6 for three calendar years from the date the document was provided.
- The Generator Owner or Transmission Owner shall retain the latest excitation control system or plant volt/var control function model verification evidence of Requirement R2, Measure M2.
- The Generator Owner or Transmission Owner shall retain the information/data request and provided response evidence of Requirements R3 through R5, and Measures M3 through M5 for three calendar years from the date the document was provided.

If a Generator Owner, Transmission Owner, or Transmission Planner is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete or approved or for the time specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

6.3. Compliance

Compliance Audit

Self-Certification

Spot Checking

Compliance Investigation

Self-Reporting

Complaint

E. Footnotes

[1] Excitation control system or plant volt/var control function:

a. For individual synchronous machines, the generator excitation control system includes the generator, exciter, voltage regulator, impedance compensation and power system stabilizer.
b. For an aggregate generating plant, the volt/var control system includes the voltage regulator & reactive power control system controlling and coordinating plant voltage and associated reactive capable resources.

[2] If verification is performed, the 5-year period as outlined in GPAMOD-026 Attachment 1 is reset.

[3] Exciter, voltage regulator, plant volt/var or power system stabilizer control replacement including software alterations that alter excitation control system equipment response, plant digital control system addition or replacement, plant digital control system software alterations that alter excitation control system equipment response, plant volt/var function equipment addition or replacement (such as static var systems, capacitor banks, individual unit excitation systems, etc), a change in the voltage control mode (such as going from power factor control to automatic voltage control, etc), exciter, voltage regulator, impedance compensator, or power system stabilizer settings change. Automatic changes in settings that occur due to changes in operating mode do not apply to Requirement R4

[4] Technical justification is achieved by the Transmission Planner demonstrating that the simulated unit or plant response does not match the measured unit or plant response.

GPAMOD-26; GPA Attachment 1 Excitation Control System or Plant Volt/Var Function Model Verification Periodicity		
Row Number	**Verification Condition**	**Required Action**
1	Establishing the initial verification date for an applicable unit. (Requirement R2)	Transmit the verified model, documentation and data to the Transmission Planner on or before the Effective Date. Row 4 applies when calculating generation fleet compliance during the 5-year implementation period See Section A5 for Effective Dates.
2	Subsequent verification for an applicable unit. (Requirement R2)	Transmit the verified model, documentation and data to the Transmission Planner on or before the 5-year anniversary of the last transmittal (per Note 1).
3	Initial verification for a new applicable unit or for an existing applicable unit with new excitation control system or plant volt/var control function equipment installed. (Requirment R2)	Transmit the verified model, documentation and data to the Transmission Planner within 90 calendar days after the commissioning date.

GPAMOD-26; GPA Attachment 1 Excitation Control System or Plant Volt/Var Function Model Verification Periodicity		
Row Number	**Verification Condition**	**Required Action**
4	Existing applicable unit that is equivalent to another unit(s) at the same physical location. AND Each applicable unit has the same MVA nameplate rating. AND The nameplate rating is ≤ 30 MVA or 2 MVA for Power Electronics Transmission Assets. AND Each applicable unit has the same components and settings. AND The model for one of these equivalent applicable units has been verified.	Document circumstance with a written statement and include with the verified model, documentation, and data provided to the Transmission Planner for the verified equivalent unit. Verify a different equivalent unit during each 5-year verification period. Applies to Row 1 when calculating generation fleet compliance during the 5-year implementation period.
5	The Generator Owner or Transmission Owner has submitted a verification plan. (Requirement R3, R4 or R5)	Transmit the verified model, documentation and data to the Transmission Planner within 60-calendar days after the model verification.

GPAMOD-26; GPA Attachment 1 Excitation Control System or Plant Volt/Var Function Model Verification Periodicity		
Row Number	**Verification Condition**	**Required Action**
6	New or existing applicable unit does not include an active closed loop voltage or reactive power control function. (Requirement R2)	Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. Perform verification per the periodicity specified in Row 3 for a "New Generating Unit" (or new equipment) only if active closed loop function is established. See Footnote 1 (see Section A.3) for clarification of what constitutes an active closed loop function for both conventional synchronous machines (reference Footnote 1a) and aggregate generating plants (reference Footnote 1b).
7	Existing applicable unit has a current average net capacity factor over the most recent three calendar years, beginning on January 1 and ending on December 31 of 5% or less. Existing Power Electronics Transmission Assets was available for less than 10% of the most recent one year, beginning on January 1 and ending on December 31. (Requirement R2)	Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. At the end of this 5-year timeframe, the current average three year net capacity factor (for years 3, 4, and 5) can be examined to determine if the capacity factor exemption can be declared for the next 5-year period. If not eligible for the capacity factor exemption, then model verification must be completed within 365 calendar days of the date the capacity factor exemption expired. For the definition of net capacity factor, refer to Note 3.

GPAMOD-26; GPA Attachment 1

Excitation Control System or Plant Volt/Var Function Model Verification Periodicity

Row Number	Verification Condition	Required Action

NOTES:

NOTE 1: Establishing the recurring 5-year unit verification period start date:
The start date is the actual date of submittal of a verified model to the Transmission Planner for the most recently performed unit verification.

NOTE 2: Consideration for early compliance:
Existing generator excitation control system or plant volt/var control function model verification is sufficient for demonstrating compliance for a 5-year period from the actual transmittal date if either of the following applies:

- The Generator Owner or Transmission Owner has a verified model that is compliant with the applicable regional policies, guidelines or criteria existing at the time of model verification.
- The Generator Owner or Transmission Owner has an existing verified model that is compliant with the requirements of this standard.

NOTE 3: Net Capacity Factor Equations:

$$Equation\ 1\text{: } NCF = \frac{Net\ Actual\ Generation}{PH * NMC} * 100\% \qquad Equation\ 2: \ NCF = \frac{\sum(Net\ Actual\ Generation)}{\sum(PH * NMC)} * 100\%$$

Where:

- PH = Period Hours (Number of hours in the period being reported that the unit was in the active state)
- NMC = Net Maximum Capacity
- Equation 2 is an energy-weighted equation. Use Equation 2 when calculating for a group of units (or a unit that has a varying capacity value over time), do not simply average these factors. Follow Equation 2

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GRID STABILITY and RELIABILITY STANDARDS

GPA-MOD-027-0

FOR

VERIFICATION OF MODELS AND DATA FOR TURBINE/GOVERNOR AND LOAD CONTROL OR ACTIVE POWER/FREQUENCY CONTROL FUNCTIONS

VERIFICATION OF MODELS AND DATA FOR TURBINE/GOVERNOR AND LOAD CONTROL OR ACTIVE POWER/FREQUENCY CONTROL FUNCTIONS

- TABLE OF CONTENTS

- A. Introduction

17. Purpose:

To verify that the turbine/governor and load control or active power/frequency control[1] model and the model parameters, used in dynamic simulations that assess Bulk Electric System (BES) reliability, accurately represent generator unit real power response to system frequency variations.

18. Applicability:

18.1 Functional Entities:

18.1.1 Generator Owner

18.1.2 Transmission Planner

18.1.3 Transmission Owner

18.2 Facilities:

For the purpose of the requirements contained herein, Facilities that are directly connected to the Bulk Electric System (BES) will be collectively referred to as an "applicable unit" that meet the following:

18.2.1 Generation in the Interconnection with the following characteristics:

18.2.1.1 Individual generating unit greater than 5 MVA (gross nameplate rating).

18.2.1.2 Individual generating plant consisting of multiple generating units that are directly connected at a common BES bus with total generation greater than 5 MVA (gross aggregate nameplate rating).

18.2.2 Power Electronics Transmission Assets with Real Power capabilities greater than 1 MVA directly connected to the Bulk Electric System.

B. Requirements

R1. Each Transmission Planner shall provide the following information to the Generator Owner or Transmission Owner within 30 calendar days of receiving a written request:

- Instructions on how to obtain the list of turbine/governor and load control or active power/frequency control system models that are acceptable to the Transmission Planner for use in dynamic simulation,
- Instructions on how to obtain the dynamic turbine/governor and load control or active power/frequency control function model library block diagrams and/or data sheets for models that are acceptable to the Transmission Planner, or
- Model data for any of the Generator Owner's or Transmission Owner's existing applicable unit specific turbine/governor and load control or active power/frequency

control system contained in the Transmission Planner's dynamic database from the current (in-use) models.

- It is noted that digital governors with multiple modes of control and operation may require the Generation Owner or Transmission Owner to develop custom models to simulate the response of the unit. Such models will be based on standard models provided by the Transmission Planner to the extent possible.

R2. Each Generator Owner shall provide, for each applicable unit, a verified turbine/governor and load control or active power/frequency control model, including documentation and data (as specified in Part 2.1) to any Transmission Planner in accordance with the periodicity specified in MOD-027 Attachment 1. Transmission Owners shall provide the same documentation and data for applicable Power Electronics Transmission Asset.

R13.1. Each applicable unit's model shall be verified by the Generator Owner or Transmission Owner using one or more models acceptable to the Transmission Planner. Verification for individual units rated less than 5 MVA (gross nameplate rating, 1 MVA for Power Electronics Transmission Assets) in a generating plant (per Section 4.2.1.2) may be performed using either individual unit or aggregate unit model(s) or both. Each verification shall include the following:

R13.1.1. Documentation comparing the applicable unit's MW model response to the recorded MW response for either:

- A frequency excursion from a system disturbance that meets MOD-027 Attachment 1 Note 1 with the applicable unit on-line,
- A speed governor reference change with the applicable unit online, or
  - For staged tests, the governor reference change should occur at multiple operating points including minimum, peak load, and near peak load to show the impact that unit output has on the unit response to a reference change.
  - Staged tests shall include verification of governor performance for each mode transition, including transitions back from transient mode if applicable for system modeling.
- A partial load rejection test,[2]

R13.1.2. Type of governor and load control or active power control/frequency control[3] equipment,

R13.1.3. A description of the turbine (e.g. for hydro turbine - Kaplan, Francis, or Pelton; for steam turbine - boiler type, normal fuel type, and turbine type; for gas turbine - the type and manufacturer; for variable energy plant - type and manufacturer; for Power Electronics Transmission Asset – type and manufacturer),

R13.1.4. Model structure and data for turbine/governor and load control or active power/frequency control,

R13.1.5. Description and recommended modeling method for any governor actions that would limit the active power or change governor control modes including, but not limited to:

- Temperature limiters
- Pressure limiters
- Rate limiters

R13.1.6. Description and recommended modeling method for any governor response resulting from a control mode change within the governor during on-line operations. All control mode changes must be included in the recommended modeling method.

R13.1.7. Representation of the real power response effects of outer loop controls (such as operator set point controls, and load control but excluding AGC control) that would override the governor response (including blocked or nonfunctioning governors or modes of operation that limit Frequency Response), if applicable.

R13.2. Each Generator Owner or Transmission Owner shall provide model structure, data, and source code (if available) for any turbine/governor and load control or active power/frequency control function model that requires a custom model that is not in the model list provided by the Transmission Planner.

R13.2.1. The Generator Owner or Transmission Owner shall document the need for using a custom model and provide the documentation to the Transmission Planner.

R.3 Each Generator Owner or Transmission Owner shall provide a written response to any Transmission Planner within 60 calendar days of receiving one of the following items for an applicable unit.

- Written notification, from any Transmission Planner (in accordance with Requirement R5) that the turbine/governor and load control or active power/frequency control model is not "usable,"
- Written comments from any Transmission Planner identifying technical concerns with the verification documentation related to the turbine/governor and load control or active power/frequency control model, or
- Written comments and supporting evidence from any Transmission Planner indicating that the simulated turbine/governor and load control or active power/frequency control response did not approximate the recorded response for three or more transmission system events.

The written response shall contain either the technical basis for maintaining the current model, the model changes, or a plan to perform model verification[4] (in accordance with Requirement R2).

R.4 Each Generator Owner or Transmission Owner shall provide revised model data or plans to perform model verification (in accordance with Requirement R2) for an applicable unit to any

Transmission Planner within 60 calendar days of making changes to the turbine/governor and load control or active power/frequency control system that alter the equipment response characteristic[5].

R.5 Each Transmission Planner shall provide a written response to the Generator Owner or Transmission Owner within 30 calendar days of receiving the turbine/governor and load control or active power/frequency control system verified model information in accordance with Requirement R2 that the model is usable (meets the criteria specified in Parts 5.1 through 5.3) or is not usable.

R16.1. The turbine/governor and load control or active power/frequency control function model initializes to compute modeling data without error,

R16.2. A no-disturbance simulation results in negligible transients, and

R16.3. For an otherwise stable simulation, a disturbance simulation results in the turbine/governor and load control or active power/frequency control model exhibiting positive damping.

C. Measures

M11. The Transmission Planner must provide the dated request for instructions or data, the transmitted instruction or data, and dated evidence of a written transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) as evidence that it provided the request within 30 calendar days in accordance with Requirement R1.

M12. The Generator Owner or Transmission Owner must provide dated evidence it verified each generator turbine/governor and load control or active power/frequency control model according to Part 2.1 for each applicable unit and a dated transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) as evidence it provided the model, documentation, and data to any Transmission Planner, in accordance with Requirement R2.

M13. Evidence for Requirement R3 must include the Generator Owner's or Transmission Owner's dated written response containing the information identified in Requirement R3 and dated evidence of transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) of the response.

M14. Evidence for Requirement R4 must include, for each of the Generator Owner's or Transmission Owner's applicable units for which system changes specified in Requirement R4 were made, dated revised model data or dated plans to perform a model verification and dated evidence of transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) within 60 calendar days of making changes.

M15. Evidence of Requirement R5 must include, for each model received, the dated response indicating the model was usable or not usable according to the criteria specified in Parts 5.1 through 5.3 and for a model that is not useable, a technical description that the model is not usable, and dated evidence of transmittal (e.g., electronic mail messages, postal receipts, or confirmation of facsimile) that the

Generator Owner or Transmission Owner was notified within 30 calendar days of receipt of model information in accordance with Requirement R5.

D. Compliance

7. Compliance Monitoring Process

7.1. Compliance Enforcement Authority

Regional Coordinating Council

7.2. Data Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The Generator Owner, Transmission Owner, and Transmission Planner shall each keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- The Transmission Planner shall retain the information/data request and provided response evidence of Requirements R1 and R5, Measures M1 and M5 for 3 calendar years from the date the document was provided.
- The Generator Owner or Transmission Owner shall retain the latest turbine/governor and load control or active power/frequency control system model verification evidence of Requirement R2, Measure M2.
- The Generator Owner or Transmission Owner shall retain the information/data request and provided response evidence of Requirements R3, and R4 Measures M3 and M4 for 3 calendar years from the date the document was provided.

If a Generator Owner, Transmission Owner, or Transmission Planner is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved or for the time specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

7.3. Compliance

Compliance Audit

Self-Certification

Spot Checking

Compliance Investigation

Self-Reporting

Complaint

8. Levels of Non-Compliance

8.1. Levels of Non-Compliance for Requirement R1, Measure M1

8.1.1 Level 1 - The Transmission Planner failed to retain dated evidence that it provided the requested information within 30 calendar days in accordance with Requirement R1.

8.1.2 Level 2 - The Transmission Planner failed to provide the Generator Owner or Transmission Owner with the requested information in accordance with Requirement R1.

8.2. Levels of Non-Compliance for Requirement R2, Measure M2

8.2.1 Level 1 - The Generator Owner or Transmission Owner failed to retain dated evidence it provided the model, documentation, and data to any Transmission Planner, in accordance with Requirement R2.

8.2.2 Level 2 - The Generator Owner, or Transmission Owner failed to provide the model, documentation, and data to any Transmission Planner, in accordance with Requirement R2.

8.3. Levels of Non-Compliance for Requirement R3, Measure M3

8.3.1 Level 1 – The Generator Owner, or Transmission Owner failed to retain dated evidence showing it responded to the Transmission Planner and provided the information identified in Requirement R3.

8.3.2 Level 2 – The Generator Owner, or Transmission Owner failed to respond to the Transmission Planner with the information identified in Requirement R3.

8.4. Levels of Non-Compliance for Requirement R4, Measure M4

8.4.1 Level 1 – The Generator Owner, or Transmission Owner failed to retain evidence which includes, for each of the Generator Owner's or Transmission Owner's applicable units for which system changes specified in Requirement R4 were made, dated revised model data or dated plans to perform a model verification.

8.5. Levels of Non-Compliance for Requirement R5, Measure M5

8.5.1 Level 1 – The Transmission Planner failed to retain dated response to the Generator Owner or Transmission Owner which must include, for each model received, an indication that the model was usable or not usable according to the criteria specified in Parts 5.1 through 5.3.

F. Footnotes

[1]Turbine/governor and load control or active power/frequency control:

c. Turbine/governor and load control applies to conventional synchronous generation.
d. Active power/frequency control applies to inverter connected generators (often found at variable energy plants).

[2]Differences between the control mode tested and the final simulation model must be identified, particularly when analyzing load rejection data. Most controls change gains or have a set point runback which takes effect when the breaker opens. Load or set point controls will also not be in effect once the breaker opens. Some method of accounting for these differences must be presented if the final model is not validated from on-line data under the normal operating conditions under which the model is expected to apply.

[3]Turbine/governor and load control or active power/frequency control:

a. Turbine/governor and load control applies to conventional synchronous generation.
b. Active power/frequency control applies to inverter connected generators (often found at variable energy plants).

[4]If verification is performed; the 5 year period as outlined in MOD-027 Attachment 1 is reset.

[5]Control replacement or alteration including software alterations or plant digital control system addition or replacement, plant digital control system software alterations that alter droop, and/or dead band, and/or frequency response and/or a change in the frequency control mode (such as going from droop control to constant MW control, etc).

GPAMOD-27; Attachment 1 Turbine/Governor and Load Control or Active Power/Frequency Control Model Periodicity		
Row Number	**Verification Condition**	**Required Action**
1	Establishing the initial verification date for an applicable unit. (Requirement R2)	Transmit the verified model, documentation and data to the Transmission Planner on or before the Effective Date. Row 5 applies when calculating generation fleet compliance during the 5 year implementation period. See Section A5 for Effective Dates.
2	Subsequent verification for an applicable unit. (Requirement R2)	Transmit the verified model, documentation and data to the Transmission Planner on or before the 5-year anniversary of the last transmittal (per Note 2).
3	Applicable unit was not subjected to a frequency excursion per Note 1 with available generating capacity available to show Governor or Load Control response by the date otherwise required to meet the dates per Rows 1, 2, 4, or 6. (This row is only applicable if a frequency excursion from a system disturbance that meets Note 1 is selected for the verification method and the ability to record the applicable unit's real power response to a frequency excursion is installed and expected to be available). (Requirement R2)	Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. Transmit the verified model, documentation and data to the Transmission Planner on or before 60 calendar days after a frequency excursion per Note 1 occurs and the recording equipment captures the applicable unit's real power response as expected.
4	Initial verification for a new applicable unit or for an existing applicable unit with new turbine/governor and load control or active power/frequency control equipment installed. (Requirment R2)	Transmit the verified model, documentation and data to the Transmission Planner within 90 calendar days after the commissioning date.

GPAMOD-27; Attachment 1 Turbine/Governor and Load Control or Active Power/Frequency Control Model Periodicity		
Row Number	**Verification Condition**	**Required Action**
5	Existing applicable unit that is equivalent to another applicable unit(s) at the same physical location. AND Each applicable unit has the same MVA nameplate rating. AND The nameplate rating is ≤ 30 MVA or 2 MVA for Power Electronics Transmission Assets. AND Each applicable unit has the same components and settings; AND The model for one of these equivalent applicable units has been verified. (Requirement R2)	Document circumstance with a written statement and include with the verified model, documentation and data provided to the Transmission Planner for the verified equivalent unit. Verify a different equivalent unit during each 5-year verification period. Applies to Row 1 when calculating generation fleet compliance during the 5-year implementation period.
6	The Generator Owner or Transmission Owner has submitted a verification plan. (Requirement R3, R4 or R5)	Transmit the verified model, documentation and data to the Transmission Planner within 60 calendar days after the model verification.

GPAMOD-27; Attachment 1 Turbine/Governor and Load Control or Active Power/Frequency Control Model Periodicity		
Row Number	**Verification Condition**	**Required Action**
7	Applicable unit is not responsive to both over and under frequency excursion events (The applicable unit does not operate in a frequency control mode, except during normal start up and shut down, that would result in a turbine/governor and load control or active power/frequency control mode response.); OR Applicable unit either does not have an installed frequency control system or has a disabled frequency control system. (Requirement R2)	Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. Perform verification per the periodicity specified in Row 4 for a “New Generating Unit” (or new equipment) only if responsive control mode operation for connected operations is established.
8	Existing applicable unit has a current average net capacity factor over the most recent three calendar years, beginning on January 1 and ending on December 31 of 5% or less. Existing Power Electronics Transmission Assets was available for less than 10% of the most recent one year, beginning on January 1 and ending on December 31. (Requirement R2)	Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. At the end of this 5 calendar year timeframe, the current average three year net capacity factor (for years 3, 4, and 5) can be examined to determine if the capacity factor exemption can be declared for the next 5 calendar year period. If not eligible for the capacity factor exemption, then model verification must be completed within 365 calendar days of the date the capacity factor exemption expired. For the definition of net capacity factor, refer to Note 4.

GPAMOD-27; GPA Attachment 1

Turbine/Governor and Load Control or Active Power/Frequency Control Model Periodicity

Row Number	Verification Condition	Required Action

NOTES:

NOTE 1: Unit model verification frequency excursion criteria:

- ≥ 0.30 hertz deviation (nadir point) from scheduled frequency for the Interconnection with the applicable unit operating in a frequency responsive mode

NOTE 2: Establishing the recurring 5 year unit verification period start date:

- The start date is the actual date of submittal of a verified model to the Transmission Planner for the most recently performed unit verification.
- The Generator Owner or Transmission Owner has an existing verified model that is compliant with the requirements of this standard.

NOTE 3: Consideration for early compliance:

Existing turbine/governor and load control or active power/frequency control model verification is sufficient for demonstrating compliance for a 5 year period from the actual transmittal date if either of the following applies:

- The Generator Owner or Transmission Owner has a verified model that is compliant with the applicable regional policies, guidelines or criteria existing at the time of model verification
- The Generator Owner or Transmission Owner has an existing verified model that is compliant with the requirements of this standard

NOTE 4: Net Capacity Factor Equations:

$$Equation\ 1\text{: } NCF = \frac{Net\ Actual\ Generation}{PH * NMC} * 100\% \qquad Equation\ 2: \ NCF = \frac{\sum(Net\ Actual\ Generation)}{\sum(PH * NMC)} * 100\%$$

Where:

- PH = Period Hours (Number of hours in the period being reported that the unit was in the active state)
- NMC = Net Maximum Capacity
- Equation 2 is an energy-weighted equation. Use Equation 2 when calculating for a group of units (or a unit that has a varying capacity value over time), do not simply average these factors. Follow Equation 2

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GRID STABILITY and RELIABILITY STANDARDS

GPA-MOD-032-0

FOR

DATA FOR POWER SYSTEM MODELING AND ANALYSIS

DATA FOR POWER SYSTEM MODELING AND ANALYSIS

- TABLE OF CONTENTS

- A. Introduction

19. Purpose:

To establish consistent modeling data requirements and reporting procedures for development of planning horizon cases necessary to support analysis of the reliability of the interconnected transmission system.

20. Applicability:

20.1 Functional Entities:

20.1.1 Balancing Authority

20.1.2 Generator Owner

20.1.3 Load Serving Entity

20.1.4 Planning Coordinator

20.1.5 Resource Planner

20.1.6 Transmission Owner

20.1.7 Transmission Planner

20.1.8 Transmission Service Provider

B. Requirements

R1. The Regional Reliability Council, in conjunction with each areas' Transmission Planner, shall develop steady-state, dynamics, and short circuit modeling data requirements and reporting procedures for the Planning Coordinator's planning area that include:

R16.4. The data listed in Attachment 1.

R16.5. Specifications of the following items consistent with procedures for building the Interconnection-wide case(s):

R16.5.1. Data format;

R16.5.2. Level of detail to which equipment shall be modeled;

R16.5.3. Case types or scenarios to be modeled; and

R16.5.4. A schedule for submission of data at least once every 13 calendar months.

R16.6. Specifications for distribution or posting of the data requirements and reporting procedures so that they are available to those entities responsible for providing the data.

R2. Each Balancing Authority, Generator Owner, Load Serving Entity, Resource Planner, Transmission Owner, and Transmission Service Provider shall provide steady-state, dynamics, and short circuit modeling data to any Transmission Planner(s) and Planning Coordinator(s)

according to the data requirements and reporting procedures developed by its Planning Coordinator and Transmission Planner in Requirement R1. For data that has not changed since the last submission, a written confirmation that the data has not changed is sufficient.

R3. Upon receipt of written notification from the Regional Coordinating Council regarding technical concerns with the data submitted under Requirement R2, including the technical basis or reason for the technical concerns, each notified Balancing Authority, Generator Owner, Load Serving Entity, Resource Planner, Transmission Owner, or Transmission Service Provider shall respond to the Regional Coordinating Council as follows:

R18.1. Provide either updated data or an explanation with a technical basis for maintaining the current data;

R18.2. Provide the response within 90 calendar days of receipt, unless a longer time period is agreed upon by notifying the Regional Coordinating Council.

R4. Each Planning Coordinator shall make available models for its planning area reflecting data provided to it under Requirement R2 to the Regional Coordinating Council or its designee to support creation of the Interconnection-wide case(s) that includes the Planning Coordinator's planning area.

C. Measures

M16. The Regional Coordinating Council shall provide evidence that it has jointly developed the required modeling data requirements and reporting procedures specified in Requirement R1.

M17. Each registered entity identified in Requirement R2 shall provide evidence, such as email records or postal receipts showing recipient and date, that it has submitted the required modeling data to the Regional Coordinating Council; or written confirmation that the data has not changed.

M18. Each registered entity identified in Requirement R3 that has received written notification from the Regional Coordinating Council regarding technical concerns with the data submitted under Requirement R2 shall provide evidence, such as email records or postal receipts showing recipient and date, that it has provided either updated data or an explanation with a technical basis for maintaining the current data to the Regional Coordinating Council within 90 calendar days of receipt (or within the longer time period agreed upon by the notifying the Regional Coordinating Council).

M19. Each Planning Coordinator shall provide evidence, such as email records or postal receipts showing recipient and date, that it has submitted models for its planning area reflecting data provided to it under Requirement R2 when requested by the Regional Coordinating Council or its designee.

D. Compliance

9. Compliance Monitoring Process

9.1. Compliance Enforcement Authority

Regional Coordinating Council

9.2. Data Retention

The following data retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The applicable entity shall keep data or evidence to show compliance with Requirements R1 through R4, and Measures M1 through M4, since the last audit, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

If an applicable entity is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved, or for the time specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

9.3. Compliance Monitoring and Assessment Processes:

Refer to the NERC Rules of Procedure for a list of compliance monitoring and assessment processes.

MOD-032-01 – ATTACHMENT 1:

Data Reporting Requirements

The table, below, indicates the information that is required to effectively model the interconnected transmission system for the Near-Term Transmission Planning Horizon and Long-Term Transmission Planning Horizon. Data must be shareable on an interconnection-wide basis to support use in the Interconnection-wide cases. A Planning Coordinator may specify additional information that includes specific information required for each item in the table below. Each functional entity1 responsible for reporting the respective data in the table is identified by brackets "[functional entity]" adjacent to and following each data item. The data reported shall be as identified by the bus number, name, and/or identifier that is assigned in conjunction with the PC, TO, or TP.

steady-state (Items marked with an * indicate data that vary with system operating state or conditions. Those items may have different data provided for different modeling scenarios)	dynamics (If a user-written model(s) is submitted in place of a generic or library model, it must include the characteristics of the model, including block diagrams, values and names for all model parameters, a list of all state variables, and source code of the model, if available)	short circuit
1 Each bus [TO]	1 Generator [GO, RP (for future planned resources only)]	1 Provide for all applicable elements in column "steady-state" [GO, RP, TO]
a. nominal voltage	2 Excitation System [GO, RP(for future planned resources only)]	a. Positive Sequence Data
b. area, zone and owner	3 Governor [GO, RP(for future planned resources only)]	b. Negative Sequence Data
2 Aggregate Demand[2] [LSE]	a. real power capabilities - seasonal (summer valley, summer peak, and winter peak) maximum and minimum values	c. Zero Sequence Data
a. real and reactive power*	4 Power System Stabilizer [GO, RP(for future planned resources only)]	2 Mutual Line Impedance Data [TO]
b. in-service status*	5 Demand [LSE]	3 Fault current contribution from non-synchronous(inverter, power electronics, etc) generation sources
3 Generating Units[3] [GO, RP (for future planned resources only)]	a. Frequency dependence settings and documentation supporting the use of frequency dependent demand	4 Other information requested by the Planning Coordinator or Transmission Planner necessary for modeling
a. real power capabilities - seasonal (summer valley, summer peak, and winter peak)maximum and minimum values	7 Photovoltaic systems [GO]	
b. reactive power capabilities - maximum and minimum values at real power capabilities in 3a above	6 Wind Turbine Data [GO]	
c. station service auxiliary load for normal plant configuration (provide data in the same manner as that required for aggregate Demand under item 2, above).	7 Photovoltaic systems [GO]	
d. regulated bus* and voltage set point* (as typically provided by the TOP)		
e. machine MVA base		
f. generator step up transformer data (provide same data as that required for transformer under item 6, below)		
g. generator type (hydro, wind, fossil, solar, nuclear, etc)		
h. in-service status*		

steady-state (Items marked with an * indicate data that vary with system operating state or conditions. Those items may have different data provided for different modeling scenarios)	dynamics (If a user-written model(s) is submitted in place of a generic or library model, it must include the characteristics of the model, including block diagrams, values and names for all model parameters, a list of all state variables, and source code of the model, if available)	short circuit
4 AC Transmission Line or Circuit [TO]	8 Energy Storage Systems [GO]	
a. impedance parameters (positive sequence)	a. Frequency response characteristics	
b. susceptance (line charging)	b. Contingency response characteristics	
c. seasonal ratings (summer valley, summer peak, winter peak)*	c. Ability to simulate all modes of actual ESS operation	
d. in-service status*	9 Static Var Systems and FACTS [GO, TO, LSE]	
5 DC Transmission systems [TO]	10 DC system models [TO]	
6 Transformer (voltage and phase-shifting) [TO]	11 Unit Protection Settings	
a. nominal voltages of windings	a. Voltage Ride Through Settings	
b. impedance(s)	b. Frequency Ride Through Settings, as determined by PRC-006	
c. tap ratios (voltage or phase angle)*		
d. minimum and maximum tap position limits	12 Special Protection Systems	
e. number of tap positions (for both the ULTC and NLTC)	13 Other information requested by the Planning Coordinator or Transmission Planner necessary for modeling purposes. [BA, GO, LSE, TO, TSP]	
f. regulated bus (for voltage regulating transformers)*		
g. maximum seasonal (summer valley, summer peak, and winter peak) rating*		
h. in-service status*		
7 Reactive compensation (shunt capacitors and reactors) [TO]		
a. admittances (MVars) of each capacitor and reactor step		
b. regulated voltage band limits* (if mode of operation not fixed)		
c. mode of operation (fixed, discrete, continuous, etc.)		
d. regulated bus* (if mode of operation not fixed)		
e. in-service status*		
8 Static Var Systems [TO]		
a. reactive limits		
b. voltage set point*		
c. fixed/switched shunt, if applicable		
d. in-service status*		
9 Other information requested by the Planning Coordinator or Transmission Planner necessary for modeling purposes. [BA, GO, LSE, TO, TSP]		

[1] For purposes of this attachment, the functional entity references are represented by abbreviations as follows: Balancing Authority (BA), Generator Owner (GO), Load Serving Entity (LSE), Planning Coordinator (PC), Resource Planner (RP), Transmission Owner (TO), Transmission Planner (TP), and Transmission Service Provider (TSP).

[2] For purposes of this item, aggregate Demand is the Demand aggregated at each bus under item 1 that is identified by a Transmission Owner as a load serving bus. A Load Serving Entity is responsible for providing this information, generally through coordination with the Transmission Owner.

[3] Including synchronous condensers, ~~and~~ pumped storage, and energy storage systems.

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GRID STABILITY and RELIABILITY STANDARDS

GPA-MOD-033-0

FOR

STEADY-STATE AND DYNAMIC SYSTEM MODEL VALIDATION

STEADY-STATE AND DYNAMIC SYSTEM MODEL VALIDATION

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- A. Introduction

21. Purpose:

To establish consistent validation requirements to facilitate the collection of accurate data and building of planning models to analyze the reliability of the interconnected transmission system.

22. Applicability:

22.1 Functional Entities:

22.1.1 Planning Coordinator

22.1.2 Reliability Coordinator

22.1.3 Transmission Operator

23. Background:

Reliability Standard GPAMOD-033-1 is a new standard, and requires the Regional Coordinating Council to implement a documented process to perform model validation for power flow and dynamics.

B. Requirements

R1. The Regional Coordinating Council shall implement a documented data validation process that includes the following attributes:

R19.1. Comparison

R19.2. Comparison of the performance of the existing system in a planning power flow model simulation compared to actual system behavior, represented by a state estimator case or other Real-time data sources, for at least the summer minimum, summer and winter maximum peak conditions, at least once every 24 calendar months;

R19.2.1. Performance of the performance of the existing system in a planning dynamic model to actual system response, through simulation of a dynamic event, at least once every 24 calendar months (use a dynamic event that occurs within 24 calendar months of the last dynamic event used in comparison, and complete each comparison within 24 calendar months of the dynamic event). If no dynamic event occurs within the 24 calendar months, use the next dynamic event that occurs;

R19.2.1.1. By specifying these duties of the Regional Coordinating Council, it is the intent of the standard that until such a time that the Railbelt becomes more closely interconnected, that such verifications will be completed using a generation trip and a transmission line fault in each of the three major load/generation areas.

R19.2.2. The dynamic event chosen must be able to be simulated with reasonable accuracy. Recordings and accurate description of the sequence of the event (power output of a

unit that is tripped, or line from unit / plant, line flow of the line that was tripped, etc) must be available to accurately complete the comparison. Dynamic events that are a result of discreet action (unit breaker, line breaker) should be given priority over other events. Events such as unbalanced faults, unexplained unit / plant output reductions, and other obscure events should not be used for purposes of this comparison.

R19.3. Guidelines the Regional Coordinating Council will use to determine unacceptable differences in performance under Part 1.1 or 1.2, and at a minimum will include the following;

R19.3.1. Bus frequency differences should not exceed 0.05 Hz at minimum frequency and 0.2 Hz at maximum frequency

R19.3.2. Machine electrical power differences should not exceed 2 MW during the transient and 1 MW after the transient has occurred (5 seconds after event), and 0.5 MW during steady state conditions (power flow).

R19.3.3. Tie line flow differences should not exceed 5 MW after the transient event has occurred (5 seconds after event), and 0.5 MW during steady state conditions (power flow).

R19.3.4. Voltage differences should not exceed +/- 5% after the transient event has occurred (5 seconds after event), and +/- 1% during steady state conditions (power flow).

R19.4. Guidelines to resolve the unacceptable differences in performance identified under Part 1.3, and at a minimum will include the following;

R19.4.1. Identification of equipment in an area for the source of a difference. If a machine, synchronous condenser, or Power Electronic Transmission Asset, response is found to be the source of the difference, the applicable owning body (Generator Owner or Transmission Owner) shall be required to verify the modeling data as required in the applicable modeling standard (MOD 25, MOD 26, or MOD 27). Otherwise facility inspections shall be completed to verify the accuracy of the equipment modeling (conductor or transformer impedances, etc). The validation shall be completed no later than 6 months after notification of the modeling deficiency is made to the applicable Owner or RRO.

R19.4.2. Identification of area(s) / equipment where additional recording devices are required to determine source of difference. A plan must be developed to increase visibility / recordings for the area / equipment and be completed 12 months after identification from the comparison is made.

R2. Each Reliability Coordinator and Transmission Operator shall provide actual system behavior data (or a written response that it does not have the requested data) to the Regional Coordinating Council performing validation under Requirement R1 within 30 calendar days of a written request, such as, but not limited to, state estimator case or other Real-time data (including disturbance data recordings) necessary for actual system response validation.

C. Measures

M20. The Regional Coordinating Council shall provide evidence that it has a documented validation process according to Requirement R1 as well as evidence that demonstrates the implementation of the required components of the process. Attachment 1 is provided as an example for the guidelines in Requirement R1.3.

M21. The Regional Coordinating Council shall provide evidence, such as email notices or postal receipts showing recipient and date that it has distributed the requested data or written response that it does not have the data, to any Planning Coordinator performing validation under Requirement R1 within 30 days of a written request in accordance with Requirement R2; or a statement by the Regional Coordinating Council that it has not received notification regarding data necessary for validation by any Planning Coordinator.

D. Compliance

10. Compliance Monitoring Process

10.1. Compliance Enforcement Authority

Regional Coordinating Council

10.2. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The applicable entity shall keep data or evidence to show compliance with Requirements R1 through R2, and Measures M1 through M2, since the last audit, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

If an applicable entity is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved, or for the time specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

10.3. Compliance Monitoring and Assessment Processes:

Compliance Audit

Self-Certification

Spot Checking

Compliance Investigation

Self-Reporting

Complaints

11. Levels of Non-Compliance

11.1. Levels of Non-Compliance for Requirement R1, Measure M1

11.1.1 Level 1 - The Regional Coordinating Council documented and implemented a process to validate data but did not address one of the four required topics under Requirement R1; or the Regional Coordinating Council did not perform simulation as required by part 1.1 within 24 calendar months but did perform the simulation within 30 calendar months; or the Regional Coordinating Council did not perform simulation as required by part 1.2 within 24 calendar months (or the next dynamic event in cases where there is more than 24 months between events) but did perform the simulation within 30 calendar months.

11.1.2 Level 2 - The Regional Coordinating Council did not have a validation process at all or did not document or implement any of the four required topics under Requirement R1; or The Regional Coordinating Council did not validate its portion of the system in the power flow model as required by part 1.1 within 36 calendar months; or The Regional Coordinating Council did not perform simulation as required by part 1.2 within 36 calendar months (or the next dynamic event in cases where there is more than 24 months between events).

11.2. Levels of Non-Compliance for Requirement R2, Measure M2

11.2.1 Level 1 - The Reliability Coordinator or Transmission Operator did not provide requested actual system behavior data (or a written response that it does not have the requested data) to a requesting Regional Coordinating Council within 30 calendar days of the written request, but did provide the data (or written response that it does not have the requested data) in less than or equal to 45 calendar days.

11.2.2 Level 2 - The Reliability Coordinator or Transmission Operator did not provide requested actual system behavior data (or a written response that it does not have the requested data) to a requesting Regional Coordinating Council within 75 calendar days; or The Reliability Coordinator or Transmission Operator provided a written response that it does not have the requested data, but actually had the data.

Guidelines and Technical Basis

Requirement R1:

The requirement focuses on the results-based outcome of developing a process for and performing a validation, but does not prescribe a specific method or procedure for the validation outside of the attributes specified in the requirement. For further information on suggested validation procedures, see "Procedures for Validation of Powerflow and Dynamics Cases" produced by the NERC Model Working Group.

The specific process is left to the judgment of the Planning Coordinator, but the Planning Coordinator is required to develop and include in its process guidelines for evaluating discrepancies between actual system behavior or response and expected system performance for determining whether the discrepancies are unacceptable.

For the validation in part 1.1, the state estimator case or other Real-time data should be taken as close to desired seasonal conditions as possible. While the requirement specifies "once every 24 calendar months," entities are encouraged to perform the comparison on a more frequent basis. Until the model has been sufficiently verified to confirm its accuracy in varying load and generation conditions, each entity is encouraged to confirm the model following each major system disturbance.

In performing the comparison required in part 1.1, the Planning Coordinator may consider, among other criteria:

1. System load;
2. Transmission topology and parameters;
3. Voltage at major buses; and
4. Flows on major transmission elements.

The validation in part 1.1 would include consideration of the load distribution and load power factors (as applicable) used in the power flow models. The validation may be made using metered load data or state estimator cases. The comparison of system load distribution and load power factors shall be made on the substation level at a minimum but may also be made on a bus by bus basis within each substation, or smaller area basis as deemed appropriate by the Planning Coordinator.

The validation required in part 1.2 may include simulations that are to be compared with actual system data and may include comparisons of:

- Voltage oscillations at major buses
- System frequency (for events with frequency excursions)
- Real and reactive power oscillations on generating units and major inter-area ties

Determining when a dynamic event might occur may be unpredictable, and because of the analytic complexities involved in simulation, the time parameters in part 1.2 specify that the comparison period of "at least once every 24 calendar months" is intended to both provide for at least 24 months between dynamic events used in the comparisons and that comparisons must be completed within 24 months of the date of the dynamic event used. This clarification ensures that PCs will not face a timing scenario that

makes it impossible to comply. If the time referred to the completion time of the comparison, it would be possible for an event to occur in month 23 since the last comparison, leaving only one month to complete the comparison. With the 30 day timeframe in Requirement R2 for TOPs or RCs to provide actual system behavior data (if necessary in the comparison), it would potentially be impossible to complete the comparison within the 24 month timeframe.

In contrast, the requirement language clarifies that the time frame between dynamic events used in the comparisons should be within 24 months of each other (or, as specified at the end of part 1.2, in the event more than 24 months passes before the next dynamic event, the comparison should use the next dynamic event that occurs). Each comparison must be completed within 24 months of the dynamic event used. In this manner, the potential problem with a "month 23" dynamic event described above is resolved. For example, if a PC uses for comparison a dynamic event occurring on day 1 of month 1, the PC has 24 calendar months from that dynamic local event's occurrence to complete the comparison. If the next dynamic event the PC chooses for comparison occurs in month 23, the PC has 24 months from that dynamic event's occurrence to complete the comparison.

Part 1.3 requires the PC to include guidelines in its documented validation process for determining when discrepancies in the comparison of simulation results with actual system results are unacceptable. The PC may develop the guidelines required by parts 1.3 and 1.4 itself, reference other established guidelines, or both. For the power flow comparison, as an example, this could include a guideline the Planning Coordinator will use that flows on 138 kV lines should be within 10% or 5 MW, whichever is larger. It could be different percentages or MW amounts for different voltage levels. Or, as another example, the guideline for voltage comparisons could be that it must be within 1%. But the guidelines the PC includes within its documented validation process should be meaningful for the Planning Coordinator's system. Guidelines for the dynamic event comparison may be less precise. Regardless, the comparison should indicate that the conclusions drawn from the two results should be consistent. For example, the guideline could state that the simulation result will be plotted on the same graph as the actual system response. Then the two plots could be given a visual inspection to see if they look similar or not. Or a guideline could be defined such that the rise time of the transient response in the simulation should be within 20% of the rise time of the actual system response. As for the power flow guidelines, the dynamic comparison criteria should be meaningful for the Planning Coordinator's system.

The guidelines the PC includes in its documented validation process to resolve differences in Part 1.4 could include direct coordination with the data owner, and, if necessary, through the provisions of GPAMOD-032-1, Requirement R3 (i.e., the validation performed under this requirement could identify technical concerns with the data). In other words, while this standard is focused on validation, results of the validation may identify data provided under the modeling data standard that needs to be corrected. If a model with estimated data or a generic model is used for a generator, and the model response does not match the actual response, then the estimated data should be corrected or a more detailed model should be requested from the data provider.

If the simulations can be made to match the actual system responses by reasonable changes to the data in the Planning Coordinator's area, then the Planning Coordinator should make those changes in coordination with the data provider. The guidelines the Planning Coordinator included under Part 1.4 could cover these situations.

Rationale for R1:

Requirement R1 requires the Planning Coordinator to implement a documented data validation process to validate data in the Planning Coordinator's portion of the existing system in the steady-state and dynamic models to compare performance against expected behavior or response. The following items were chosen for the validation requirement:

A. Comparison of performance of the existing system in a planning power flow model to actual system behavior; and

B. Comparison of the performance of the existing system in a planning dynamics model to actual system response.

Implementation of these validations will result in more accurate power flow and dynamic models. This, in turn, should result in better correlation between system flows and voltages seen in power flow studies and the actual values seen by system operators during outage conditions. Similar improvements should be expected for dynamics studies, such that the results will more closely match the actual responses of the power system to disturbances.

Validation of model data is a good utility practice, but it does not easily lend itself to Reliability Standards requirement language. Furthermore, it is challenging to determine specifications for thresholds of disturbances that should be validated and how they are determined. Therefore, this requirement focuses on the Planning Coordinator performing validation pursuant to its process, which must include the attributes listed in parts 1.1 through 1.4, without specifying the details of "how" it must validate, which is necessarily dependent upon facts and circumstances. Other validations are best left to guidance rather than standard requirements.

Rationale for R2:

The Planning Coordinator will need actual system behavior data in order to perform the validations required in R1. The Reliability Coordinator or Transmission Operator may have this data. Requirement R2 requires the Reliability Coordinator and Transmission Operator to supply actual system data, if it has the data, to any requesting Planning Coordinator for purposes of model validation under Requirement R1.

This could also include information the Reliability Coordinator or Transmission Operator has at a field site. For example, if a PMU or DFR is at a generator site and it is recording the disturbance, the Reliability Coordinator or Transmission Operator would typically have that data.

GPAMOD-033 – Attachment 1

Example Interconnection Model Validation Process and Guidelines:

GPA's primary concerns includes voltage collapse, and the activation of UFLS in response to the loss of generation. The guidelines listed below were created for the GPA system. The validation sections below should serve as an example set of guidelines as required in Requirement 1.3.

Power Flow

Input Data

The following items from the recorded snapshot data are transferred directly into the steady-state power flow case (state estimators may be a suitable source for this data):

- Generators
    - Real power output
    - Reactive power output or voltage setting
    - Control mode (voltage control, power factor control)
    - Voltage regulation point (local or remote, if on voltage control)
    - Status
- Loads
    - Measured real power at available granularity
    - Measured reactive power
- Transmission Network
    - Network topology
        - Device statuses
            - Transmission lines
            - Breakers (may result in split buses)
            - Reactive shunt elements (Capacitor, Reactor)
            - Reactive series elements (Capacitor, Reactor)
        - Fixed-tap transformer tap positions
        - ULTC transformers – Fixed tap position and LTC voltage setting
        - Phase-shifting transformers – angle position or MW setting
    - Static VAR systems and fast-switched shunt devices – reactive output or voltage setting
    - DC lines – active power flow
    - Other devices present in system model
- Wide-Area Control
    - Area interchange totals

After data is inserted, a power flow solution is performed. After the initial power flow solution is performed, the following priority list should be used when comparing the power flow solution to the recorded values.

Validation

1. Minimize the tie flow error (recorded vs. simulation) between areas with a desired error of 0.5 MW or less.
    a. The tie flows should take top priority due to the transient stability concerns.
    b. May need to adjust recorded generation and/or area load.
2. Minimize generation error within +/- 0.5 MW.
    a. Use recorded values to the extent possible. May need adjustment based on tie flows.
    b. May need to adjust area load so slack generator matches the recorded MW while keeping tie flows close to recorded values.
3. Adjust voltage setpoints to match recorded voltages within +/- 1%. Minimize generation error within +/- 1.0 MVAR.
    a. Engineering judgement should be used when balancing the voltage errors and generation reactive power errors.
4. Use recorded load MW, MVAR.
    a. To match generation and tie flows the unobservable load should be adjusted
    b. If necessary, the recorded load may need to be adjusted to match line flows, tie flows, and generation outputs.

If using power flow case for transient stability analysis, the relative priority above may change based on the goals of the validation case. The generation output would take highest priority if a specific unit is going to be tripped as part of the transient stability validation. Whereas, the line flow would take priority when a transmission line fault and trip will be simulated as part of the transient stability validation process.

Transient Stability

Input Data

Comparisons between simulation results from the model and measured dynamic data provide an indication of the collective validity of a large set of component dynamics models. The following data must be entered in the transient stability database, at a minimum:

- Generator
    - Status of exciter
    - Status of PSS
    - Status of governor (Droop, temperature limits, etc.)
    - Control parameters (gains, feedback time constants, etc.)
    - Machine characteristics (inertia, time constants)
- Load model
    - Real and reactive power under dynamic conditions
- Transmission Network model
    - Reactive shunt dynamics models (automatic shunt switching)
    - SVC model characteristics

- Dynamic Load Characteristics
    - Dynamic load characteristic models are currently utilized in the GPA PSLF model. Fault Induced Delayed Voltage Recovery (FIDVR) has been observed in the GPA system and has a tremendous impact of system response and its ability to recover from a transient event. Transient recorders at stations that serve load should be utilized to ascertain the dynamic response of load to changes in voltage and frequency characteristics. Often times, this characteristic will vary depending upon the time of day/season of the event. Estimates of load characteristics at stations with recorders should be used as a proxy for similar loads in the system.

Validation

Non-3-phase faults are going to be more difficult to validate since industry tools are positive sequence programs.

1. Match interconnection frequency response within 0.05 Hz at minimum frequency and 0.2 Hz at maximum frequency.
    a. In order to ensure proper margin it is preferable that the simulation response has an interconnection frequency that is slightly lower or equal to the recorded interconnection frequency response for underfrequency events. Adjustments to the load characteristics may be made to get the load to match recorded load during the transient event after all other possible adjustments have been exhausted.
2. Match the recorded and simulated generation responses to within 2 MW during the transient and 1 MW after the transient has occurred (5 seconds after event).
    a. The primary goal of the validating is to match the interconnection frequency. The simulated generation response should match the recordings but preference should be given to the interconnection frequency. Multiple iterations alternating between matching the system load characteristics and generation output may be required to obtain close correlation between the simulation and recorded values.
3. Using engineering judgement, match the significant flows between areas within 5 MW after the transient has occurred (5 seconds after event).
    a. The stability limits along the tie from Kenai to Anchorage and from Anchorage to Fairbanks are a significant concern and dictate many operational limits. Ensuring simulations match the recorded tie-line flows will improve the confidence in the defined limits.

Using engineering judgement, match the recorded and simulated major bus voltages within +/-2% during pre and post-disturbance comparisons.

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GRID STABILITY and RELIABILITY STANDARDS

GPA-PRC-001-0

FOR

AUTOMATIC UNDERFREQUENCY LOAD SHEDDING

AUTOMATIC UNDERFREQUENCY LOAD SHEDDING

8 TABLE OF CONTENTS

9 A. Introduction

24. Purpose:
To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures.

25. Applicability:
UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Regional Coordinating Council.

B. Requirements

R1. The Regional Coordinating Council shall develop and document criteria within the Railbelt system, including consideration of historical events and system studies, to select load levels within the Distribution Provider's Area to form load shedding stages.

R21.1. The UFLS program shall be designed for the system to survive the following imbalance scenarios (at a minimum) for all system load conditions.

R21.1.1. Loss of generation as determined by the Maximum N-1 Contingency Criteria.

R21.1.2. Loss of generation as defined in GPABAL-002 as a Reportable Excess Contingency.

R21.1.3. Loss of largest plant.

R21.2. The UFLS program shall be designed with a provision for a backup block of load (s) with an extended time delay to prevent extended low frequency operation.

R21.3. The UFLS program shall be designed such that the loss of a contingency less than 75% of the Maximum N-1 Contingency Criteria should not result in the activation of the UFLS program.

R21.4. The UFLS program shall consider severe scenarios of unit commitment and dispatch defined to limit reserve response and location.

R2. The Regional Coordinating Council shall design the UFLS with the requirements of the interconnected system and subsequently identify one or more islands to serve as a basis for designing its UFLS program during islanding conditions including:

R23.1. Any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System, and

R23.2. A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides.

R23.3. The load included in the UFLS for the protection of the interconnected system shall not be included in a SILOS program. Load included in an island's UFLS system designed to protect the area following islanding may be included in a SILOS program.

R3. The Regional Coordinating Council shall develop a UFLS program within the Railbelt system, including notification of and a schedule for implementation by UFLS entities within the interconnected system, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where imbalance = [(load — actual generation output) / (load)].

R24.1. Frequency shall remain within the bounds of the Underfrequency Performance Characteristic curve contained within Attachment 1, either for 60 seconds or until a steady-state condition between 59.5 Hz and 60.5 Hz is reached for any contingency less than or equal to the Maximum N-1 Contingency Criteria.

R24.2. Frequency shall remain within the bounds of the Underfrequency Performance Characteristic curve contained within Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached for any contingency larger than the Maximum N-1 Contingency Criteria.

R24.3. The UFLS program shall be designed such that no UFLS program action results in an interconnected system frequency that exceeds 61.8 Hz for any contingency.

R24.3.1. Portions of the BES designed to detach from the Interconnection as a result of the operation of a relay scheme or Special Protection System may exceed these frequency limits but should not exceed 63.0 Hz following a UFLS program activation.

R24.4. Simulated UFLS events shall not result in Volts per Hertz (V/Hz) exceeding the generator trip settings or equipment damage limits if no protection exists.

R24.5. Simulated UFLS events shall not result in an increase in transfers between areas that exceed the transfer limits of the transmission path.

R4. The Regional Coordinating Council shall conduct and document a UFLS design assessment within the Railbelt system at least once every five years or upon any significant changes in Distribution Providers' resources or characteristics of the Bulk Electric Transmission System that may impact UFLS performance. The design assessment shall update the UFLS design as necessary to maintain the performance characteristics in Requirement R3 for each island identified in Requirement R2. The simulation shall model each of the following:

R25.1. Underfrequency trip settings of each generating unit / plant with a nameplate capability larger than or equal to 5 MVA directly connected to the BES through a single contingency interconnection that trips within the bounds of the Generator Underfrequency Trip Modeling curve in GPAPRC-006 - Attachment 1.

R25.2. Overfrequency trip settings of each generating unit / plant greater than 5 MVA (gross nameplate rating) directly connected to the BES through a single contingency interconnection that trips below the Generator Overfrequency Trip Modeling curve in GPAPRC-006 — Attachment 1

R25.3. Any system action that impacts Interconnection frequency response including:

R25.3.1. Any automatic load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

R25.3.2. Any operation of a relay scheme or Special Protection System that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.
R25.3.3. Operation of plant controls that affect unit response and system frequency.
R25.3.4. The best estimate of each Distribution Provider load's response to changes in system frequency or voltage.

R5. Each Planning Coordinator shall maintain a UFLS database containing data necessary to model its UFLS program for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities.

R6. Each Planning Coordinator shall provide its UFLS database containing data necessary to model its UFLS program to other Planning Coordinators within the Interconnection within 30 calendar days of a request.

R7. Each UFLS entity shall provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.

R8. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets.

R9. Each Transmission Owner shall provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.

R10. The Regional Coordinating Council shall conduct and document an assessment for an event that results in system frequency excursions below the initializing set points of the UFLS program, within two (2) months of event to evaluate:

R31.1. The performance of the UFLS equipment,
R35.2. The effectiveness of the UFLS program.
R35.3. If further analysis is not required, all documentation should be completed within two (2) months from the initial event.

R.11 The Regional Coordinating Council shall conduct and document a UFLS design assessment as outlined in R4 to evaluate the event and UFLS response, when an UFLS initial event assessment (per R11) shows need for additional analysis, within six (6) months of the event. The analysis shall include, but not be limited to:

R36.1. A description of the event including initiating conditions.
R36.2. A review of the UFLS set points and tripping times.
R36.3. A simulation of the event.
R36.4. A summary of the findings.

R.12 The Regional Coordinating Council shall respond to written comments submitted by UFLS entities and Transmission Owners following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes will be made or reasons why changes will not be made to the following:

R37.1. UFLS program, including a schedule for implementation
R37.2. UFLS design assessment
R37.3. Format and schedule of UFLS data submittal

C. Measures

M22. Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of its system that may form load shedding blocks including how system studies and historical events were considered to develop the criteria per Requirement R1.

M23. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of potential islands to serve as a basis for designing a UFLS program that meet the criteria in Requirement R2.

M3. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3.

M4. Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4.

M5. Each Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.

M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

M7. Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within the Interconnection within 30 calendar days of a request per Requirement R7.

M8. Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.

M9. Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for application per Requirement R9.

M10. Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application per Requirement R10.

M11. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R9.

M12. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

M13. Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, to written comments submitted by UFLS entities and Transmission Owners within the Interconnection following a comment period and before finalizing its UFLS program per Requirement R13.

D. Compliance

12. Compliance Monitoring Process

12.1. Compliance Monitoring Responsibility

Regional Coordinating Council

12.2. Data Retention

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, and R13, Measures M1, M2, M3, M4, M5, M12, and M13 as well as any evidence necessary to show compliance since the last compliance audit.
- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to other Planning Coordinators in the Interconnection since the last compliance audit in accordance with Requirement R7, Measure M7.

- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

12.3. Compliance Monitoring and Assessment Process

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

13. Levels of Non-Compliance

13.1. Levels of Non-Compliance for Requirement R1, Measure M1

9.1.1. Level 1 - The Regional Coordinating Council developed and documented criteria but failed to include either the consideration of historical events or the consideration of system studies.

9.1.2. Level 2 - The Regional Coordinating Council failed to meet all the requirements of Level 1 for Requirement R1 and Measurement M1.

9.2. Levels of Non-Compliance for Requirement R2, Measure M2

9.2.1. Level 1 - NA

9.2.2. Level 2 - The Regional Coordinating Council failed to identify islands to serve as a basis for designing its UFLS program as specified in Requirement R2.

9.3. Levels of Non-Compliance for Requirement R3, Measure M3

9.3.1. Level 1 - The Regional Coordinating Council developed a UFLS program, including a schedule for implementation within its area where imbalance = (load — actual generation output) / (load), but failed to meet one (1) of the performance characteristic in Requirement Part R3.1 through Part R3.3 in simulations of underfrequency conditions.

9.3.2. Level 2 – The Regional Coordinating Council failed to meet all the requirements of Level 1 for Requirement R3 and Measurement M3.

9.4. Levels of Non-Compliance for Requirement R4, Measure M4

9.4.1. Level 1 - The Regional Coordinating Council conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include one (1) of the items as specified in Requirement Part R4.1 through Part R4.4.

9.4.2. Level 2 – The Regional Coordinating Council failed to meet all the requirements of Level 1 for Requirement R4 and Measurement M4.

9.5. Levels of Non-Compliance for Requirement R5, Measure M5

9.5.1. Level 1 – The Planning Coordinator failed to retain dated evidence of joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island.

9.5.2. Level 2 - The Planning Coordinator failed to coordinate its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island.

9.6. Levels of Non-Compliance for Requirement R6, Measure M6

9.6.1. Level 1 – N/A

9.6.2. Level 2 - The Planning Coordinator failed to perform maintenance on the UFLS database within 15 months of previous maintenance activity.

9.7. Levels of Non-Compliance for Requirement R7, Measure M7

9.7.1. Level 1 – The Planning Coordinator provided data more than 5 calendar days but less than or equal to 10 calendar days following the schedule specified by Requirement R7 to support maintenance of the UFLS database.

9.7.2. Level 2 - The Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R7 and Measurement M7.

9.8. Levels of Non-Compliance for Requirement R8, Measure M8

9.8.1. Level 1 - The UFLS entity provided data more than 5 calendar days but less than or equal to 10 calendar days following the schedule specified by Requirement R8 to support maintenance of the UFLS database.

9.8.2. Level 2 - The UFLS entity failed to meet all the requirements of Level 1 for Requirement R8 and Measurement M8.

9.9. Levels of Non-Compliance for Requirement R9, Measure M9

9.9.1. Level 1 - The UFLS entity provided less than 100% but more than (and including) 90% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Requirement R9.

9.9.2. Level 2 - The UFLS entity failed to meet all the requirements of Level 1 for Requirement R9 and Measurement M9.

9.10. Levels of Non-Compliance for Requirement R10, Measure M10

9.10.1. Level 1 - The Transmission Owner provided less than 100% but more than (and including) 90% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by Requirement R10.

9.10.2. Level 2 - The Transmission Owner failed to meet all the requirements of Level 1 for Requirement R10 and Measurement M10.

9.11. Levels of Non-Compliance for Requirement R11, Measure M11

9.11.1. Level 1 - The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R9, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than six months but less than or equal to 7 months of event actuation.

9.11.2. Level 2 - The Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R11 and Measurement M11.

9.12. Levels of Non-Compliance for Requirement R12, Measure M12

9.12.1. Level 1 – The Planning Coordinator, in whose area an event results in a system frequency excursion below the initializing set points of the UFLS program, conducted an assessment of the UFLS event more than one (1) month but less than two (2) months after the initiating event.

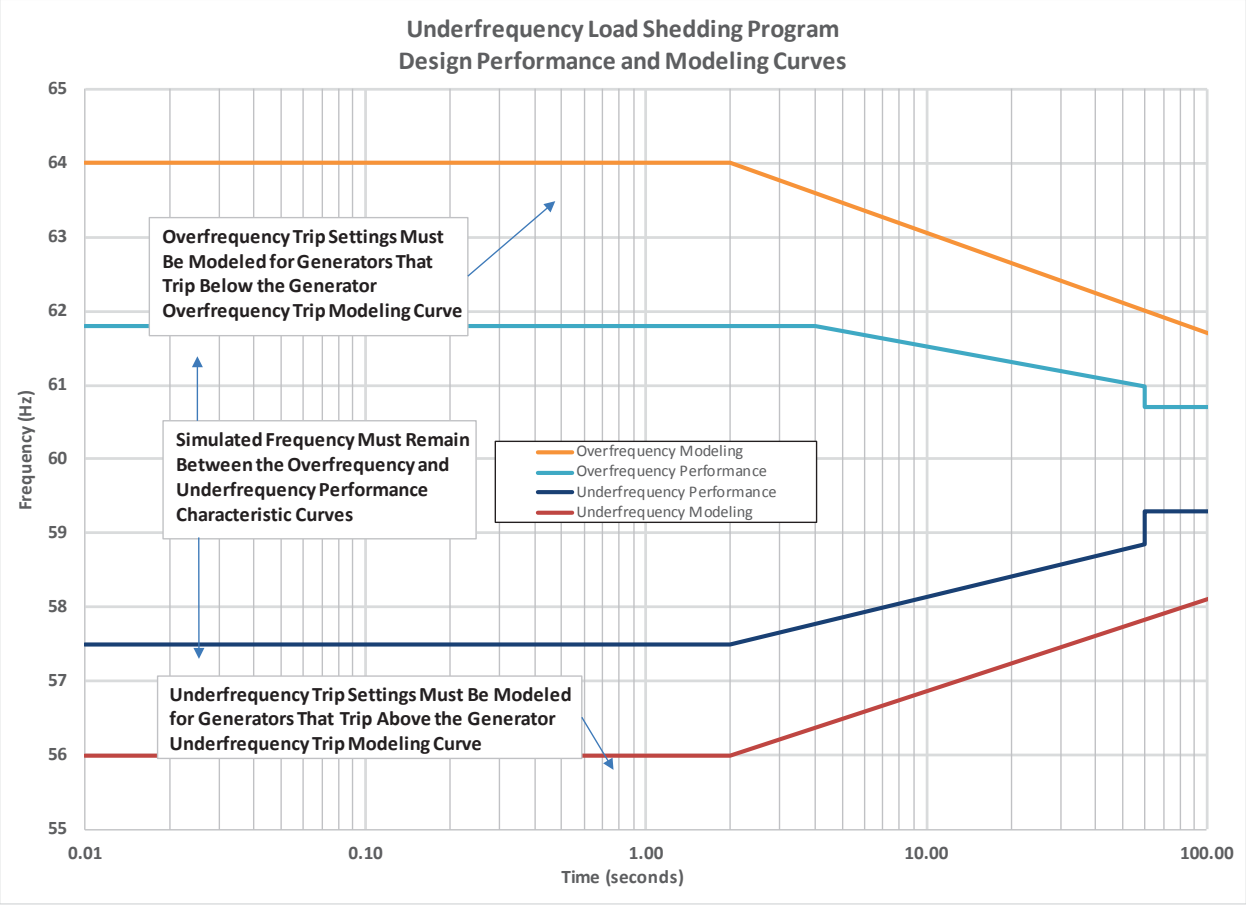
9.12.2. Level 2 - The Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R12 and Measurement M12.

9.13. Levels of Non-Compliance for Requirement R13, Measure M13

9.13.1. Level 1 – N/A

9.13.2. Level 2 – The Planning Coordinator failed to retain dated evidence of responses submitted by UFLS entities and Transmission Owners within the Interconnection.

GPAPRC-006 – Attachment 1



Generator Overfrequency Trip Modeling		Generator Overfrequency Performance Characteristic		
t < 2 s	t ≥ 2 s	t < 4 s	60 s > t ≥ 4 s	t ≥ 60 s
f = 64 Hz	f = -0.686*log(t)+62.41 Hz	f = 61.8 Hz	f = -0.686*log(t)+62.21 Hz	f = 60.7 Hz

Generator Underfrequency Trip Modeling		Generator Underfrequency Performance Characteristic		
t < 2 s	t ≥ 2 s	t < 2 s	60 s > t ≥ 2 s	t ≥ 60 s
f = 56 Hz	f = 0.575*log(t)+57.63 Hz	f = 57.5 Hz	f = 0.915*log(t)+57.23 Hz	f = 59.3 Hz

GUAM POWER AUTHORITY
10 P.O. BOX 2977
AGANA, GUAM 96932

GRID STABILITY and RELIABILITY STANDARDS

GPA-TPL-001-0

FOR

TRANSMISSION SYSTEM PLANNING PERFORMANCE REQUIREMENTS

TRANSMISSION SYSTEM PLANNING PERFORMANCE REQUIREMENTS

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12 A. Introduction

26. Purpose:

Establish transmission system planning performance requirements within the planning horizon to develop a System that will operate reliably over a broad spectrum of conditions and following a wide range of probable Contingencies applicable to the portions of the Bulk Electrical System (BES) used to supply power to or from major load and generation centers.

27. Applicability:

27.1 Planning Authority

27.2 Transmission Planner

27.3 Resource Planner

B. Requirements

R1. System Model

The Regional Coordinating Council, in conjunction with the Transmission Planner, shall maintain System models for performing the studies needed to complete its Planning Assessment. The models shall use data consistent with that provided in accordance with the GPAMOD-032-1 standard, supplemented by other sources as needed, including items represented in the CAP, and must represent projected System conditions. This establishes Category P0 as the normal System condition in Table 1.

R41.1. System models shall represent:

R41.1.1. Existing Facilities

R41.1.2. Known outage(s) of generation or transmission facility(ies) with a duration of at least six months.

R41.1.3. New planned facilities and changes to existing facilities

R41.1.4. Real and reactive load forecasts

R41.1.5. Resources (supply or demand side) required for load

R41.1.6. Resources required for transmission stability or contingencies

R2. Assessment

The Regional Coordinating Council, in conjunction with the Transmission Planner and Planning Coordinator shall prepare a Planning Assessment of the BES no longer than every five years or as determined by the Regional Coordinating Council. This Planning Assessment shall use current

or qualified past studies (as indicated in R2.6), document assumptions, and document summarized results of the steady state analyses, short circuit analyses, and Stability analyses.

R43.1. Near Term – Steady State

For the Planning Assessment, the Near-Term Transmission Planning Horizon portion of the steady state analysis shall be assessed no longer than every five years or as determined by the Regional Coordinating Council, and be supported by current studies or qualified past studies as indicated in R2.6. Qualifying studies need to include the following conditions:

R43.1.1. System Peak Load (with minimum and maximum Intermittent Generation) for year one.

R43.1.2. System Peak Load (with minimum and maximum Intermittent Generation) for year five.

R43.1.3. System Minimum Load (with minimum and maximum Intermittent Generation) for one of the five years.

R43.1.4. P1 events in Table 1, with known outages modeled as in Requirement R41.1.2, under those System peaks, or System minimum conditions when known outages are scheduled.

R43.1.5. For each of the studies described in R2.1.1 through R2.1.5, sensitivity case(s) may be utilized to demonstrate the impact of changes to the basic assumptions used in the model. To accomplish this, the sensitivity analysis in the Planning Assessment shall vary one or more of the following conditions by a sufficient amount to stress the System within a range of credible conditions that demonstrate a measurable change in System response: (as accepted by the Regional Coordinating Council)

R43.1.5.1. Real and reactive forecasted Load.

R43.1.5.2. Expected transfers

R43.1.5.3. Expected in-service dates of new or modified Transmission Facilities.

R43.1.5.4. Reactive resource capability.

R43.1.5.5. Generation additions, retirements.

R43.1.5.6. Unit commitment and Dispatch scenarios to maximize transfers between each load and generation area.

R43.1.5.7. Controllable Loads and Demand Side Management.

R43.1.5.8. Duration or timing of known Transmission outages.

R43.1.6. When an entity's spare equipment strategy could result in the unavailability of major Transmission equipment that has a lead time of one year or more (such as a transformer), the impact of this possible unavailability on System performance shall be studied. The studies shall be performed for the P0, P1, and P2, categories

identified in Table 1 with the conditions that the System is expected to experience during the possible unavailability of the long lead time equipment.

R43.2. Long Term – Steady State

For the Planning Assessment, the Long-Term Transmission Planning Horizon portion of the steady state analysis shall be assessed no longer than every five years or as determined by the Regional Coordinating Council, and be supported by the following current study, supplemented with qualified past studies as indicated in R2.6. Qualifying studies need to include the following conditions:

R43.2.1. For one of the years in the Long-Term Transmission Planning Horizon and the rationale for why that year was selected.

R43.2.2. System Peak Load (with minimum and maximum Intermittent Generation) for year selected.

R43.2.3. System Minimum Load (with minimum and maximum Intermittent Generation) for year selected.

R43.2.4. Unit commitment and Dispatch scenarios to maximize transfers between each load and generation area.

R43.3. Near Term – Short Circuit

The short circuit analysis portion of the Planning Assessment shall be conducted no longer than every five years or as determined by the Regional Coordinating Council, addressing the Near-Term Transmission Planning Horizon and can be supported by current or past studies as qualified in R2.6. The analysis shall be used to determine whether circuit breakers have interrupting capability for Faults that they will be expected to interrupt using the System short circuit model with any planned generation and Transmission Facilities in service which could impact the study area.

R43.4. Near Term – Stability

For the Planning Assessment, the Near-Term Transmission Planning Horizon portion of the Stability analysis shall be assessed no longer than every five years or as determined by the Regional Coordinating Council, and be supported by current or past studies as qualified in R2.6. The following studies are required:

R43.4.1. Load levels shall include a Load model which represents the expected dynamic behavior of Loads that could impact the study area, considering the behavior of induction motor Loads. An aggregate System Load model which represents the overall dynamic behavior of the Load is acceptable.

R43.4.2. System Peak Load (with minimum and maximum Intermittent Generation) for one of the five years.

R43.4.3. System Minimum Load (with minimum and maximum Intermittent Generation) for one of the five years.

R43.4.4. For each of the studies described in R2.4.1 through R2.4.6, sensitivity case(s) may be utilized to demonstrate the impact of changes to the basic assumptions used in the model. To accomplish this, the sensitivity analysis in the Planning Assessment shall vary one or more of the following conditions by a sufficient amount to stress the System within a range of credible conditions that demonstrate a measurable change in performance: (as accepted by the Regional Coordinating Council)

R43.4.4.1. Load level, Load forecast, or dynamic Load model assumptions.

R43.4.4.2. Expected transfers.

R43.4.4.3. Expected in service dates of new or modified Transmission Facilities.

R43.4.4.4. Reactive resource capability.

R43.4.4.5. Generation additions, retirements.

R43.4.4.6. Unit commitment and Dispatch scenarios to maximize transfers between each load and generation area.

R43.5. Long Term – Stability

For the Planning Assessment, the Long-Term Transmission Planning Horizon portion of the Stability analysis shall be assessed no longer than every five years or as determined by the Regional Coordinating Council, to address the impact of proposed material generation additions or changes in that time frame and be supported by current or past studies as qualified in R2.6 and shall include documentation to support the technical rationale for determining material changes. Qualifying studies need to include the following conditions:

R43.5.1. For one of the years in the Long-Term Transmission Planning Horizon and the rationale for why that year was selected.

R43.5.2. System Peak Load (with minimum and maximum Intermittent Generation) for year selected.

R43.5.3. System Minimum Load (with minimum and maximum Intermittent Generation) for year selected.

R43.5.4. Unit commitment and Dispatch scenarios to maximize transfers between each load and generation area.

R43.6. Past Studies

Past studies may be used to support the Planning Assessment if they meet the following requirements:

R43.6.1. For steady state, short circuit, or Stability analysis: the study shall be five calendar years old or less, unless a technical rationale can be provided to demonstrate that the results of an older study are still valid.

R43.6.2. For steady state, short circuit, or Stability analysis: no material changes have occurred to the System represented in the study. Documentation to support the technical rationale for determining material changes shall be included.

R43.7. Planning Analysis – CAP(s)

For planning events shown in Table 1, when the analysis indicates an inability of the System to meet the performance requirements in Table 1, the Planning Assessment shall include CAP(s) detailing the plans to meet the performance requirements. The CAP(s) must:

R43.7.1. Include both interim measures that are recommended while longer-term capital projects are under evaluation, design, permitting or construction such as reduced or revised transfer limits, system operating constraints, loss of firm load or suspension of firm transmission service was well as long-term capital improvement plans.

R43.7.2. Include plans for longer term projects that are capable of eliminating the deficiencies identified in the system studies. Included in the plan for each of the projects must be:

1. Complete description of the proposed project
2. Complete cost estimate of the proposed project
3. Complete time frame of the project from project approval to project completion, including major milestones
4. Complete Cost/Benefit analysis using the costs above and the reduced operating costs and reliability improvements achieved over the life of the project

R43.7.3. Be reviewed in subsequent annual Planning Assessments for continued validity (via studies) and status of items in the CAP(s).

R43.7.4. If resource additions or changes are part of a CAP, the resources required in the CAP must be included as a proposed resource in GPABAL-502 for the corresponding time period.

R43.7.5. Provide the System operator a written summary of the recommended operating guidelines to mitigate the cause and/or effect of any deficiencies until such a time as a permanent solution can be achieved.

R43.8. Short Circuit – CAP

For short circuit analysis, if the short circuit current interrupting duty on circuit breakers determined in R2.3 exceeds their Equipment Rating, the Planning Assessment shall include a CAP to address the Equipment Rating violations. The CAP must:

R43.8.1. List System deficiencies and the associated CAP needed to meet required System performance.

R43.8.2. Be reviewed in subsequent annual Planning Assessments for continued validity and status of items in the CAP.

R.3 Steady State – Performance

For the steady state portion of the Planning Assessment, the Regional Coordinating Council, the Planning Authority, and Transmission Planner shall perform studies for the Near-Term and Long-Term Transmission Planning Horizons in R2.1, and R2.2. The studies shall be based on computer simulation models using data provided in R1.

R44.1. Studies shall be performed for planning events to determine whether the System meets the performance requirements in Table 1 based on the Contingency list created in R3.4.

R44.2. Studies shall be performed to assess the impact of the extreme events which are identified by the list created in R3.5.

R44.3. Contingency analyses for R3.1 & R3.2 must:

R44.3.1. Simulate the removal of all elements that the Protection System and other automatic controls are expected to disconnect for each Contingency without operator intervention.

R44.3.2. Simulate the expected automatic operation of existing and planned devices designed to provide steady state control of electrical system quantities when such devices impact the study area. These devices may include equipment such as phase-shifting transformers, load tap changing transformers, and switched capacitors and inductors.

R44.4. Those planning events in Table 1, that are expected to produce more severe System impacts shall be identified and a list of those Contingencies to be evaluated for System performance in R3.1 created. The rationale for those Contingencies selected for evaluation shall be available as supporting information.

R44.5. Those extreme events in Table 1 that are expected to produce more severe System impacts shall be identified and a list created of those events to be evaluated in R3.2. The rationale for those Contingencies selected for evaluation shall be available as supporting information. If the analysis concludes there is Cascading caused by the occurrence of extreme events, an evaluation of possible actions designed to reduce the likelihood or mitigate the consequences and adverse impacts of the event(s) shall be conducted.

R.4 Stability - Performance

For the Stability portion of the Planning Assessment, as described in Requirement R2, Parts 2.4 and 2.5, the Regional Coordinating Council, Planning Authority, and Transmission Planner shall perform the Contingency analyses listed in Table 1. The studies shall be based on computer simulation models using data provided in Requirement R1.

R45.1. Studies shall be performed for planning events to determine whether the System meets the performance requirements in Table 1 based on the Contingency list created in R4.4.

R45.1.1. For planning event P1: No generating unit shall pull out of synchronism. A generator being disconnected from the System by fault clearing action or by a Special Protection System is not considered pulling out of synchronism.

R45.1.2. For planning events P2 through P7: When a generator pulls out of synchronism in the simulations, the resulting apparent impedance swings shall not result in the tripping of any Transmission system elements other than the generating unit and its directly connected Facilities.

R45.1.3. For planning events P1 through P7: Power oscillations shall exhibit acceptable damping as established by the Balancing Authority.

R45.2. Studies shall be performed to assess the impact of the extreme events which are identified by the list created in R4.5.

R45.3. Contingency analyses for R4.1 and R4.2 must:

R45.3.1. Simulate the removal of all elements that the Protection System and other automatic controls are expected to disconnect for each Contingency without operator intervention. The analyses shall include the impact of subsequent:

R45.3.1.1. Successful high speed (less than one second) reclosing and unsuccessful high-speed reclosing into a Fault where high speed reclosing is utilized.

R45.3.2. Simulate the expected automatic operation of existing and planned devices designed to provide dynamic control of electrical system quantities when such devices impact the study area. These devices may include equipment such as generation exciter control and power system stabilizers, static var compensators and power flow controllers.

R45.4. Those planning events in Table 1 that are expected to produce more severe System impacts, shall be identified, and a list created of those Contingencies to be evaluated in R4.1. The rationale for those Contingencies selected for evaluation shall be available as supporting information.

R45.4.1. The Planning Coordinator and Transmission Planner shall coordinate with their own Resource Planner and adjacent Planning Coordinators and Transmission Planners and Resource Planners to ensure that Contingencies on adjacent Systems which may impact their Systems are included in the Contingency list.

R45.5. Those extreme events in Table 1 that are expected to produce more severe System impacts shall be identified and a list created of those events to be evaluated in R4.2. The rationale for those Contingencies selected for evaluation shall be available as supporting information. If the analysis concludes there is Cascading caused by the occurrence of extreme events, an

evaluation of possible actions designed to reduce the likelihood or mitigate the consequences of the event(s) shall be conducted.

R.5 The Regional Coordinating Council, Planning Authority, and Transmission Planner shall have criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and the transient voltage response for its System. For transient voltage response, the criteria shall at a minimum, specify a low voltage level and a maximum length of time that transient voltages may remain below that level.

R.6 The Regional Coordinating Council, Planning Authority, and Transmission Planner shall define and document, within their Planning Assessment, the criteria or methodology used in the analysis to identify System instability for conditions such as cascading, voltage instability, or uncontrolled islanding.

R.7 The Regional Coordinating Council, in conjunction with the Planning Coordinators and Transmission Planners, shall determine and identify each entity's individual and joint responsibilities for performing the required studies for the Planning Assessment.

R.8 The Planning Coordinator and Transmission Planner shall distribute its Planning Assessment results to the Regional Coordinating Council within 90 calendar days of completing its Planning Assessment, and to any functional entity that has a reliability related need and submits a written request for the information within 30 days of such a request.

R49.1. If a recipient of the Planning Assessment results provides documented comments on the results, the respective party shall provide a documented response to that recipient within 90 calendar days of receipt of those comments.

Table 1 – Steady State & Stability Performance Planning Events
Steady State & Stability:
a. The System shall remain stable. Cascading and uncontrolled islanding shall not occur.
b. Consequential Load Loss as well as generation loss is acceptable as a consequence of any event excluding P0.
c. Simulate the removal of all elements that Protection Systems and other controls are expected to automatically disconnect for each event.
d. Simulate Normal Clearing unless otherwise specified.
e. Planned System adjustments such as Transmission configuration changes and re-dispatch of generation are allowed if such adjustments are executable within the time duration applicable to the Facility Ratings.
Steady State Only:
f. Applicable Facility Ratings shall not be exceeded.
g. System steady state voltages and post-Contingency voltage deviations shall be within acceptable limits as established by the Planning Authority and Transmission Planner.
h. Planning event P0 is applicable to steady state only.
i. The response of voltage sensitive Load that is disconnected from the System by end-user equipment associated with an event shall not be used to meet steady state performance requirements.
Stability Only:
j. Transient voltage response shall be within acceptable limits established by the Planning Authority and Transmission Planner.

Category	Initial Condition	Event	Fault(s) Type[1]	Interruption of Firm Transmission Service Allowed	Non-Consequential Load Loss Allowed
P0 No Contingency	Normal System	None	NA	No	No
P1 Single Contingency	Normal System	Loss of one of the following:		No	No
		1. Generator, no fault	N/A		
		2. Generator	3Ø		
		3. Transmission Circuits			
		4. Transformer[2]			
		5. Shunt Device-Ancillary Service Device[3]			
		6. Single Pole of a DC line	SLG		
P2 Single Contingency	Normal System	1. Opening a line section w/o fault[4]	N/A	No	No
		2. Bus Section fault	SLG		
		3. Internal Breaker Fault[5] (non-Bus-tie Breaker)			
		4. Internal Breaker Fault (Bus-tie Breaker)[5]			

Category	Initial Condition	Event	Fault(s) Type[1]	Interruption of Firm Transmission Service Allowed	Non-Consequential Load Loss Allowed
P3a Multiple Contingency	Loss of generator unit followed by System adjustments[6] Unit Commitment Changes Allowed for All Events	Loss of one of the following:			
		1. Generator	3Ø	No	No
		2. Transmission Circuits			
		3. Transformer[2]			
		4. Shunt Device/ Ancillary Service Device[3]			
		5. Single pole of a DC line	SLG		
P3b Multiple Contingency	Loss of generator unit followed by System adjustments[6]	Loss of one of the following:			Yes, 10% of System Load
		1. Generator	3Ø	No	
		2. Transmission Circuits			No
		3. Transformer[2]			
		4. Shunt Device/ Ancillary Service Device[3]			
		5. Single pole of a DC line	SLG		
P4 Multiple Contingency (Fault plus stuck breaker[7])	Normal System	Loss of multiple elements caused by a stuck breaker[7] (non-Bus-tie Breaker) attempting to clear a Fault on one of the following:			
		1. Generator	SLG	Yes	Yes, 25% for Islanded Area Load, 10% of System Load
		2. Transmission Circuits			
		3. Transformer[2]			
		4. Shunt Device[3]			
		5. Bus Section			
		6. Loss of multiple elements caused by a stuck breaker[7] (Bus-tie Breaker) attempting to clear a Fault on the associated bus			
P5 Multiple Contingency (Fault plus relay failure to operate)	Normal System	Delayed Fault Clearing due to the failure of a non-redundant relay[9] protecting the Faulted element to operate as designed, for one of the following:			
		1. Generator	SLG	Yes	Yes, 25% for Islanded Area Load, 10% of System Load
		2. Transmission Circuits			
		3. Transformer[2]			
		4. Shunt Device[3]			
		5. Bus Section			
P6 Multiple Contingency (Two overlapping singles)	Loss of one of the followed by System adjustments[6]	Loss of one of the following:			
	1. Transmission Circuits	1. Transmission Circuits	3Ø	Yes	Yes, 25% for Islanded Area Load, 10% of System Load
	2. Transformer[2]	2. Transformer[2]			
	3. Shunt Device[3]	3. Shunt Device[3]			
	4. Single Pole of a DC Line	4. Single pole of a DC line	SLG		
P7 Multiple Contingency (Common Structure)	Normal System	The loss of:			
		1. Any two adjacent (vertically or horizontally) circuits on common structure.[8]	SLG	Yes	Yes, 25% for Islanded Area Load, 10% of System Load
		2. Loss of a bipolar DC line			

Table 1 – Steady State & Stability Performance Extreme Events

Steady State & Stability

For all extreme events evaluated:

1. Simulate the removal of all elements that Protection systems and automatic controls are expected to disconnect for each Contingency.
2. Simulate Normal Clearing unless otherwise specified.

Steady State	**Stability**
1. Loss of a single generator, Transmission Circuit, single pole of a DC Line, shunt device, or transformer forced out of service followed by another single generator, Transmission Circuit, single pole of a DC Line, shunt device, or transformer forced out of service prior to System adjustments.	**1.** Loss of a single generator, Transmission circuit, single pole of a DC line, shunt device, or transformer force out of service, apply a 3Ø fault on another single generator, Transmission circuit, single pole of a different DC line, shunt device, or transformer prior to System adjustments.
2. Local area events affecting the Transmission System such as:	**2.** Local or wide area events affecting the Transmission System such as:
a. Loss of a tower line with three or more circuits[9].	**a.** 3Ø fault on generator with stuck breaker[8] or a relay failure[10] resulting in Delayed Fault Clearing.
b. Loss of all Transmission lines on a common Right-of-Way[9].	**b.** 3Ø fault on Transmission circuit with stuck breaker[8] or a relay failure[10] resulting in Delayed Fault Clearing.
c. Loss of a switching station or substation (loss of one voltage level plus transformers).	**c.** 3Ø fault on transformer with stuck breaker[8] or a relay failure[10] resulting in Delayed Fault Clearing.
d. Loss of all generating units at a generating station.	**d.** 3Ø fault on bus section with stuck breaker[8] or a relay failure[10] resulting in Delayed Fault Clearing.
e. Loss of a large Load or major Load center.	**e.** 3Ø internal breaker fault.
3. Wide area events affecting the Transmission System based on System topology such as:	**f.** Other events based upon operating experience, such as consideration of initiating events that experience suggests may result in wide area disturbances.
a. Loss of two generating stations resulting from conditions such as:	
i. Loss of a large fuel line into an area.	
ii. Loss of the use of a large body of water as the cooling source for generation.	
iii. Wildfires	
iv. Severe weather, e.g., hurricanes	
v. A successful cyber attack	
vi. Large earthquake, tsunami or volcanic eruption	
b. Other events based upon operating experience that may result in wide area disturbances.	

Table 1 – Steady State & Stability Performance Footnotes (Planning Event and Extreme Events)	
1.	Unless specified otherwise, simulate Normal Clearing of faults. Single line to ground (SLG) or three-phase (3Ø) are the fault types that shall be evaluated in Stability simulations for the event described. A 3Ø or a double line to ground fault study indicating the criteria are being met is sufficient evidence that a SLG condition would also meet the criteria.
2.	For non-generator step up transformer outage events, the reference voltage, as used in footnote 1, applies to the low-side winding (excluding tertiary windings). For generator and Generator Step Up transformer outage events, the reference voltage applies to the System connected voltage (high-side of the Generator Step Up transformer). Requirements which are applicable to transformers also apply to variable frequency transformers and phase shifting transformers.
3.	Requirements which are applicable to shunt devices also apply to FACTS devices that are connected to ground.
4.	Opening one end of a line section without a fault on a normally networked Transmission circuit such that the line is possibly serving Load radial from a single source point.
5.	An internal breaker fault means a breaker failing internally, thus creating a System fault which shall be cleared by protection on both sides of the breaker.
6.	An objective of the planning process should be to minimize the likelihood and magnitude of interruption of Firm Transmission Service following Contingency events. Curtailment of Firm Transmission Service is allowed both as a System adjustment (as identified in the column entitled 'Initial Condition') and a corrective action when achieved through the appropriate re-dispatch of resources obligated to re-dispatch, where it can be demonstrated that Facilities, internal and external to the Transmission Planner's planning region, remain within applicable Facility Ratings and the re-dispatch does not result in any Non-Consequential Load Loss. Where limited options for re-dispatch exist, sensitivities associated with the availability of those resources should be considered. System adjustments assume the system has been brought back to 60 Hz and transfers are adjusted based on the constraints of the reduced system.
7.	A stuck breaker means that for a gang-operated breaker, all three phases of the breaker have remained closed. For an independent pole operated (IPO) or an independent pole tripping (IPT) breaker, only one pole is assumed to remain closed. A stuck breaker results in Delayed Fault Clearing.
8.	Excludes circuits that share a common structure (Planning event P7, Extreme event steady state 2a) or common Right-of-Way (Extreme event, steady state 2b) for 1 mile or less.
9.	Applies to the following relay functions or types: pilot (#85), distance (#21), differential (#87), current (#50, 51, and 67), voltage (#27 & 59), directional (#32, & 67), and tripping (#86, & 94).

C. Measures

M14. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide evidence, in electronic or hard copy format, that it is maintaining System models within their respective area, using data consistent with GPAMOD-032-1, including items represented in the CAP, representing projected System conditions, and that the models represent the required information in accordance with R1.

M15. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide dated evidence, such as electronic or hard copies of its annual Planning Assessment, that it has prepared an annual Planning Assessment of its portion of the System in accordance with Requirement R2.

M3. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide dated evidence, such as electronic or hard copies of the studies utilized in preparing the Planning Assessment, in accordance with Requirement R3.

M4. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide dated evidence, such as electronic or hard copies of the studies utilized in preparing the Planning Assessment in accordance with Requirement R4.

M5. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide dated evidence such as electronic or hard copies of the documentation specifying the criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and the transient voltage response for its System in accordance with Requirement R5.

M6. The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall provide dated evidence, such as electronic or hard copies of documentation specifying the criteria or methodology used in the analysis to identify System instability for conditions such as Cascading, voltage instability, or uncontrolled islanding that was utilized in preparing the Planning Assessment in accordance with Requirement R6.

M7. The Transmission Planner and Planning Coordinator shall provide evidence, such as email notices, postal receipts showing recipient and date that it has distributed its Planning Assessment results to the Regional Coordinating Council within 30 calendar days upon a written request for the information in accordance with Requirement R7.

M8. The Planning Coordinator and Transmission Planner shall provide evidence, such as email notices, documentation of updated web pages, postal receipts showing recipient and date; or a demonstration of a public posting, that it has distributed its Planning Assessment results to the Regional Coordinating Council within 90 days of having completed its Planning Assessment, and to any functional entity who has indicated a reliability need within 30 days of a written request and that the Regional Coordinating Council has provided a documented response to comments received on Planning Assessment results within 90 calendar days of receipt of those comments in accordance with Requirement R8.

D. Compliance

14. Compliance Monitoring Process

14.1. Compliance Enforcement Authority

Regional Coordinating Council

14.2. Compliance Monitoring and Enforcement Processes:

14.2.1 Compliance Audits

14.2.2 Self-Certifications

14.2.3 Spot Checking

14.2.4 Compliance Violation Investigations

14.2.5 Self-Reporting

14.2.6 Complaints

14.3. Data Retention

The Regional Coordinating Council, Transmission Planner, and Planning Coordinator shall each retain data or evidence to show compliance as identified unless directed by the Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

14.3.1 The models utilized in the current in-force Planning Assessment and one previous Planning Assessment in accordance with Requirement R1 and Measure M1.

14.3.2 The Planning Assessments performed since the last compliance audit in accordance with Requirement R2 and Measure M2.

14.3.3 The studies performed in support of its Planning Assessments since the last compliance audit in accordance with Requirement R3 and Measure M3.

14.3.4 The studies performed in support of its Planning Assessments since the last compliance audit in accordance with Requirement R4 and Measure M4.

14.3.5 The documentation specifying the criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and transient voltage response since the last compliance audit in accordance with Requirement R5 and Measure M5.

14.3.6 The documentation specifying the criteria or methodology utilized in the analysis to identify System instability for conditions such as Cascading, voltage instability, or uncontrolled islanding in support of its Planning Assessments since the last compliance audit in accordance with Requirement R6 and Measure M6.

14.3.7 The current, in force documentation for the agreements(s) on roles and responsibilities, as well as documentation for the agreements in force since the last compliance audit, in accordance with Requirement R7, and Measure M7.

The Planning Coordinator shall retain data or evidence to show compliance as identified unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

14.3.8 Three calendar years of the notifications employed in accordance with Requirement R8 and Measure M8

If the Transmission Planner and Planning Coordinator is found non-compliant, it shall keep information related to the non-compliance until found compliant or the time periods specified above, whichever is longer.

15. Levels of Non-Compliance for Requirement R1, Measure M1

15.1. Level 1 - The Regional Coordinating Council, Planning Authority's and Transmission Planner's System model failed to represent one of the Requirement R1, Parts 1.1.1 through 1.1.5 for Requirement R1 and Measurement M1.

15.2. Level 2 - The Regional Coordinating Council, Transmission Planner and Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R1 and Measurement M1.

16. Levels of Non-Compliance for Requirement R2, Measure M2

16.1. Level 1 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator failed to comply with Requirement R2, Part 2.6 for Requirement R2 and Measurement M2.

16.2. Level 2 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R2 and Measurement M2.

17. Levels of Non-Compliance for Requirement R3, Measure M3

17.1. Level 1 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator did not identify planning events as described in Requirement R3, Part 3.4 or extreme events as described in Requirement R3, Part 3.5 for Requirement R3 and Measurement M3.

17.2. Level 2 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R3 and Measurement M3.

18. Levels of Non-Compliance for Requirement R4, Measure M4

18.1. Level 1 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator did not identify planning events as described in Requirement R4, Part 4.4 or extreme events as described in Requirement R4, Part 4.5 for Requirement R4 and Measurement M4.

18.2. Level 2 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R4 and Measurement M4.

19. Levels of Non-Compliance for Requirement R5, Measure M5

19.1. Level 1 – N/A

19.2. Level 2 - The Regional Coordinating Council, Transmission Planner, and Planning Coordinator does not have criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, or the transient voltage response for its System for Requirement R5 and Measurement M5.

20. Levels of Non-Compliance for Requirement R6, Measure M6

20.1. Level 1 – N/A

20.2. Level 2 - The Transmission Planner and Planning Coordinator failed to define and document the criteria or methodology for System instability used within its analysis as described in Requirement R6 for Requirement R6 and Measurement M6.

21. Levels of Non-Compliance for Requirement R7, Measure M7

21.1. The Transmission Planner and Planning Coordinator distributed its Planning Assessment results to IMC / Regional Reliability Organization but it was more than 30 days but less than or equal to 40 days following the request as described in Requirement R7 for Requirement R7 and Measurement M7.

21.2. The Transmission Planner and Planning Coordinator failed to meet all the requirements of Level 1 for Requirement R7 and Measurement M7.

Accredited Capacity - The capacity of a generating unit or group of generating units with a single point of interconnection to GPA. Determined by the Intertie Management Committee or its designee. Used in determining Reserve Capacity Obligation and Total Operating Reserve requirement.

Actual Disturbance Recovery Period - The actual duration of time for the period, in minutes from the time of the initiating event to the time the frequency is restored to within acceptable frequency limits of 60.3 to 59.7 Hz for single contingency events and for excess contingency events off of nominal 60 Hz.

Adequacy - The ability of the electric system to supply the aggregate electrical demand and energy requirements of the end-use customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.

Adjacent Balancing Authority - A Balancing Authority Area that is interconnected another Balancing Authority Area either directly or via a multi-party agreement or transmission tariff.

Adverse Reliability Impact - The impact of an event that results in frequency-related instability; voltage collapse; unplanned tripping of load or generation; or uncontrolled separation or cascadingoutages that affects a widespread area of the Interconnection.

After the Fact (ATF) - A time classification assigned to an RFI when the submittal time is greater than one hour after the start time of the RFI.

Agreement - A contract or arrangement, either written or verbal and sometimes enforceable bylaw.

Alternative Interpersonal Communication - Any Interpersonal Communication that is able to serve as a substitute for, and does not utilize the same infrastructure (medium) as, Interpersonal Communication used for day-to- day operation.

Altitude Correction Factor - A multiplier applied to specify distances, which adjusts the distances to account for the change in relative air density (RAD) due to altitude from the RAD used to determine the specified distance. Altitude correction factors apply to both minimumworker approach distances and to minimum vegetation clearance distances.

Ancillary Service - Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Service Provider's transmission system in accordance with good utility practice. (From FERC order 888-A.)

Anti-Aliasing Filter - An analog filter installed at a metering point to remove the high frequency components of the signal over the AGC sample period.

Area Control Error (ACE) - The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, if taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction term is abbreviated (ATEC).

Area Interchange Methodology - The Area Interchange methodology is characterized by determination of incremental transfer capability via simulation, from which Total Transfer Capability (TTC) can be mathematically derived. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from the TTC, and Postbacks and counterflows are added, to derive Available Transfer Capability. Under the Area Interchange Methodology, TTC results are generally reported on an area to area basis.

Arranged Interchange - The state where the Interchange Authority has received the Interchange information (initial or revised).

Automatic Generation Control (AGC) - Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction.

Available Flowgate Capability (AFC) - A measure of the flow capability remaining on a Flowgate for further commercial activity over and above already committed uses. It is defined as TFC less Existing Transmission Commitments (ETC), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, and plus counterflows.

Available Transfer Capability (ATC) - A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. It is defined as Total Transfer Capability less Existing Transmission Commitments (including retail customer service), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, plus counterflows.

Available Transfer Capability Implementation Document (ATCID) - A document that describes the implementation of a methodology for calculating ATC or AFC, and provides information related to a Transmission Service Provider's calculation of ATC or AFC.

ATC Path - Any combination of Point of Receipt and Point of Deliver for which ATC is calculated; and any Posted Path.

Balancing Authority or Load Balancing Authority (BA or LBA) - The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

Balancing Authority Area or Load Balancing Area - The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.

Base Load - The minimum amount of electric power delivered or required over a given period at a constant rate.

BES Cyber Asset - A Cyber Asset that if rendered unavailable, degraded, or misused would, within 15 minutes of its required operation, misoperation, or non-operation, adversely impact one or more Facilities, systems, or equipment, which, if destroyed, degraded, or otherwise rendered unavailable when needed, would affect the reliable operation of the Bulk Electric System. Redundancy of affected Facilities, systems, and equipment shall not be considered when determining adverse impact. Each BES Cyber Asset is included in one or more BES Cyber Systems. (A Cyber Asset is not a BES Cyber Asset if, for 30 consecutive calendar days or less, it is directly connected to a network within an ESP, a Cyber Asset within an ESP, or to a BES Cyber Asset, and it is used for data transfer, vulnerability assessment, maintenance, or troubleshooting purposes.)

BES Cyber System - One or more BES Cyber Assets logically grouped by a responsible entity to perform one or more reliability tasks for a functional entity.

BES Cyber System Information - Information about the BES Cyber System that could be used to gain unauthorized access or pose a security threat to the BES Cyber System. BES Cyber System Information does not include individual pieces of information that by themselves do not pose a threat or could not be used to allow unauthorized access to BES Cyber Systems, such as, but not limited to, device names, individual IP addresses without context, ESP names, or policy statements. Examples of BES Cyber System Information may include, but are not limited to, security procedures or security information about BES Cyber Systems, Physical Access Control Systems, and Electronic Access Control or Monitoring Systems that is not publicly available and could be used to allow unauthorized access or unauthorized distribution; collections of network addresses; and network topology of the BES Cyber System.

Blackstart Capability Plan - A documented procedure for a generating unit or station to go from a shutdown condition to an operating condition delivering electric power without assistance from the electric system. This procedure is only a portion of an overall system restoration plan.

Blackstart Resource - A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System or is designed to remain energized without connection to the remainder of the System, with the ability to energize a bus, meeting the Transmission Operator's restoration plan needs for real and reactive power

capability, frequency and voltage control, and that has been included in the Transmission Operator's restoration plan.

Block Dispatch - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, the capacity of a given generator is segmented into loadable “blocks,” each of which is grouped and ordered relative to other blocks (based on characteristics including, but not limited to, efficiency, run of river or fuel supply considerations, and/or “must-run” status).

Bulk Electric System (BES) - As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 69 kV or higher.

Bulk-Power System - (A) Facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (B) Electric energy from generation facilities needed to maintain transmission system reliability. The term does not include facilities used in the local distribution of electric energy.

Burden - Operation of the Bulk Electric System that violates or is expected to violate a System Operating Limit or Interconnection Reliability Operating Limit in the Interconnection, or that violates any other NERC, Regional Reliability Organization, or local operating reliability standards or criteria.

Business Practices - Those business rules contained in the Transmission Service Provider's applicable tariff, rules, or procedures; associated Regional Reliability Organization or regional entity business practices; or NAESB Business Practices.

Bus-tie Breaker - A circuit breaker that is positioned to connect two individual substation bus configurations.

Capacity Benefit Margin (CBM) - The amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose loads are located on that Transmission Service Provider's system, to enable access by the LSEs to generation from interconnected systems to meet generation reliability requirements. Preservation of CBM for an LSE allows that entity to reduce its installed generating capacity below that which may otherwise have been necessary without interconnections to meet its generation reliability requirements. The transmission transfer capability preserved as CBM is intended to be used by the LSE only in times of emergency generation deficiencies.

Capacity Benefit Margin Implementation Document (CBMID) - A document that describes the implementation of a Capacity Benefit Margin methodology.

Capacity Emergency - A capacity emergency exists when a Balancing Authority Area's operating capacity, plus firm purchases from other systems, to the extent available or limited by transfer capability, is inadequate to meet its demand plus it's regulating requirements.

Cascading - The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread electric service interruption that cannot be restrained from sequentially spreading beyond an area predetermined by studies.

Cascading Outages - The uncontrolled successive loss of Bulk Electric System Facilities triggered by anincident (or condition) at any location resulting in the interruption of electric service that cannot be restrained from spreading beyond a pre-determined area.

Catastrophic Contingency Event - Any contingency event (greater than the N-1 Contingency Criteria) whose total requirements exceed the Contingency Reserve criteria plus Protection Reserve criteria within the Balancing Authority Area.

Critical Infrastructure Protection (CIP) Exceptional Circumstance - A situation that involves or threatens to involve one or more of the following, orsimilar, conditions that impact safety or BES reliability: a risk of injury or death; a natural disaster; civil unrest; an imminent or existing hardware, software, or equipment failure; a Cyber Security Incident requiring emergency assistance; a response by emergency services; the enactment of a mutual assistance agreement; or an impediment of large scale workforce availability.

CIP Senior Manager - A single senior management official with overall authority and responsibility for leading and managing implementation of and continuing adherence to the requirements within the GPA CIP Standards.

Clock Hour - The 60-minute period ending at :00. All surveys, measurements, and reports are based on Clock Hour periods unless specifically noted.

Cogeneration - Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.

Compliance Monitor - The entity that monitors, reviews, and ensures compliance of responsible entities with reliability standards.

Compliance Enforcement Authority - Entity with Statutory power to enforce operating and Planning Standards and enforce the findings of the Compliance Monitor.

Confirmed Interchange - The state where the Interchange Authority has verified the Arranged Interchange.

Congestion Management Report - A report that the Interchange Distribution Calculator issues when a Reliability Coordinator initiates the Transmission Loading Relief procedure. This report identifies the transactions and native and network load curtailments that must be initiated to achieve the loading relief requested by the initiating Reliability Coordinator.

Consequential Load Loss - All Load that is no longer served by the Transmission system as a result of Transmission Facilities being removed from service by a Protection System operation designed to isolate the fault.

Constrained Facility - A transmission facility (line, transformer, breaker, etc.) that is approaching, is at, or is beyond its System Operating Limit or Interconnection Reliability Operating Limit.

Contingency - The unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.

Contingency Reserve - The provision of capacity deployed by the Balancing Authority to meet the Disturbance Control Standard (DCS) and other Regional Reliability Organization contingency requirements.

Contingency Reserve Restoration Period - The time in minutes required to re-establish the Contingency Reserves utilized during the Disturbance Recovery Period such that the system can sustain another contingency. The Contingency Reserve Restoration Period is 120.

Contract Path - An agreed upon electrical path for the continuous flow of electrical power between the parties of an Interchange Transaction.

Control Center - One or more facilities hosting operating personnel that monitor and control the Bulk Electric System (BES) in real- time to perform the reliability tasks, including their associated data centers, of: 1) a Reliability Coordinator, 2) a Balancing Authority, 3) a Transmission Operator for transmission Facilities at two or more locations, or 4) a Generator Operator for generation Facilities at two or more locations.

Control Performance Standard (CPS) - The reliability standard that sets the limits of a Balancing Authority's Area Control Error over a specified time period.

Corrective Action Plan - A list of actions and an associated timetable for implementation to remedy specific problem.

Cranking Path - A portion of the electric system that can be isolated and then energized to deliver electric power from a generation source to enable the startup of one or more other generating units.

Critical Assets - Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System.

Critical Cyber Assets - Cyber Assets essential to the reliable operation of Critical Assets.

Curtailment - A reduction in the scheduled capacity or energy delivery of an Interchange Transaction.

Curtailment Threshold - The minimum Transfer Distribution Factor which, if exceeded, will subject an Interchange Transaction to curtailment to relieve a transmission facility constraint.

Cyber Assets - Programmable electronic devices and communication networks including hardware, software, and data.

Cyber Security Incident - Any malicious act or suspicious event that:

- Compromises, or was an attempt to compromise, the Electronic Security Perimeter or Physical
  Security Perimeter of a Critical Cyber Asset or,
- Disrupts, or was an attempt to disrupt, the operation of a Critical Cyber Asset.

Declared Capability - Declared Generating Unit Capability not less than the load (MW) on the unit at any point in time and not more than the temperature compensated maximum amount of load (MW) the unit is capable of supplying for a two-hour period or immediately supplying through the actions of AGC. In the case of multiple units connected to the Grid through a single point of interconnection (regardless of RAS applications) the sum of the Declared Generating Unit Capabilities subject to outage of the single point of interconnection.

Delayed Fault Clearing - Fault clearing consistent with correct operation of a breaker failure protection system and its associated breakers, or of a backup protection system with an intentional time delay.

Demand - 1) The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time, 2) The rate at which energy is being used by the customer.

Demand-Side Management (DSM) - The term for all activities or programs undertaken by Load- Serving Entity or its customers to influence the amount or timing of electricity they use.

Dial-up Connectivity - A data communication link that is established when the communication equipment dials a phone number and negotiates a connection with the equipment on the other end of the link.

Direct Control Load Management (DCLM) - Demand-Side Management that is under the direct control of the system operator. DCLM may control the electric supply to individual appliances or equipment on customer premises. DCLM as defined here does not include Interruptible Demand.

Dispatch Order - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, each generator is ranked by priority.

Dispersed Load by Substations - Substation load information configured to represent a system for power flow or system dynamics modeling purposes, or both.

Distribution Factor (DF) - The portion of an Interchange Transaction, typically expressed in per unit that flows across a transmission facility (Flowgate).

Distribution Provider (DP) - Provides and operates the “wires” between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distributionfunction at any voltage.

Disturbance - 1) An unplanned event that produces an abnormal system condition, 2) Any perturbation to the electric system, 3) The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.

Disturbance Control Standard (DCS) - The reliability standard that sets the time limit following a Disturbance within which aBalancing Authority must return its Area Control Error to within a specified range.

Disturbance Monitoring Equipment (DME) - Devices capable of monitoring and recording system data pertaining to a Disturbance. Such devices include the following categories of recorders:

- Sequence of event recorders which record equipment response to the event
- Fault recorders, which record actual waveform data replicating the system primary voltages and currents. This may include protective relays
- Dynamic Disturbance Recorders (DDRs), which record incidents that portray power system behavior during dynamic events such as low-frequency (0.1 Hz – 3 Hz) oscillations and abnormal frequency or voltage excursions

Dynamic Interchange Schedule or Dynamic Schedule - A telemetered reading or value that is updated in real time and used as a schedule in the AGC/ACE equation and the integrated value of which is treated as a schedule for interchange accounting purposes. Commonly used for scheduling jointly owned generation to or from another Balancing Authority Area.

Dynamic Transfer - The provision of the real-time monitoring, telemetering, computer software, hardware, communications, engineering, energy accounting (including inadvertent interchange), and administration required to electronically move all or a portion of the real energy services associated with a generator or load out of one Balancing Authority Area into another.

Economic Dispatch (EDC) - The allocation of demand to individual generating units on line to effect the most economical production of electricity.

Electronic Access Control or Monitoring Systems - Cyber Assets that perform electronic access control or electronic access monitoring of the Electronic Security Perimeter(s) or BES Cyber Systems. This includes Intermediate Devices.

Electronic Access Point (EAP) - A Cyber Asset interface on an Electronic Security Perimeter that allows routable communication between Cyber Assets outside an Electronic Security Perimeter and Cyber Assets inside an Electronic Security Perimeter.

Electrical Energy - The generation or use of electric power by a device over a period of time, expressed in kilowatthours (kWh), megawatthours (MWh), or gigawatthours (GWh).

Electronic Security Perimeter (ESP) - The logical border surrounding a network to which Critical Cyber Assets are connected and for which access is controlled.

Element - Any electrical device with terminals that may be connected to other electrical devices such as a generator, transformer, circuit breaker, bus section, or transmission line. An element may be comprised of one or more components.

Emergency or BES Emergency - Any abnormal system condition that requires automatic or immediate manual action to prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the Bulk Electric System.

Emergency Rating - The rating as defined by the equipment owner that specifies the level of electrical loading or output, usually expressed in megawatts (MW) or Mvar or other appropriate units, that a system, facility, or element can support, produce, or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved. The rating may reflect thermal capability and

sag/terrain conditions, potential stability or out of step conditions related to subsequent events or other limiting conditions.

Emergency Request for Interchange (Emergency RFI) - Request for Interchange to be initiated for Emergency or Energy Emergency conditions.

Energy Emergency - A condition when a Load-Serving Entity has exhausted all other options and can no longer provide its customers' expected energy requirements.

Equipment Rating - The maximum and minimum voltage, current, frequency, real and reactive power flows on individual equipment under steady state, short-circuit and transient conditions, aspermitted or assigned by the equipment owner.

Electric Reliability Organization (ERO) - An organization with Statutory Authority to regulate reliability.

External Routable Connectivity - The ability to access a BES Cyber System from a Cyber Asset that is outside of its associated Electronic Security Perimeter via a bi-directional routable protocol connection.

Facility - A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.).

Facility Rating - The maximum or minimum voltage, current, frequency, or real or reactive power flow through a facility that does not violate the applicable equipment rating of any equipment comprising the facility.

Fault - An event occurring on an electric system such as a short circuit, a broken wire, or an intermittent connection.

Fire Risk - The likelihood that a fire will ignite or spread in a particular geographic area.

Firm Demand - That portion of the Demand that a power supplier is obligated to provide except when system reliability is threatened or during emergency conditions.

Firm Transmission Service - The highest quality (priority) service offered to customers under a filed rate schedulethat anticipates no planned interruption.

Flashover - An electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space.

Flowgate - A designated point on the transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions.

Flowgate Methodology - The Flowgate methodology is characterized by identification of key Facilities as Flowgates. Total Flowgate Capabilities are determined based on Facility Ratings and voltage and stability limits. The impacts of Existing Transmission Commitments (ETCs) are determined by simulation. The impacts of ETC, Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) are subtracted from the Total Flowgate Capability, and Postbacks and counterflows are added, to determine the Available Flowgate Capability (AFC) value for that Flowgate. AFCs can be used to determine Available Transfer Capability (ATC).

Forced Outage - 1) The removal from service availability of a generating unit, transmission line, or other facility for emergency reasons, 2) The condition in which the equipment is unavailable due to unanticipated failure.

Frequency Bias - A value, usually expressed in megawatts per 0.1 Hertz (MW/0.1 Hz), associated with a Balancing Authority Area that approximates the Balancing Authority Area's response to Interconnection frequency error.

Frequency Bias Setting - A value, usually expressed in MW/0.1 Hz, set into a Balancing Authority ACE algorithm that allows the Balancing Authority to contribute its frequency response to the Interconnection. The algebraic sign of Frequency Bias is negative.

Frequency Deviation - A change in Interconnection frequency.

Frequency Error - The difference between the actual and scheduled frequency. ($F_A - F_S$)

Frequency Regulation - The ability of a Balancing Authority to help the Interconnection maintain Scheduled Frequency. This assistance can include both turbine governor response and Automatic Generation Control.

Frequency Response - (Equipment) The ability of a system or elements of the system to react or respond to a change in system frequency. (System) The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz). The algebraic sign of frequency response is negative.

Frequency Response Measure (FRM) - The median of all the Frequency Response observations reported annually by Balancing Authorities or Frequency Response Sharing Groups for frequency events specified by the ERO (Electric Reliability Organization). This will be calculated as MW/0.1Hz.

Frequency Response Obligation (FRO) - The Balancing Authority's share of the required Frequency Response needed for the reliable operation of an Interconnection. This will be calculated as MW/0.1Hz.

Frequency Response Sharing Group (FRSG) - A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating resources required to jointly meet the sum of the Frequency Response Obligations of its members.

Generator Operator (GOP) - The entity that operates Generating Assets and performs the functions of supplyingenergy and Interconnected Operations Services.

Generator Owner (GO) - Entity that owns and maintains Generating Assets.

Generator Shift Factor (GSF) - A factor to be applied to a generator's expected change in output to determine the amount of flow contribution that change in output will impose on an identifiedtransmission facility or Flowgate.

Generator-to-Load Distribution Factor (GLDF) - The algebraic sum of a Generator Shift Factor and a Load Shift Factor to determine the total impact of an Interchange Transaction on an identified transmission facility or Flowgate.

Generating Assets (GA) - Primarily refers to machines synchronously connected to the GPA Grid providing real and reactive power. In some specialized instances these may include assets that are asynchronously connected to the GPA. Or, devices that provide only reactive power (Synchronous condensers, SVC's, Cables, Wind Turbines, FACTS etc.).

Generation Capability Import Requirement (GCIR) - The amount of generation capability from external sources identified by a Load-Serving Entity (LSE) or Resource Planner (RP) to meet its generation reliability or resource adequacy requirements as an alternative to internal resources.

Good Utility Practice - From FERC Pro-Forma OATT-1.15 Good Utility Practice: Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of thepractices, methods and acts which, in the exercise of reasonable judgment in light ofthe facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region, including those practices required by Federal Power Act section 215(a)(4).

GPA (GPA Grid, GPA Interconnect) - The interconnected generation and transmission system of Guam, currently.

GPA Entity - Any entity owning, operating or maintaining any electrical facilities which separately or in aggregate are capable of measurably and meaningfully influencing the GPA Grid's frequency or voltage profile. This term is to be interpreted in the broadest sense in the context of preserving GPA Grid Reliability.

Host Balancing Authority – 1) A Balancing Authority that confirms and implements Interchange Transactions for a Purchasing Selling Entity that operates generation or serves customers directly within the Balancing Authority's metered boundaries, 2) The Balancing Authority within whose metered boundaries a jointly owned unit is physically located.

Hourly Value - Data measured on a Clock Hour basis.

Implemented Interchange - The state where the Balancing Authority enters the Confirmed Interchange into its Area Control Error equation.

Inadvertent Interchange - The difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange. (IA – IS)

Independent Power Producer (IPP) - Any entity that owns or operates an electricity generating facility that is notincluded in an electric utility's rate base. This term includes, but is not limitedto, cogenerators and small power producers and all other nonutility electricity producers, such as exempt wholesale generators, who sell electricity.

Independent System Operator (ISO) - An Entity with characteristics and functions substantially similar to and RTO recognized but not necessarily authorized by the RCA. The entity either hasnot formally petitioned the RCA for status as an RTO, or does not fully meet the requirements of an RTO. Often developed around the framework of an existing power pool.

Institute of Electrical and Electronics Engineers, Inc. (IEEE)

Interactive Remote Access - User-initiated access by a person employing a remote access client or other remote access technology using a routable protocol. Remote access originates from a Cyber Asset that is not an Intermediate Device and not located within any of the Responsible Entity's Electronic Security Perimeter(s) or at a defined Electronic Access Point (EAP).Remote access may be initiated from: 1) Cyber Assets used or owned by the Responsible Entity, 2) Cyber Assets used or owned by employees, and 3) Cyber Assets used or owned by vendors, contractors, or consultants. Interactive remote access does not includesystem-to-system process communications.

Interchange - Energy transfers that cross Balancing Authority boundaries.

Interchange Authority (IA) - The responsible entity that authorizes implementation of valid and balanced Interchange Schedules between Balancing Authority Areas, and ensures communication of Interchange information for reliability assessment purposes.

Interchange Distribution Calculator (IDC) - A mechanism used by Reliability Coordinators in the Eastern Interconnection to calculate the distribution of Interchange Transactions over specific Flowgates. It includes a database of all Interchange Transactions and a matrix of the Distribution Factors for the Interconnection.

Interchange Schedule - An agreed-upon Interchange Transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of power and energy between the Source and Sink Balancing Authorities involved in the transaction.

Interchange Transaction - An agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area boundaries.

Interchange Transaction Tag or Tag - The details of an Interchange Transaction required for its physical implementation.

Interconnected Operations Service - A service (exclusive of basic energy and transmission services) that is required to support the reliable operation of interconnected Bulk Electric Systems.

Interconnection - When capitalized, any one of the three major electric system networks in North America: Eastern, Western, and ERCOT and the minor interconnections of Hawaii, Alaska and Guam.

Interconnection Reliability Operating Limit (IROL) – The value (such as MW, MVar, Amperes, Frequency or Volts) derived from, or a subset of the System Operating Limits, which if exceeded, could expose a widespread area of the Bulk Electric System to instability, uncontrolled separation(s) or cascading outages.

Interconnection Reliability Operating Limit Tv (IROL Tv) - The maximum time that an Interconnection Reliability Operating Limit can be violated before the risk to the interconnection or other Reliability Coordinator Area(s) becomes greater than acceptable. Each Interconnection Reliability Operating Limit's Tv shall be less than or equal to 30 minutes.

Interconnected Value - The technical value of a generating asset to the GPA Grid and its subdivisions (LSE's, BAL's etc.) in terms of dispatch-ability, real and reactive power output and absorption, inertia, system response, operating and non-operating reserves, etc.

Intermediate Balancing Authority - A Balancing Authority Area that has connecting facilities in the Scheduling Path between the Sending Balancing Authority Area and Receiving Balancing Authority Area and operating agreements that establish the conditions for the use of such facilities.

Intermediate System - A Cyber Asset or collection of Cyber Assets performing access control to restrict Interactive Remote Access to only authorized users. The Intermediate System must not be located inside the Electronic Security Perimeter.

Interpersonal Communication - Any medium that allows two or more individuals to interact, consult, or exchange information.

Interruptible Load or Interruptible Demand - Demand that the end-use customer makes available to its Load-Serving Entity viacontract or agreement for curtailment.

Largest Single Contingency (LSC) - The largest single source (either transmission or generation) which can be removed from the area under study by a single system level event i.e. opening of a transmission line or breaker etc.

Largest Single Generation Contingency (LSGC) - The Declared Capability of largest generating unit contingency (or combination of units with a single point of interconnection forming a single contingency regardless of RAS applications) interconnected to the GPA Grid.

Limiting Element - The element that is 1) Either operating at its appropriate rating, or, 2) Would be following the limiting contingency. Thus, the Limiting Element establishes a system limit.

Load - An end-use device or customer that receives power from the electric system.

Load Shift Factor (LSF) - A factor to be applied to a load's expected change in demand to determine the amount of flow contribution that change in demand will impose on an identified transmission facility or monitored Flowgate.

Load-Serving Entity (LSE) - Secures energy and transmission service (and related Interconnected Operations Services) to serve the electrical demand and energy requirements of its end-use customers.

Long-Term Transmission Planning Horizon - Transmission planning period that covers years six through ten or beyond when required to accommodate any known longer lead time projects that may take longerthan ten years to complete.

Market Flow - The total amount of power flowing across a specified Facility or set of Facilities due to a market dispatch of generation internal to the market to serve load internal tothe market.

Maximum N-1 Contingency Criteria - The maximum loss of generation contingency reserves for the BA shall be calculated by the greatest of the following two values: 1) the maximum amount of generation capacity that can be lost following any single event, including the impact of waste heat generation following the loss of the primary generation unit or 2) the maximum amount of generation that can be lost by any single failure of a single transmission component. The maximum loss of load contingency reserves shall be calculated by the loss of load on the largest single transformer or load serving transmission line on the system.

Minimum Vegetation Clearance Distance (MVCD) - The calculated minimum distance stated in feet (meters) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages.

Misoperation

- Any failure of a Protection System element to operate within the specifiedtime when a fault or abnormal condition occurs within a zone of protection.
- Any operation for a fault not within a zone of protection (other than operationas backup protection for a fault in an adjacent zone that is not cleared within a specified time for the protection for thatzone).
- Any unintentional Protection System operation when no fault or other abnormal condition has occurred unrelated to on-site maintenance and testing activity.

Native Load - The end-use customers that the Load-Serving Entity is obligated to serve.

Near-Term Transmission Planning Horizon - The transmission planning period that covers Year One through five.

Net Actual Interchange - The algebraic sum of all metered interchange over all interconnections between two physically Adjacent Balancing Authority Areas.

Net Energy for Load - Net Balancing Authority Area generation, plus energy received from other BalancingAuthority Areas, less energy delivered to Balancing Authority Areas through interchange. It includes Balancing Authority Area losses but excludes energy required for storage at energy storage facilities.

Net Interchange Schedule - The algebraic sum of all Interchange Schedules with each Adjacent Balancing Authority.

Net Scheduled Interchange - The algebraic sum of all Interchange Schedules across a given path or between Balancing Authorities for a given period or instant in time.

Network Integration Transmission Service - Service that allows an electric transmission customer to integrate, plan, economically dispatch and regulate its network reserves in a manner comparable to that in which the Transmission Owner serves Native Load customers.

Non-Consequential Load Loss - Non-Interruptible Load loss that does not include: 1) Consequential Load Loss, 2) the response of voltage sensitive Load, or 3) Load that is disconnected from the System by end-user equipment.

Non-Firm Transmission Service - Transmission service that is reserved on an as-available basis and is subject to curtailment or interruption.

Non-Spinning Reserve – 1) That generating reserve not connected to the system but capable of serving demand within a specified time, 2) Interruptible load that can be removed from the system in a specified time.

Normal Clearing - A protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection systems.

Normal Rating - The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or element can support or withstand through the daily demand cycles without loss ofequipment life.

Obligated Entity - A GPA Entity who is obligated to provide operating and or non-operating reserves or reserve capacity under AKRES-001-0; usually but not always a Generation owner operator, a Load Serving Entity or its Balancing Authority.

Off-Peak - Those hours or other periods defined by North American Energy Standards Board (NAESB) business practices, contract, agreements, or guides as periods of lower electrical demand.

On-Peak - Those hours or other periods defined by NAESB business practices, contract, agreements, or guides as periods of higher electrical demand.

Open Access Same Time Information Service (OASIS) - An electronic posting system that the Transmission Service Provider maintains for transmission access data and that allows all transmission customers to view the data simultaneously.

Operating Plan - A document that identifies a group of activities that may be used to achieve some goal. An Operating Plan may contain Operating Procedures and Operating Processes. A company-specific system restoration plan that includes an Operating Procedure for black-starting units, Operating Processes for communicating restoration progress with other entities, etc., is an example of an Operating Plan.

Operating Procedure - A document that identifies specific steps or tasks that should be taken by one or more specific operating positions to achieve specific operating goal(s). The steps in an Operating Procedure should be followed in the order in which they are presented, and should be performed by the position(s) identified. A document that lists the specific steps for a system operator to take in removing a specific transmission line from service is an example of an Operating Procedure.

Operating Process - A document that identifies general steps for achieving a generic operating goal. An Operating Process includes steps with options that may be selected depending upon Real- time conditions. A guideline for controlling high voltage is an example of an Operating Process.

Operating Reserve - That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.

Operating Reserve Spinning - The portion of Operating Reserve consisting of:

- Generation synchronized to the system and fully available to serve load within the Disturbance Recovery Period following the contingency event; or
- Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

Operating Reserve Supplemental - The portion of Operating Reserve consisting of:

- Generation (synchronized or capable of being synchronized to the system) that is fully available to serve load within the Disturbance Recovery Period following the contingency event; or
- Load fully removable from the system within the Disturbance Recovery Period following Disturbance Recovery Period following the contingency event.

Operating Voltage - The voltage level by which an electrical system is designated and to which certain operating characteristics of the system are related; also, the effective (root-mean- square) potential difference between any two conductors or between a conductor

and the ground. The actual voltage of the circuit may vary somewhat above or below this value.

Operational Planning Analysis - An analysis of the expected system conditions for the next day's operation. (That analysis may be performed either a day ahead or as much as 12 months ahead.) Expected system conditions include things such as load forecast(s), generation output levels, and known system constraints (transmission facility outages, generator outages, equipmentlimitations, etc.).

Outage Transfer Distribution Factor (OTDF) - In the post-contingency configuration of a system under study, the electric Power Transfer Distribution Factor (PTDF) with one or more system Facilities removed from service (outaged).

Overlap Regulation Service - A method of providing regulation service in which the Balancing Authority providing the regulation service incorporates another Balancing Authority's actual interchange, frequency response, and schedules into providing Balancing Authority's AGC/ACE equation.

Participation Factors - A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, generators are assigned a percentage that they will contribute to serve load.

Peak Demand – 1) The highest hourly integrated Net Energy for Load within a Balancing Authority Area occurring within a given period (e.g., day, month, season, or year), 2) The highest instantaneous demand within the BalancingAuthority Area.

Performance-Reset Period - The time period that the entity being assessed must operate without any violations to reset the level of non-compliance to zero.

Physical Access Control Systems (PACS) - Cyber Assets that control, alert, or log access to the Physical Security Perimeter(s), exclusive of locally mounted hardware or devices at the Physical Security Perimeter such as motion sensors, electronic lock control mechanisms, and badge readers.

Physical Security Perimeter (PSP) - The physical border surrounding locations in which BES Cyber Assets, BES Cyber Systems, or Electronic Access Control or Monitoring Systems reside, and for which access is controlled.

Planning Assessment - Documented evaluation of future Transmission system performance and Corrective Action Plans to remedy identified deficiencies.

Planning Authority (PA) - The responsible entity that coordinates and integrates transmission facility and service plans, resource plans, and protection systems.

Planning Coordinator (PC) – See Planning Authority.

Planning Reserve Margin - The ratio of the total amount of planned available Firm Generation capacity divided by the Forecasted Peak Demand of the system minus 1.0, expressed in %. The Planning Reserve Margin requirement must be calculated by each BA by system analysis.

Point of Delivery (POD) - A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction leaves or a Load-Serving Entity receivesits energy.

Point of Receipt (POR) - A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction enters or a Generator delivers its output.

Point to Point Transmission Service (PTP) - The reservation and transmission of capacity and energy on either a firm or non-firm basis from the Point(s) of Receipt to the Point(s) of Delivery.

Postback - Positive adjustments to ATC or AFC as defined in Business Practices. Such Business Practices may include processing of redirects and unscheduled service.

Power Transfer Distribution Factor (PTDF) - In the pre-contingency configuration of a system under study, a measure of the responsiveness or change in electrical loadings on transmission system Facilities due to a change in electric power transfer from one area to another, expressed in percent (up to100%) of the change in power transfer.

Pro Forma Tariff - Usually refers to the standard OATT and/or associated transmission rights mandated by the U.S. Federal Energy Regulatory Commission Order No. 888.

Protected Cyber Assets (PCA) - One or more Cyber Assets connected using a routable protocol within or on an Electronic Security Perimeter that is not part of the highest impact BES Cyber System within the same Electronic Security Perimeter. The impact rating of Protected Cyber Assets is equal to the highest rated BES Cyber System in the same ESP. A Cyber Asset is not a Protected Cyber Asset if, for 30 consecutive calendar days or less, it is connected either to a CyberAsset within the ESP or to the network within the ESP, and it is used for data transfer, vulnerability assessment, maintenance, or troubleshooting purposes.

Protection Reserves - The resources under the control of the Under Frequency Load Shedding System designed to protect the system against single or multiple contingency events.

Protection System - Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.

Protection System Maintenance Program (PSMP) - An ongoing program by which Protection System components are kept in working order and proper operation of malfunctioning components is restored. A maintenance program for a specific component includes one or more of the following activities:

- Verify - Determine that the component is functioning correctly.
- Monitor - Observe the routine in-service operation of the component.
- Test - Apply signals to a component to observe functional performance or output behavior, or to diagnose problems.
- Inspect - Examine for signs of component failure, reduced performance or degradation.
- Calibrate - Adjust the operating threshold or measurement accuracy of a measuring element to meet the intended performance requirement.

Pseudo-Tie - A telemetered reading or value that is updated in real time and used as a "virtual" tie line flow in the AGC/ACE equation but for which no physical tie or energy metering actually exists. The integrated value is used as a metered MWh value for interchange accounting purposes.

Purchasing-Selling Entity (PSE) - The entity that purchases or sells, and takes title to, energy, capacity, and Interconnected Operations Services. Purchasing-Selling Entities may be affiliated or unaffiliated merchants and may or may not own generating facilities.

Ramp Rate or Ramp - (Schedule) The rate, expressed in megawatts per minute, at which the interchange schedule is attained during the ramp period. (Generator) The rate, expressed in megawatts per minute, that a generator changes its output.

Rated Electrical Operating Conditions - The specified or reasonably anticipated conditions under which the electrical system or an individual electrical circuit is intend/designed to operate.

Rating - The operational limits of a transmission system element under a set of specified conditions.

Rated System Path Methodology - The Rated System Path Methodology is characterized by an initial Total Transfer Capability (TTC), determined via simulation. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from TTC, and Postbacks and counterflows are added as applicable, to derive Available Transfer Capability. Under the Rated System Path Methodology, TTC results are generally reported as specific transmission pathcapabilities.

Reactive Power (VARS) - The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is usually expressed in kilovars (kvar) or megavars (Mvar).

Real Power (WATTS) - The portion of electricity that supplies energy to the load.

Reallocation - The total or partial curtailment of Transactions during TLR to allow Transactions using higher priority to be implemented.

Real-Time - Present time as opposed to future time. (From Interconnection Reliability Operating Limits standard).

Real-Time Assessment - An examination of existing and expected system conditions, conducted by collecting and reviewing immediately available data.

Receiving Balancing Authority - The Balancing Authority importing the Interchange.

Regional Reliability Organization (RRO) – 1) An entity that ensures that a defined area of the Bulk Electric System is reliable, adequate and secure, 2) A RCA recognized or authorized Regional Reliability Organization can serve as the Compliance Monitor.

Regional Reliability Plan - The plan that specifies the Reliability Coordinators and Balancing Authorities within the Regional Reliability Organization, and explains how reliability coordination will be accomplished.

Regional Transmission Organization (RTO) - An organization formed with the approval of the PUC to coordinate, control and monitor operation of the Electric Power System within a given region of the State.

- Characteristics:
  a) Independence from market participants;
  b) Appropriate scope and regional configuration;
  c) Possession of operational authority for all transmission facilities under the RTO's control; and
  d) Exclusive authority to maintain short-term reliability.
- Functions:
  a) Administer its own tariff and employ a transmission pricing system that will integrate reliability costs into transmission pricing, promote efficient use and expansion of transmission and generation facilities;

b) Create market mechanisms to manage transmission congestion;
c) Develop and implement procedures to address parallel path flow issues;
d) Serve as a supplier of last resort for all ancillary services (Similar to the requirements in FERC Order No. 888 and subsequent FERC orders);
e) Operate a single OASIS site for all transmission facilities under its control with responsibility for independently calculating TTC and ATC;
f) Monitor markets to identify design flaws and market power;
g) Plan and coordinate necessary transmission additions and upgrades; and
h) Perform region wide security constrained economic dispatch of real and reactive resources, often dispatched through existing Load Balancing Authorities.

Regulating Reserve - An amount of reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin; above and beyond the spinning reserve requirement.

Regulating Service - The process whereby one Balancing Authority contracts to provide corrective response to all or a portion of the ACE of another Balancing Authority. The Balancing Authority providing the response assumes the obligation of meeting allapplicable control criteria as specified by NERC for itself and the Balancing Authority for which it is providing the Regulation Service.

Reliability Adjustment RFI - Request to modify an Implemented Interchange Schedule for reliability purposes.

Reliability Coordinator (RC) - The entity that is the highest level of authority who is responsible for the reliableoperation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including theauthority to prevent or mitigate emergency operating situations in both next-dayanalysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systems beyond any Transmission Operator's vision.

Reliability Coordinator Area - The collection of generation, transmission, and loads within the boundaries of the Reliability Coordinator. Its boundary coincides with one or more BalancingAuthority Areas.

Reliability Coordinator Information System (RCIS) - The system that Reliability Coordinators use to post messages and share operating information in real time.

Reliability Directive - A communication initiated by a Reliability Coordinator, Transmission Operator, or Balancing Authority where action by the recipient is necessary to address an Emergency or Adverse Reliability Impact.

Remedial Action Scheme (RAS) - See “Special Protection System”.

Reportable Cyber Security Incident - A Cyber Security Incident that has compromised or disrupted one or more reliability tasks of a functional entity.

Reliability Standard - A standard similar in function to those required by the United States Federal Energy Regulatory Commission under Section 215 of the Federal Power Act, adopted by a regional utility body and approved or recognized by an applicable authority in jurisdiction not regulated by FERC. Reliability standards provide for “Reliable Operation” of the bulk-power system “Bulk- Power System”. The term includes requirements for the operation of existing bulk- power system facilities, including cyber-security protection, and the design of planned additions or modifications to such facilities to the extent necessary to provide for reliable operation Reliable Operation of the bulk-power system, but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity.

Reliable Operation - Operating the elements of the bulk-power system “Bulk- Power System” within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cyber-security incident, or unanticipated failure of system elements.

Reportable Excess Contingency Disturbance - Any series of events, or multiple contingency events which exceed the maximum N-1 contingency event which occur in a manner that causes System frequency to exceed the limits of +/- 0.3 Hz in the Balancing Authority’s area. The excess contingency events occur prior to the contingency reserves being re-established following a single contingency disturbance or for multiple contingency events which exceed the reserve requirements of the single largest contingency.

Reportable Single Contingency Disturbance - Any single event that causes System frequency to exceed the limits of +/- 0.3 Hz in the Balancing Authority’s area.

Request for Interchange (RFI) - A collection of data as defined in the NAESB RFI Datasheet, to be submitted to the Interchange Authority for the purpose of implementing bilateral Interchange betweena Source and Sink Balancing Authority.

Reserve Margin - The ratio of the actual total amount of available Firm Generation capacity, expressed in %, between the total available Firm Generation capacities divided by the Peak Demand of the system minus 1.0, expressed in %.

Reserve Sharing Group (RSG) - A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating reserves required for each Balancing Authority's use in recovering from contingencies within the group. Scheduling energyfrom an Adjacent Balancing Authority to aid recovery need not constitute reserve sharing provided the transaction is ramped in over a period the supplying party couldreasonably be expected to load generation in (e.g., ten minutes). If the transaction is ramped in quicker (e.g., between zero and ten minutes) then, for the purposes of Disturbance Control Performance, the Areas become a Reserve Sharing Group.

Resource Planner (RP) - The entity that develops a long-term (generally one year and beyond) plan for the resource adequacy of specific loads (customer demand and energy requirements) within a Planning Authority Area.

Response Rate - The Ramp Rate that a generating unit can achieve under normal operating conditions expressed in megawatts per minute (MW/Min).

Right-of-Way (ROW) - The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the Transmission Owner's legal rights but may be less based on the aforementioned criteria.

Scenario – Possible event.

Schedule - (Verb) To set up a plan or arrangement for an Interchange Transaction. (Noun) An Interchange Schedule.

Scheduled Frequency - 60.0 Hertz, except during a time correction.

Scheduling Entity - An entity responsible for approving and implementing Interchange Schedules.

Scheduling Path - The Transmission Service arrangements reserved by the Purchasing-Selling Entity for a Transaction.

Sending Balancing Authority - The Balancing Authority exporting the Interchange.

Share - The proportionate share of a Joint Owned Generating Unit (or combination of units with a single point of interconnection regardless of RAS applications) belonging to a single entity.

Sink Balancing Authority - The Balancing Authority in which the load (sink) is located for an InterchangeTransaction. (This will also be a Receiving Balancing Authority for the resulting Interchange Schedule).

Source Balancing Authority - The Balancing Authority in which the generation (source) is located for an Interchange Transaction. (This will also be a Sending Balancing Authority for the resulting Interchange Schedule).

Special Protection System or Remedial Action Scheme (SPS) - An automatic protection system designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components to maintain system reliability. Such action may include changes in demand, generation (MW and Mvar), or system configuration to maintain system stability, acceptable voltage, or power flows. An SPS does not include (a) underfrequency or undervoltage load shedding or (b) fault conditions that must be isolated or (c) out-of-step relaying (not designed as an integral part of an SPS). Also called Remedial Action Scheme.

Spinning Reserve - Unloaded generation that is synchronized and ready to serve additional demand.

Spinning Reserve Largest Contingency Ratio (SRLCR) - The ratio of an individual Entities' Largest Generating Contingency to the sum of the Largest Generating Contingencies of all the GPA entities.

Stability - The ability of an electric system to maintain a state of equilibrium during normal and abnormal conditions or disturbances.

Stability Limit - The maximum power flow possible through some particular point in the system while maintaining stability in the entire system or the part of the system to which the stability limit refers.

Standard Disturbance Recovery Period - The time, in minutes set as the target goal in the standard to allow restoration of the frequency from the time of the initiating event to the time the frequency is restored to within acceptable limits of 60.3 to 59.7 Hz for single contingency events off and for excess contingency events off of nominal 60 Hz.

Supervisory Control and Data Acquisition (SCADA) - A system of remote control and telemetry used to monitor and control the transmission system.

Supplemental Regulation Service - A method of providing regulation service in which the Balancing Authority providing the regulation service receives a signal representing all or a portion of the other Balancing Authority's ACE.

Surge - A transient variation of current, voltage, or power flow in an electric circuit or across an electric system.

Sustained Outage - The de-energized condition of a transmission line resulting from a fault ordisturbance following an unsuccessful automatic reclosing sequence and/or unsuccessful manual reclosing procedure.

System - A combination of generation, transmission, and distribution components.

System Operating Limit (SOL) - The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to:

- Facility Ratings (Applicable pre- and post-Contingency equipment orfacility ratings)
- Transient Stability Ratings (Applicable pre- and post- ContingencyStability Limits)
- Voltage Stability Ratings (Applicable pre- and post- ContingencyVoltage Stability)
- System Voltage Limits (Applicable pre- and post- ContingencyVoltage Limits)

System Operator - An individual at a control center (Balancing Authority, Transmission Operator, Generator Operator, Reliability Coordinator) whose responsibility it is to monitor and control thatelectric system in real time.

System Reserve Basis (SRB) - The amount of Spinning Reserve required to prevent first stage load-shed. Generally determined by system studies of the frequency response of the system under various conditions for the loss of the Largest Single Contingency.

Telemetering – The process by which measurable electrical quantities from substations and generating stations are instantaneously transmitted to the control center, and by which operating commands from the control center are transmitted to the substations and generating stations.

Thermal Rating - The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating or before it sags to the point that it violates public safety requirements.

Tie Line - A circuit connecting two Balancing Authority Areas.

Tie Line Bias - A mode of Automatic Generation Control that allows the Balancing Authority to: 1) Maintain its Interchange Schedule and 2) Respond to Interconnection frequencyerror.

Time Error - The difference between the Interconnection time measured at the Balancing Authority(ies) and the time specified by the National Institute of Standards and Technology. Time error is caused by the accumulation of Frequency Error over a given period.

Time Error Correction - An offset to the Interconnection's scheduled frequency to return the Interconnection's Time Error to a predetermined value.

TLR Log - Report required to be filed after every Transmission Load Reduction Level 2 or higher in a specified format. Initiating Balancing Authority prepares the report. The report is electronically filed on the IOC reliability web site.

Total Flowgate Capability (TFC) - The maximum flow capability on a Flowgate, is not to exceed its thermal rating, or in the case of a flowgate used to represent a specific operating constraint (such as a voltage or stability limit), is not to exceed the associated System Operating Limit.

Total Operating Reserve (TOR) - The Total Operating Reserve for the GPA is 150% of the largest generating unit contingency in operation on the GPA Interconnection. (further described in agreement entitled “Addendum H” of the separate amended and restated “Guam Intertie Agreement”).

Total Transfer Capability (TTC) - The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.

Transaction – See Interchange Transaction.

Transfer Capability - The measure of the ability of interconnected electric systems to move or transfer power in a reliable manner from one area to another over all transmission lines (or paths) between those areas under specified system conditions. The units of transfer capability are in terms of electric power, generally expressed in megawatts (MW). The transfer capability from “Area A” to “Area B” is not generally equal to the transfer capability from “Area B” to “Area A”.

Transfer Distribution Factor – See Distribution Factor.

Transmission - An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems. Generally operated at or above 69kV.

Transmission Constraint - A limitation on one or more transmission elements that may be reached during normal or contingency system operations.

Transmission Customer – 1) Any eligible customer (or its designated agent) that can or does execute a transmission service agreement or can or does receive transmission service, 2) Any of the following responsible entities: Generator Owner, Load-Serving Entity, or Purchasing-Selling Entity.

Transmission Line - A system of structures, wires, insulators and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at relatively high voltages varying from 69 kV up to 765 kV, and are capable of transmitting large quantities of electricity over long distances.

Transmission Operator (TOP) - The entity responsible for the reliability of its "local" transmission system, and that operates or directs the operations of the transmission facilities.

Transmission Operator Area - The collection of Transmission assets over which the Transmission Operator is responsible for operating.

Transmission Owner (TO) - The entity that owns and maintains transmission facilities.

Transmission Planner (TP) - The entity that develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within its portion of the Planning Authority Area.

Transmission Reliability Margin (TRM) - The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

Transmission Reliability Margin Implementation Document (TRMID) - A document that describes the implementation of a Transmission Reliability Margin methodology, and provides information related to a Transmission Operator's calculation of TRM.

Transmission Service - Services provided to the Transmission Customer by the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery.

Transmission Service Provider (TSP) - The entity that administers the transmission tariff and provides Transmission Service to Transmission Customers under applicable transmission service agreements.

Vegetation - All plant material, growing or not, living or dead.

Vegetation Inspection - The systematic examination of vegetation conditions on a Right-of-Way and those vegetation conditions under the applicable Transmission Owner's or applicable Generator Owner's control that are likely to pose a hazard to the line(s) prior to the next planned maintenance or inspection. This may be combined with a general line inspection.

Wide Area - The entire Reliability Coordinator Area as well as the critical flow and status information from adjacent Reliability Coordinator Areas as determined by detailed system studies to allow the calculation of Interconnected Reliability Operating Limits.

Year One - The first twelve month period that a Planning Coordinator or a Transmission Planner is responsible for assessing. For an assessment started in a given calendar year, YearOne includes the forecasted peak Load period for one of the following two calendar years. For example, if a Planning Assessment was started in 2011, then Year One includes the forecasted peak Load period for either 2012 or 2013.

Appendix H: Probabilistic Investigation of Capacity and Energy Shortages PICES Analysis

The Project Company will coordinate with GPA to verify optimum output size with PICES analysis.

Evaluation of Capacity Requirements for New Power Plant

The new power plant is expected to meet future peak demands and to produce energy with improved efficiencies over GPA's existing units. The sizing of units and total capacity of the power plant must meet reliability and production requirements to serve GPA for the next 25-30 years.

GPA addresses system reliability through maintaining a reserve margin that would satisfy a Loss of Load Expectation (LOLE) of 1 day in 4.5 years for projected peak demands. This means that there is sufficient reserve capacity of generating units in the system to replace units that are unavailable due to planned or forced outages and that the loss of capacity, causing GPA to not serve customer load, would not exceed the equivalent of a day within a four and half year period.

Table below is a recent updated load and energy forecast. The table shows that within 10 years after commissioning the new power plant in 2022, GPA would need to serve a peak of 310 MW in Year 2030. Additionally, by Year 2040 the peak is projected to increase by an additional 10 MW.

Table 1 – GPA Load and Energy Forecast (July 2018)

Year	Peak Demand	Annual Energy Sales (MWH)
2018	268	1,662,920
2019	271	1,690,763
2020	276	1,712,447
2021	282	1,738,766
2022	282	1,750,963
2023	286	1,764,898
2024	292	1,781,582
2025	294	1,791,046
2026	293	1,800,420
2027	302	1,814,358
2028	302	1,831,041
2029	300	1,840,498
2030	310	1,849,864
2031	307	1,859,215
2032	305	1,868,554
2033	309	1,877,892
2034	311	1,887,216
2035	314	1,896,524
2036	312	1,901,309
2037	315	1,903,372
2038	313	1,912,987
2039	319	1,923,052
2040	320	1,928,992

To evaluate reserve margin requirements GPA uses the Probabilistic Investigation of Capacity and Energy Shortages (PICES) program which considers generating unit sizes, total system capacity and individual unit reliability. Table 2 provides a summary of power plant capacities and their peak load carrying capability based on unit sizes and reliability. Highlighted on the table are the required total number of units per unit type and size, in addition to remaining existing GPA units, to meet a minimum 320MW peak demand.

Table 2 - Peak Load Carrying Capacity Summary by Unit Size

Unit Size/No.	PLCC	No. of Units	Total Capacity (MW)	Reserve Margin
18MW CT	331	8	144	31%

20MW CT	325	7	140	32%
25MW CT	331	6	150	33%
30MW CT	327	5	150	35%
40MW CT	328	4	160	37%
50MW CT	322	4	200	52%
60MW CT	322	3	180	46%
18MW RECIP	322	8	144	35%
20MW RECIP	334	8	160	35%
25MW RECIP	320	6	150	38%
30MW RECIP	341	6	180	38%
40MW RECIP	346	5	200	42%
50MW RECIP	330	4	200	48%
60MW RECIP	347	4	240	53%

The table demonstrates need for particular sized units and reliability characteristics (availability) will need certain capacity to meet GPA 1 day in 4.5 years loss of load expectation.

INVITATION FOR MULTI-STEP BID

GPA-034-18

BUILD, OPERATE & TRANSFER CONTRACT FOR 180MW OF NEW GENERATION CAPACITY

Section D: Forms

SEPTEMBER 2018

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1 FORM 1 - PROPOSAL LETTER

John M. Benavente, P.E.
General Manager
Guam Power Authority
Post Office Box 2977
Hagatna, Guam 96932-2977
Attention: Supply Management Administrator
Email: jpangelinan@gpagwa.com
Phone: (671) 646-3054/55
Fax: (671) 648-3165

The undersigned,

Last Name: _____

First Name: _____

Title/Position: _____

Located at the following address:

Telephone:

E-mail:

Fax:

Acting:

As the representative of the company[1] _____,

Lead Bidder of the Consortium composed of the following members:

1. _____
2. _____
3. _____
4. _____

and on behalf of said Consortium, in view of the Power of Attorney provided by each of the members[2].

[1] Include legal authorization

Having examined the whole of the IFMSB documents, receipt of which is duly acknowledged, for the development of a ULSD/gas-fired, power Facility, on a BOT basis, in Guam ("the Project"), comprised of the following documents:

Invitation for Bid (IFMSB), dated [2018]

Draft Agreements, dated [2018]

[Supplemental Information

Amendment No. 1

Amendment No. 2

Amendment No. 3…]

Having evaluated, following our own studies undertaken under our responsibility, the nature and scope of the contractual obligations to be executed, the financing structure, the Security Package, as defined in the ECA, and any other regulation associated to the Project or its execution, we commit ourselves to design, finance, procure, construct, own, operate, and maintain the whole of the Project, power Facility in Guam, and to sell the electricity generated exclusively to GPA for an Initial Term of twenty-five (25) years, in conformity with the schedule and conditions stipulated in the IFMSB documents and for a Present Value in United States Dollars as calculated in Form 15 hereof.

We agree to abide by this Proposal and maintain its validity for a period of twelve (12) months from the Bid Date as prescribed in the Instructions to Bidders, Section B, Article 4.7 entitled "Proposal Validity".

We accept to remain bound by this Proposal which may be accepted by GPA at any time before the expiration of that period.

We commit ourselves, if we are selected, to extend the validity of our Proposal and our Bid Guarantee until execution of the Project Agreements and our presentation of the Performance Bond.

We have provided and attached hereto a Bank Guarantee for Three Million United States Dollars (USD 3,000,000.00) in accordance to the form provided herein.

We acknowledge GPA's standard of ethics, as described immediately below:

GPA requires that all Bidders observe the highest standard of ethics during the procurement process. In pursuance of this policy GPA:

a) defines for the purposes of this standard of ethics, the terms set forth below as follows:

"Corrupt Practice" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of any value to influence the action of a public official involved in the procurement process or in contract execution;

"Fraudulent Practice" means a misrepresentation or omission of fact in order to influence the procurement process or the execution of a contract;

[2] Include Powers of Attorney

"Collusive Practice" means a scheme or arrangement between two or more bidders, with or without the knowledge of GPA, designed to establish bid prices at artificial, non-responsive, levels; and

"Coercive Practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract.

b) will declare a Bidder ineligible for the Project and reject the Bidder's Proposal if it determines that the Bidder engaged in any Corrupt, Fraudulent, Collusive or Corrupt Practices in competing for the Project.

We certify that (i) the information submitted as part of this Proposal is complete and accurate, (ii) the Proposal has been submitted in the legal name of the Consortium whose members will be bound to this Proposal and to the development of the Project, (iii) we accept the documents and terms of the IFMSB documents, and (iv) there are no material deviations in our Proposal from the terms and conditions of the draft Energy Conversion Agreement.

We understand that the GPA is not bound to accept any Proposal that it may receive.

In _____ (location) ,
on this _____ (date) _____

The Lead Bidder, duly authorized to execute the Proposal for and on behalf of the Consortium:

_____

Notarized signature and seal

_____

Attachments:

ATTACHMENT 1-A	Form of Bid Guarantee
ATTACHMENT 1-B	Proposal Opening Form

1.1 Attachment 1A - Form of Bid Guarantee

GUAM POWER AUTHORITY

ATURIDÅT ILEKTRESEDÅT GUAHAN

P.O. BOX 2977 HAGÅTÑA, GUAM U.S.A. 96932-2977

Edward J.B. Calvo
Governor

Telephone Nos. (671) 648-3054/55 Fax: 648-3165

Raymond S. Tenorio
Lieutenant Governor

BID GUARANTEE

NO.: _____

KNOW ALL MEN BY THESE PRESENTS that _____,as

Principal Hereinafter called the Principal, and (Bonding Company), _____A duly admitted insurer under the laws of the Territory of Guam, as Surety, hereinafter called the Surety are held firmly bound unto the Territory of Guam for the sum of _____Dollars ($_____), for Payment of which sum will and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for (identify project by number and brief description)_____

_____

_____

NOW, THEREFORE, if the Territory of Guam shall accept the bid of the Principal and the Principal shall enter into a Contract with the Territory of Guam in accordance with the terms of such bid, and give such bond or bonds as my be specified in bidding or Contract documents with good and sufficient surety for the faithful performance of such Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Territory of Guam the difference not to exceed the penalty hereof between the amounts specified in said bid and such larger amount for which the Territory of Guam may in good faith contract with another party to perform work covered by said bid or an appropriate liquidated amount as specified in the Invitation for Bids then this obligation shall be null and void, otherwise to remain full force and effect.

Signed and sealed this _____ day of _____ 2018.

_____
(PRINCIPAL) (SEAL)

_____
(WITNESS)

_____
(TITLE)

_____
(MAJOR OFFICER OF SURETY)

_____
(TITLE)

_____
(TITLE)

_____
(RESIDENT GENERAL AGENT)

SEE SPECIAL REMINDERS TO PROSPECTIVE BIDDERS (FORM Error! Reference source not found.**) FOR SUPPORTING DOCUMENTS REQUIRED.**

INSTRUCTION TO PROVIDERS:

NOTICE to all Insurance and Bonding Institutions:

The Bond requires the signatures of the Vendor, two (2) major Officers of the Surety and Resident General Agent, if the Surety is a foreign or alien surety.

When the form is submitted to the Guam Power Authority, it should be accompanied with copies of the following:

1. Current Certificate of Authority to do business on Guam issued by the Department of Revenue and Taxation.
2. Power of Attorney issued by the Surety to the Resident General Agent.
3. Power of Attorney issued by two (2) major officers of the Surety to whoever is signing on their behalf.

Bonds, submitted as Bid Guarantee, without signatures and supporting documents are invalid and Bids will be rejected.

1.2 Attachment 1B - Proposal Opening Form

(This document is an integral part of the Proposal and shall be read during the Bid Opening.)

A) Name of Lead Bidder _____

B) Names of Consortium Members _____

_____

_____

_____

C) Phase 1 Contracted Facility Capacity Using ULSD (for fossil fuel fired or hybrid Projects)

_____ MW

D) Phase 1 Contracted Facility Capacity Using Natural Gas (for fossil fuel fired or hybrid Projects)

_____ MW

E) Phase 2 Contracted Facility Capacity Using ULSD (for fossil fuel fired or hybrid Projects)

_____ MW

F) Phase 2 Contracted Facility Capacity Using Natural Gas (for fossil fuel fired or hybrid Projects)

_____ MW

G) Guaranteed Amount of Renewable Energy (for hybrid Projects)

_____ MWh/year

H) Contracted Facility Capacity for Projects that do not operate on fuel

_____ MW

I) Annual Availability Guarantee

_____ %

J) Forced Outage Rate Guarantee (can be no higher than 3%)

_____ %

K) Are there any exceptions taken to the IFMSB

	terms and conditions, as detailed in Exhibit VII?		YES: _____ NO: _____
L)	Are there any technical exceptions taken to the IFMSB, as detailed in Exhibit VII?		YES: _____ NO: _____
M)	Are there any exceptions taken to draft Project Agreements, as detailed in Exhibit VII?	ECA:	YES: _____ NO: _____
		LLA:	YES: _____ NO: _____
		WSA	YES: _____ NO: _____
		Other	YES: _____ NO: _____

2 FORM 2 – AFFIDAVIT BY THE BIDDER (Page 1 of 2)

The undersigned, _____, of legal age, and residing at _____
(Name of Official)
after having been duly sworn deposes and states:

1. That he is the _____ of the _____,
(Official Capacity) (Name of the Bidder's (Lead Bidder's) Company /Corporation)

corporation/association/individual, duly organized under the law of _____
(Name of Country)

2. That personally, and as _____ for and in behalf of the corporation /
(Official Capacity)

association/individual (by and under the authority indicated on Attachment 1-A) he hereby certifies:

a) That all statements made in this Bidder's statement and in the required attachments are true and correct;

b) That this Bidder's statement is made for the express purpose of identifying and describing him as a Qualified Bidder for the Project located in Guam;

c) That all Bidder information required in Section B, Article 3.2.1 are submitted herein, in substantially the formats required;

d) The Bidder will make available to GPA or its authorized agency any information they may find necessary to verify any item in this Bidder's Statement or regarding his competence and general reputation;

e) That the Lead Bidder (and parent firm if applicable) is current with regard to payment of all national and local taxes within its nation of incorporation, and in all nations in which this firm is participating in power projects (except as noted on Attachment 2-B);

f) That the Lead Bidder (and parent firm if applicable) is not the subject of litigation--within its nation of incorporation, and in all nations in which this firm is participating in power projects--that would materially affect its ability to develop this Project (except as noted on Attachment 2-C);

FORM 2 - AFFIDAVIT BY THE BIDDER (Page 2 of 2)

g) That the undersigned is duly authorized by the corporation/association/individual to make these representations and to sign this Statement.

_____

Name and Signature

WITNESSES:

1. _____ 2. _____

SUBSCRIBED AND SWORN TO before me

this ____ day of _____ 20___

at _____.

_____

Notary Public

Attachments (if applicable):

Attachment 2-A: Certificate from Parent Company (pursuant to Form 2, paragraph 2)

Attachment 2-B: (Optional) Tax Statement (pursuant to Form 2, paragraph 2.e.)

Attachment 2-C: (Optional) Litigation Pending (pursuant to Form 2, paragraph 2.f.)

2.1 Attachment 2-A: Certificate from Parent Company (if applicable)

2.2 Attachment 2-B: Tax Statement (Optional)

2.3 Attachment 2-C: Litigation Pending (Optional)

3 FORM 3 – BIDDER'S ORGANIZATION

(Page 1 or 2)

_____

Applicant

Each Consortium member of the Bidder's proposed organization, or joint venture, must fill out this Form.

1. Date of Submission: _____
2. Company's Name _____
3. Year Organized: _____
4. Country Incorporated _____
5. Type of Organization: _____
6. Local Address: _____
   _____
   _____
7. Home Address: _____
   (Local office supporting this Proposal) _____
   _____
8. Contact Person: _____
9. Other Contact Means:
   Telefax No.: _____
   Electronic Mail: _____
10. Corporate objectives or purposes of the lead firm:

_____

_____

_____

_____

_____

[Continued]

FORM 3 – BIDDER'S ORGANIZATION
(Page 2 of 2)

11. Provide in the table below the name and address of lead and associated firms to be involved in this Project (to the extent known at this point):

Table 3.1: Bidder's Team and Responsibilities

Name of Proposed Project Company: _____

Location of Incorporation:[3] _____

Type of Company: _____

Role in This Project	Company (Name and Address)	Level of Commitment (Firm, Expected, Possible)	Supporting Data Attached as Form 9 (For Each Firm) (If Any) (Yes/No)
Bidder – Lead Developer		**NA**	**NA**
Bidder – Co-Developer(S)			
[Optional: EPC Contractor]			
[Optional: Equipment Supplier]			
[Optional: O&M Contractor]			
Project Engineer			
Financial Advisor			
Legal Advisor			
Equity Participants			
Senior and Subordinated Debt Participants			

Attachments:

Attachment 3A: Letters of Agreement from Team Members (*Note: The EPC Contractor, Equipment Supplier and O&M Contractor are identified by the Bidder in its IFMSB Proposal submittal.)*

[3] Including the location of any affiliated special-purpose Project Companies.

3.1 Form 3-A: Letter of Agreement from Team Member (if applicable)

4 FORM 4 – FINANCIAL CAPABILITY

(Page 1 of 2)

1 Each member of the Bidder's Consortium, co-Bidder, or joint venture partner must fill in this form. Bidders, including each member of a team, should provide financial information in the form of their most recent annual reports and audited financial statements to demonstrate that they meet the requirements stated in Section B, Article 6.4.1.

2 Provide the complete contact information for the Bidder's main banker(s) and other financial institutions/references that may be familiar with the Bidder's financial capability.

Name of Banker	
Address of Banker	
Telephone(s)	Contact Name and Title
Fax Number	E-Mail Address

3 Attach a notarized affidavit (see Attachment 4A below) from an internationally recognized bank that confirms the Bidder's ability to provide the necessary Performance Bond deposit upon being selected to develop the Project.

4 Please attach a notarized affidavit from an internationally recognized bank or financial institution that confirms the Bidder's ability to provide the six (6) months of Working Capital that will be required to develop this Project from Notification of Selection (award) to Financial Close.

5 Please provide your current maximum limits under each of the following types of Performance Guarantees:

A) Performance Bond _____US$

B) Bank Guarantee _____US$

[Continued]

FORM 4 - FINANCIAL CAPABILITY

(Page 2 of 2)

6 Have you provided performance guarantees for other projects? Please provide the information in the table below.

Name & Address of Surety Company or Financial Institution	Name and Location of the Project	Name and Address of the Project Owner	Type of Guarantee	Amount of Guarantee
1.				
2.				
3.				
4.				
5.				

7. Have you ever had to forfeit a performance guarantee?

☐ Yes ☐ No

If yes, please explain:

_____

_____

_____

_____

_____

Attachments:

Attachment 4-A: Certificate of Availability of Bank Guarantee

4.1 Attachment 4-A - Certificate of Availability of Bank Guarantee

1 **Background.** Should the Bidder be selected as the Bidder to develop the Project, it will be required to furnish GPA a Performance Bond in the form of an irrevocable stand-by letter of credit issued by an international bank acceptable to GPA, a bank guarantee issued by an international bank in form and substance acceptable to GPA, or a performance bond issued by an international surety in form and substance acceptable to GPA, in each case in the amount of US seventy-five million ($75,000,000). This Performance Bond shall be valid until three (3) months after the Project Company achieves the Commercial Operation Date of the Facility in accordance with the ECA.

2 **Requirement.** The Bidder is required to provide in this Bidder Statement (as its Form 4-A) a notarized affidavit from the Bidder's bank stating that they can issue on behalf of the Bidder the required Performance Bond, in the amount of US seventy-five million ($75,000,000) to the benefit of GPA at the projective time that such Security will need to be issued.

5 FORM 5 – PROJECT DATA SHEETS

(Page 1 of 2)
(One for Each Project)

PROJECT NAME _____

LOCATION (City & Nation) _____

OVERALL CAPACITY (MW, other) _____

CHARACTERISTIC	TOTAL	UNIT 1	UNIT 2	UNIT 3	RENEWABLE GENERATION	ENERGY STORAGE
CAPACITY (MW, other)						
TECHNOLOGY (incl. Fuel & Type of Cycle)						
WHAT FIRMS PLAYED THESE ROLES ON THE PROJECT: Lead Developer						
Co-Developer(s)						
Equity Participant(s)						
Debt Participant(s)						
EPC Contractor						
O&M Contractor(s)						
Equipment Supplier(s)						
FINANCING EXPERIENCE: Total Equity (US$___M) Bidder's Equity (US$____M)						
Total Debt (US$___M) Bidder's Debt (US$____M)						
Date of Financial Close						
TECHNICAL DATA: Major Equipment Installed (& Cost)						
Turbines						
HRSGs						
Reciprocating						

Engine Generators						
Solar Modules						
Inverters						
Wind Turbines						
Energy Storage (batteries, compression systems, other)						
Balance of Plant						
Civil Works						

(Continued)

FORM 5 - PROJECT DATA SHEETS (Page 2 of 2)

Characteristic	Total	Unit 1	Unit 2	Unit 3	RENEWABLE GENERATION	ENERGY STORAGE
Performance: Commercial Operations Date (COD):						
Construction Period (months)						
Operating History to 2017 (years)						
Availability (%): 2014 2015 2016 2017						
Efficiency (%) 2014 2015 2016 2017						
Heat Rate (Btu/kWh) 2014 2015 2016 2017						
Production (GWh) 2014 2015 2016 2017						
Environmental Compliance History: (Describe)						
Name, address, and contact numbers of Owner (for reference):						
Name, address, and contact numbers of Operator (for reference):						
[Optional] These Certificates and Brochures are Attached:						

Certificate of Final Acceptance YES / NO		
Certificate of Good Operating Performance YES / NO		
Project Brochure or Fact Sheet YES / NO		
Other: _____ YES / NO		

6 FORM 6 – PROJECT FINANCING PLAN

(Conceptual)

1 List in the table below the potential sources of equity and debt for the Project.

Assume: US$ ____MM minimum to be raised overall, with minimum equity-debt ratio of 20:80.

Equity (20% Minimum)		
Source of Funds	**NAME[1]**	**Amount (US$)**
Bidders (Minimum of 20%)		
Contractors		
Local Sources		
Other Sources		
	TOTAL:	
Debt (80% Maximum)		
Source of Funds	**NAME[1]**	**Amount (US$)**
Supplier Credit	‘	
Commercial Sources		
Bi-lateral Sources		
Multi-lateral Sources		
Other Sources		
	TOTAL:	
	TOTAL Financing:	

2 Discussion:

[1] Names of financial institution(s) or sources of funding.

7 FORM 7 – FINANCIAL DATA IN SUPPORT OF PROJECT

7.1 Financing Plan

The Bidder will be responsible for mobilizing the financing for the Facility. Agreements required to secure financing for the Project will be entered into between the Bidder and the institutions providing the financing for the Project, and they shall be based on the financial plan presented by the Bidder in its Proposal. Any subsequent changes to the financial plan after finalization of the Project Agreements will require the approval of GPA.

The financial plan provided by the Bidder will describe the sources of funds and the terms of financing for both debt and equity, as applicable. The Bidder will provide details on the financing sources as outlined in this Form 7A, Table 1. The financing should be in an amount sufficient to cover all estimated Project costs.

Financing will be in the form of equity and debt. At least 20% of the total financing, inclusive of contingencies, will be in the form of equity and the remainder in debt or subordinated debt. At least 35% of the equity shall be provided by the Lead Bidder.

	Sources of Funds	US$
	Items / Sources	
1.1	**Total Sources**[2]	
1.2	**Equity**	
	• Lead Bidder Name: _____	
	• (Member(s) of Bidder Consortium) Name: _____	
	• (Member of Bidder Consortium) Name: _____	
	• (Member of Bidder Consortium • Name: _____	
	• Contractor/Supplier Name: _____	
	• Contractor/Supplier • Name: _____	
	• Other sources (specify) • Name: _____	
1.3	**Debt Financing**	
	Export Credit Agencies *(List individually)*	

	Sources of Funds	US$
	Items / Sources	
	• Export Credit Agency Name: _____	
	• Export Credit Agency Name: _____	
	• Export Credit Agency Name: _____	
	Commercial Sources *(List individually)*	
	• Commercial source Name: _____	
	• Commercial source Name: _____	
	Multilateral Sources *(List individually)*	
	• Multilateral source Name: _____	
	• Multilateral source Name: _____	
	Other Sources ***(List individually)***	
	• Other source Name: _____	
	Total Debt:	

7.2 Financing Plan Documentation

The following documentation is to be provided in support of the financing plan outlined in Form 7A. Please fill in each section below, however, if any of the Bidder information is combined into a single document from a Lender, then the Bidder must make a reference to the particular attachment where the information can be found.

Attachment 7.2.1 — Letters of commitment from the Chief Executive Officer or Treasurer/Controller of each of the companies verifying that the company will commit to contributing the amount of equity stated in Form 7A, Table 1, Section 1.2.

Attachment 7.2.2	Letters of commitment from the Export Credit Agencies, Commercial Sources and/or Multilateral Sources and/or financial institutions committing to the amount of debt financing stated in Form 7, Table I, Section 1.3. The letter should also indicate the method of payment, repayment period, interest rates (fixed or variable), and any other charges applicable to the commitment. The letter shall also verify that the commitment is made based upon the draft of Project Agreements, the Bidder's Proposal, and adequate debt coverage.
Attachment 7.2.3	If the Bidder has obtained an underwriting for all or part of the amount, a letter from the financing institution of such undertaking.
Attachment 7.2.4	In the event that, the Bidder has appointed a financial advisor/arranger for the Facility, the name of the organization, the lead person who will perform the services from the organization, and a qualification statement for the organization and the lead person.
Attachment 7.2.5	Should the Bidder plan to have financing for the Facility at a later date, i.e. on or following the Commercial Operation Date, details of financing arrangements prior to the long-term financing being effective.
Attachment 7.2.6	A detailed schedule of activities leading to Financial Close in Form 11.
Attachment 7.2.7	The Bidder's planned projected coverage for interest rate variations.

7.3 Debt Service Coverage and Equity Ratios Projections

DEBT SERVICE COVERAGE & EQUITY RATIOS (PROJECTED)			
Agreement Period	**Year**	**Debt Service Coverage Ratio (See 7.3.1)**	**Equity Ratio (See 7.3.2)**
Contract Year 1			
Contract Year 2			
Contract Year 3			
Contract Year 4			
Contract Year 5			
Contract Year 6			
Contract Year 7			
Contract Year 8			
Contract Year 9			
Contract Year 10			

DEBT SERVICE COVERAGE & EQUITY RATIOS (PROJECTED)			
Agreement Period	**Year**	**Debt Service Coverage Ratio (See 7.3.1)**	**Equity Ratio (See 7.3.2)**
Contract Year 11			
Contract Year 12			
Contract Year 13			
Contract Year 14			
Contract year 15			
Contract Year 16			
Contract Year 17			
Contract Year 18			
Contract Year 19			
Contract Year 20			
Contract Year 21			
Contract Year 22			
Contract Year 23			
Contract Year 24			
Contract Year 25			

NOTES to Table:

1 Debt Service Coverage Ratio shall mean the ratio of Cash Flow from Operations to Debt Service, where Cash Flow from Operations means on an annual basis all Project revenue minus all operation and maintenance expenses (including but not limited to, operator costs, Fuel procurement and transportation costs (if any), insurance, management costs, local fees, legal fees, accounting and auditing fees, other professional fees, capital expenditures, and amounts contributed to the debt service and maintenance reserves) before interest, depreciation, and income taxes, and where Debt Service means repayment of all annual principal and interest on debt outstanding during the year to all lenders.

2 The Equity Ratio should be calculated as Total Equity divided by the sum of Total Debt and Total Equity.

8 FORM 8- TECHNICAL DATA

8.1 Guaranteed Data for Project

The following data is provided by Bidder and will be subsequently included as Schedules to the ECA. The Price stated in Section D, Form 15 is based upon data furnished herein.

1 Contracted Capacity of the Facility for each Year of the Term shall be as specified in **Table 15.1 of Envelope II, and will be consistent with the data provided in Table 8.7 and Table 8.8** of this section below.

2 Guaranteed Heat Rates for each Year of the Term for ULSD and Natural Gas operation shall be as specified **in Table 15.5 and Table 15.6 of Envelope II for the Facility, and will be consistent with the data provided in Table 8.3, Table 8.4.**

3 **In Table 8.5 and Table 8.6,** the Guaranteed Heat Rate shall consider equipment degradation and any maintenance to be performed on the equipment.

4 Bidder shall provide Heat Rates for each Unit at various loads identified in **Table 8.3 and Table 8.4.** This information is based upon new equipment operated for less than 500 hours.

5 Bidder shall provide the Correction Curves that are to be used to verify the performance (i.e. Contracted Facility Capacity and Guaranteed Heat Rates). Only those curves provided by the Bidder will be taken into consideration for calculations of Facility performance characteristics determined by Testing.

6 For Proposals based on a hybrid facility, the Bidder will provide a Guaranteed Amount of Renewable Energy for a Typical Meteorological Year (TMY) and a guaranteed maximum annual degradation factor. The Guaranteed Amount of Renewable Energy will be demonstrated by means of a PVSyst production forecast (in the case of PV solar) or a WindSim production forecast (in the case of wind), each assuming TMY conditions and submitted along with the Contracted Capacity as part of Envelope II.

7 Bidder shall provide guarantees for Facility annual availability and forced outage rate

8 Bidder shall provide the following guaranteed data for environmental impact assessment.

A. Noise levels

- At Site boundary
- At one meter from major equipment
- At one hundred meters from major equipment

B. Air emissions

Maximum anticipated levels of NOx, CO, VOC, PM10, and SOx, based on the fuel characteristics provided in the IFMSB.

C. Water discharge:

- Provide particulate concentration and composition of wastewater discharge, other than sanitary discharge.

- Provide provisions made for treatment of wastewater and sanitary water.

9 Auxiliary load consumption

- Provide Facility auxiliary load consumption, in MW.

10 Provide information requested in paragraph 8.14 with respect to characteristics of the Facility (i.e. cold start time, etc.)

8.2 Basic Technical Information

1 Provide a short description of the Facility, and supporting facilities and Site infrastructure.

2 Source of major components.

Component	Information Requested	Manufacturer / Model / Type
Combustion Turbine Generator(s)	Manufacturer	_____
	Model/type	_____
Reciprocating Engine Generator(s)	Manufacturer	_____
	Model/type	_____
Steam Turbine Generator(s)	Manufacturer	_____
	Model/type	_____
Heat Recovery Steam Generator(s)	Manufacturer	_____
	Model/type	_____
Once Through Steam Generator(s)	Manufacturer	_____
	Model/Type	_____
Cooling Tower	Manufacturer	_____
	Model/type	_____
Control system	Manufacturer	_____
	Model/type	_____
Generator Step-up Transformers	Manufacturer	_____
	Model/type	_____

Medium Voltage Switchgear	Manufacturer	_____
	Model/type	_____
Solar Photo voltaic	Manufacturer	_____
	Model/type	_____
Inverters	Manufacturer	_____
	Model/type	_____
Wind Turbines	Manufacturer	_____
	Model/type	_____
Battery Energy Storage System	Manufacturer	_____
	Model/type	_____

3 Describe the equipment for filtering at the air inlet for the combustion turbines (for salt, dust, etc.).

4 Provide a listing of the codes and standards to be used in design, manufacturing, construction, performance testing, and quality control for civil, electrical, mechanical and control/instrumentation works of the Project. (Refer to Section C, Article 2).

5 Describe provisions made for SCADA system.

6 Provide temperature in combustion chamber at 100% load and for exhaust gas of combustion turbines in simple cycle at the combustion turbine exhaust and at the stack outlet.

8.3 Drawings

Provide the following drawings as a minimum:

- Conceptual station layout drawings
- General arrangement drawings of all buildings
- Exterior elevation drawings of all buildings
- Heat balance diagram for plant
- Water balance diagram for plant
- P&ID's of major systems
- Single line electrical diagram including protection
- Control room layout
- Pipeline route
- Transmission Line

8.4 Proposed Facility Design and Components Experience

Bidder shall provide historical data for the following items:

8.4.1 Overall Design of Facility

If a Facility of similar size (100 MW and above) or with similar major equipment (reciprocating engines, combustion turbines, solar modules, inverters, wind turbines and other renewable generation and/or energy storage), with similar design of systems and preferably the same equipment manufacturer, has been operating for the past three (3) years, provide the name of the Facility, year commissioned, name of owner and representative (phone and Fax number), with data on reliability, availability, Gigawatt hours (GWh) produced for each of the last two (2) years, and the number of forced outages or reduced output due to technical difficulties. Information on more than one Facility is desirable but not mandatory.

8.4.2 Information on Other Equipment

For the following equipment to be used in the Facility, provide similar information, as above (and as applicable), from manufacturers for at least three (3) projects, for the past three (3) years.

- Combustion Turbine Generators
- Reciprocating Engine Generators
- Steam Turbine Generators
- Solar Modules
- Inverters
- Energy Storage
- Wind Turbines
- Other renewable energy technologies

8.4.3 Information on EPC Contractor and Engineering and Design Subcontractors

Bidder shall provide information on qualifications and experience of proposed Construction Contractor and engineering and design subcontractors (if any).

8.5 Detailed Technical Information

Bidder shall fill out all applicable portions of the data sheets provided herewith. If the information is not available at the Proposal stage, the Bidder will be required to complete the same at time of the meetings to complete the Project Agreements.

DATA SHEETS		
Description		**Bidder's Response:**
	As a minimum, the following data sheets, drawings, and performance curves relating to the Project Company's proposal shall be provided:	Insert in this column all the data requested or the page number in the Proposal where the information is provided.
8.5.1	**<u>Combustion turbines</u>** (Performance at Reference Site Conditions)	

DATA SHEETS				
Description		**Bidder's Response:**		
			ULSD	**Natural Gas**
	Combustion turbine manufacturer			
	Model/type			
	Gross output (at generator terminals)	kW		
	Gross Heat Rate (HHV)	Btu/kWh		
	RPM			
	Air Flow at inlet	lb/hr.		
	Fuel consumption	lb/hr.		
	Water injection	lb/hr.		
	Fuel pressure required	psig		
	Air inlet filter type			
	Turbine/compressor water wash	yes/no		
	Ramp rate	kW/sec		
	Fire protection:			
	- CO_2 System	yes/no		
	Detectors:			
	- Temperature detectors	yes/no		
	- Smoke detectors	yes/no		
	- UV detectors			
	Silencers:			
	- Manufacturer			
	- Correction curves for fouling shall be provided. Deterioration factor is considered from 200 h after start of Commercial Operation			
	Governor (IEEE model)			
8.5.2	**Reciprocating Engine Generators** (Performance at Reference Site Conditions)			
			ULSD	**Natural Gas**

DATA SHEETS				
Description		**Bidder's Response:**		
	Reciprocating Engine manufacturer			
	Model/type			
	Gross output (at generator terminals)	kW		
	Gross Heat Rate (HHV)	Btu/kWh		
	RPM			
	Air Flow at inlet	lb/hr.		
	Fuel consumption	lb/hr.		
	Fuel pressure required	psig		
	Air inlet filter type			
	Ramp rate	kW/sec		
	Fire protection:			
	- CO_2 System	yes/no		
	Detectors:			
	- Temperature detectors	yes/no		
	- Smoke detectors	yes/no		
	- UV detectors	yes/no		
	Silencers:			
	- Manufacturer			
	- Correction curves for fouling shall be provided. Deterioration factor is considered from 200 h after start of Commercial Operation			
	Governor (IEEE model)			
	Fuel temperature at Reciprocating Engine Generator	°F		
	Turbochargers			
	- Manufacturer			
	Radiators (if used)			
	- Manufacturer			
	Air Coolers (if used)			
	- Manufacturer			

DATA SHEETS			
Description		**Bidder's Response:**	
8.5.3	**Steam turbines** (Performance at Reference Site Conditions)		
	Steam turbine manufacturer		
	Model/type		
	Gross output (at generator terminals)	kW	
	Turbine efficiency	%	
	RPM		
	Steam Flow at inlet	lb/hr.	
	Steam pressure at inlet	Psig	
	Steam temperature at inlet	°F	
	Exhaust pressure	In Hga	
	Quantity of Extraction(s)		
	Extraction pressure(s)	psig	
	Governor (IEEE model)		
	-		
8.5.4	**Heat Recovery Steam Generators** (Performance at Reference Site Conditions)		
	HRSG manufacturer		
	Model/type		
	Duct burner heat input	MMBtu/hr	
	Gas temperature at stack	°F	
	HP Steam Flow	Lb/hr	
	HP Steam Pressure	Psig	
	IP Steam Flow	Lb/hr	
	IP Steam Pressure	Psig	
	LP Steam Flow	Lb/hr	
	LP Steam Pressure	psig	
	SCR Catalyst	Yes/no	
	Catalyst type		

DATA SHEETS			
Description		**Bidder's Response:**	
8.5.5	**Cooling Tower**		
	Cooling Tower manufacturer		
	Model/type		
	Number of cells		
	Water flow rate	gpm	
	Heat Load	MMBtu/hr	
	Design wet bulb temperature	°F	
	Approach temperature	°F	
	Solar Photovoltaic Panel(s)		
	Manufactuer		
	Model/Type		
	Panel physical size (LxWxH		
	Panel Power Output (nominal)		
	Panel DC voltage (nominal)		
	Number of panels proposed		
	Single or dual axis sun tracking		
	Inverter(s)		
	Manufacturer		
	Model/Type		
	DC voltage (nominal)		
	AC voltage (nominal)		
	Number of AC phases		
	MVA capacity		
	Power factor range (leading/lagging capability)		
	Power electronic topology		
	IEEE 1547 compliant?		
	Total harmonic distortion (THD% voltage, open circuit)		

DATA SHEETS			
Description		**Bidder's Response:**	
	Peak Power	W	
	Maximum Power Voltage		
	Maximum Power Current		
	Battery Energy Storage System (BESS)		
	Manufacturer		
	Model/Type		
	Energy storage medium (chemical batteries or flywheels)		
	Battery chemistry (if chemical batteries proposed)		
	Inverter (See the above section)		
	Power capacity output and input	MW	
	Energy capacity	MWh	
	Cycle life		
8.5.5	**Package Boiler(s)**		
	- Manufacturer		
	- Capacity		
	- Fuel		
8.5.6	**Water Treatment Plant**		
	Primary Treatment:		
	- Manufacturer		
	- Type		
	- Number of streams		
	- Rated capacity of each stream	gpm	
	Demineralized Water Treatment		
	a. Manufacturer		
	b. Type		
	c. Number of Streams		
	d. Rated Capacity of Each Stream	gpm	
8.5.7	**Storage Tanks**		

DATA SHEETS			
Description		**Bidder's Response:**	
	a. Raw Water - Number and Capacity	T/gallons	
	b. Demineralized Water-Number and Capacity	T/gallons	
	c. Acid	T/gallons	
	d. Caustic	T/gallons	
	e. Fuel storage	T/barrels	
8.5.8	**Generators & Accessories**	**Combustion Turbines**	**Diesel Engines**
	Generator		
	a. Manufacturer		
	b. Rated voltage at generator terminal (kV)		
	c. Frequency range (Hz)		
	d. Rated Power factor		
	e. Reactance Data		
	f. Insulation class		
	g. Type of cooling		
	h. Design standard		
	i. Efficiency		
	j. Reactive capability ("D") curve		
	k. Saturation & synchronous impedance curves		
	l. Vee curves		
	m Short Circuit Ratio		
	n. Excitation IEEE Model		
	Excitation System		
	a. Type		
	b. Current rating and voltage		
	Neutral Earthing Equipment		
	a. Transformer		
	- Rating (kVA/sec)		
	- Voltage ratio		

DATA SHEETS			
Description		**Bidder's Response:**	
	- BIL (kV)		
	b. Secondary resistor		
	- Type		
	- Resistance (ohms)		
	- Current rating (A)		
	Generator Circuit Breakers (if required)		
	a. Manufacturer		
	b. Type/Model		
	c. Rated voltage (kV)		
	d. Rated Frequency (Hz)		
	e. Continuous Current rating (kVA)		
	f. Maximum Interrupting current rating (kA)		
	g. Maximum interrupting time (cycles)		
	h. Maximum closing time (cycles)		
	i. BIL rating		
	j. Interrupting medium		
8.5.9	**Generator Step-up Power Transformers**		
	General		
	a. Quantity		
	b. Manufacturer		
	c. Type		
	d. Applicable Standards		
	Design Data		
	a. Voltage ratio		
	b. Maximum Continuous Rating (MVA)		
	c. Rated temperature rise (°C)		
	d. Basic Insulation Level:		
	- Of HV winding (kV)		
	- Of neutral of HV winding (kV)		

DATA SHEETS			
Description		**Bidder's Response:**	
	- Of LV winding (kV)		
	- Of neutral of LV winding (kV)		
	e. Type of tap changer (Load or No-Load) and no./ratio of taps		
	f. Total power requirements of auxiliary equipment (kW)		
	g. Power factor		
	h. Insulation class		
	i. Type of cooling		
	j. Type of connection - High voltage winding - Low voltage winding		
	k. Design standard		
	l. Vector Group		
8.5.10	**<u>Medium Voltage Switchgear</u>**		
	a. General		
	- Manufacturer		
	- Applicable standards		
	b. Design Data		
	- Rated/nominal voltage of switchgear (kV)		
	- Rated insulation level, low frequency/ impulse (kV/kV)		
	- Momentary (asymmetrical) current rating (kA)		
	- Breaker interrupting time		
	- Breaker closing time		
	- Bus material and rating		
	- Type of enclosure		
	- Breaker type		
	- Short time current rating, 3 sec.		

DATA SHEETS			
Description		**Bidder's Response:**	
8.5.11	**ULSD Handling and Storage**		
	a. Fuel Handling Equipment		
	- Type & Capacity		
	- Metering System		
	- Chemical Analysis (if any)		
	b. Off-loading area		
	- Number of trucks offloading & parked		
	c. Storage Facility		
	- Number of Tanks, Type, and Capacity		
	- Total Capacity of Tanks (in days of supply at for operation at 100% load)		
8.5.12	**Natural Gas System**		
	a. General		
	- Design basis		
	- Maximum fuel gas required, SCFM		
	- Maximum flow rate required during start-up (shutdown to full speed and no load), SCFM		
	- Minimum fuel gas flow rate at ignition, SCFM		
	- Minimum gas pressure for base load required at Owner's interface, psig		
	- Allowable percentage variation in fuel gas supply pressure		
	▪ Steady state, psi		
	▪ Load changing, psi		
	- System design pressure, psig		
	- Allowable temperature range for fuel gas supply, °F		
	- Piping material		
	- Corrosion allowance		

DATA SHEETS			
Description		**Bidder's Response:**	
	b. Filter (Per Combustion Turbine Generator)		
	- Manufacturer		
	- Type		
	- Quantity		
	c. Gas Treatment Skids		
	- No. of skids		
	- Location		
	- Waste collection tank (per skid)		
	d. Drains Vessel		
	- Quantity (per Combustion Turbine Generator)		
	- Corrosion allowance		
	- Design standard		
	e. Knockout Vessel		
	- Quantity (per Combustion Turbine Generator)		
	- Design standard		
	f. Metering System		
	- No. of flow meters (per Combustion Turbine Generator)		
	- Manufacturer		
8.5.13	**115 kV Switchyard**		
	a. General		
	- Supplier		
	- Applicable standards		
	b. Design Data		
	- Rated/nominal voltage (kV)		
	- Rated insulation level, low frequency/ impulse (kV/kV)		
	- Momentary (asymmetrical) current rating (kA)		
	- Breaker interrupting time		

DATA SHEETS			
Description		**Bidder's Response:**	
	- Breaker closing time		
	- Bus material and rating		
	- Breaker type		
	- Breaker manufacturer		
	- Short time current rating, 3 sec.		
8.5.14	**Gas Insulated Busbar** [if used]		
	- Rated Voltage	kV	
	- Manufacturer		
8.5.15	**Wind turbines** (Performance at Reference Site Conditions)		
	Wind turbine manufacturer		
	Model/type		
	Gross output (at generator terminals)	kW	
	Total wind plant peak power at Delivery Point	kW	
8.5.16	Other Renewable Generation Technologies		

8.6 Drawings

No.	Drawing Type	Data (or page # on which to find the data)
8.6.1	**Outline drawings** of Combustion Turbine Generators and/or Reciprocating Engine Generators, Heat Recovery Steam Generators, and Steam Turbine Generators	
8.6.2	**Plant Layout**	
	1 Overall site layout drawing showing principal dimensions, major plants, cooling towers, radiators, buildings, roads, interfaces with the Electrical Interconnection Facilities, ULSD supply pipelines, natural gas supply pipeline(s), perimeter buffer zones, etc.	
	2 Proposed layout and elevation drawings	

No.	Drawing Type	Data (or page # on which to find the data)
	of all buildings in the Facility. 3 Layouts of ULSD supply pipeline and Electrical Interconnection Facilities.	
8.6.3	**Mechanical**	
	1 Process flow diagrams for Fuels and auxiliary equipment and systems.	
8.6.4	**Electrical**	
	1 Electrical single line diagrams (showing equipment ratings) for switchyard, MV switchgear, Unit synchronization plan, step up transformers and overall plant electric system including connections for emergency diesel, if required.	
	2 Principal Protection/Metering block diagram for generators, generator station transformers,).	
	3 One line block diagram for each battery and UPS system.	
	4 One line block diagram for energy metering system.	
	5 Description of philosophy for sizing of station service transformers, switchgear, battery and UPS system.	
	6 Description of generator and excitation systems with block diagrams.	
	7 General arrangement drawings of generator main connections showing generator, generator step-up transformers and excitation transformers.	
	8 Block diagram of proposed Control System) configuration showing all major components of the facility.	
	9 Basic schematics of the power block and common auxiliary plant control systems.	
	10 One line diagram of Electrical Interconnection Facilities including metering system.	

8.7 Performance Correction Curves

	Type of the Curve	Data (or page # on which to find the data)
8.7.1	**Combustion Turbine Generator (for each Fuel type)**	
	1 Combustion turbine net output versus ambient temperature	
	2 Exhaust flow versus ambient temperature	
	3 Exhaust temperature (after last stage) versus ambient temperature	
	4 Exhaust temperature (after last stage) versus combustion turbine output	
	5 Exhaust flow versus combustion turbine output	
	6 Heat rate versus combustion turbine output	
	7 Heat rate versus ambient temperature	
	8 Fuel flow versus combustion turbine output	
	9 Correction curve for barometric pressure	
	10 Correction curves for variation in ULSD and Natural Gas heating value	
	11 Correction curves for variation in humidity	
	12 Performance degradation (output and heat rate)	
	13 Table showing the expected non-recoverable yearly percent (%) degradation of the net plant output and heat rate	
8.7.2	**Reciprocating Engine Generator (for each Fuel type)**	
	1 Reciprocating engine output versus ambient temperature	
	2 Fuel flow versus engine output	
	3 Heat rate versus engine output	
	4 Heat rate versus ambient temperature	
	5 Correction curve for barometric	

	Type of the Curve	Data (or page # on which to find the data)
	pressure	
	6 Performance degradation (output and heat rate)	
	7 Correction curves for variation in ULSD and Natural Gas heating value	
	8 Correction curves for variation in humidity	
	9 Table showing the expected non-recoverable yearly percent (%) degradation of the net plant output and/or heat rate	
8.7.3	**Entire Facility (for each Fuel type and technology)**	
	1 Facility net output versus ambient temperature	
	2 Facility net output versus barometric pressure	
	3 Facility net output versus grid frequency	
	4 Facility net output versus power factor	
	5 Facility net output versus Fuel heating values	
	6 Facility net Heat Rate versus ambient temperature	
	7 Facility net Heat Rate versus barometric pressure	
	8 Facility net Heat Rate versus grid frequency	
	9 Facility net Heat Rate versus power factor	
	10 Facility net Heat Rate versus Fuel heating values	

8.8 Commercial Operation Tests Procedures

The Bidder shall provide Commercial Operation Test procedures for Facility applicable to the respective technology and for testing on both ULSD and Natural Gas in the case of fossil fuel fired generation.

8.9 Project Summary Data

8.9.1 Type of plant:

Describe technology used, number of Units, ratings, and method to recover heat (if used).

8.9.2 Fuel to be used

GPA will be responsible for supply of Natural Gas when it becomes available. Describe the Fuel supply system for the Units (and other any equipment in the Facility that will use this Fuel) including ULSD Supply Infrastructure, ULSD Storage Facilities and Natural Gas system.

8.9.3 Combustion Turbine, Reciprocating Engine, and Generator Suppliers.

Show model identification, when applicable.

8.9.4 Solar Module, Wind Turbine, Inverter, and Energy Storage System Suppliers and other proven renewable technologies.

Show model identification, when applicable.

8.9.5 Describe Standards Applied to Project Design and Equipment Selection.

All designs, materials, and equipment will conform to the requirements of the codes and standards specified in Section C of this IFMSB as well as the requirements of applicable Law and Prudent Utility Practices. The codes and standards that follow will be used where applicable to the equipment, material, components, or construction practices. All work described will be designed, constructed, tested and installed in accordance with the latest edition of the following list of codes and standards (To be completed by the Bidders). In order not to create possible duplication or different interpretations, the names and initials of the respective entities must not be translated.

In the event conflicts arise between the codes and standards of practice described herein and codes, laws, rules, decrees, regulations, standards, etc., of the locality where the equipment is to be installed, the codes and standards of practice described herein will govern. In the event conflicts arise between any of the codes and standards described herein, the more stringent section of the applicable codes will govern. Each of the equipment and designs will comply with one or more of the above codes, but none will necessarily comply with all the listed standards.

8.9.5.1 General design codes

(List)

8.9.5.2 Civil engineering design criteria, standards and codes

(List)

8.9.5.3 Structural engineering design criteria, standards and codes

(List)

8.9.5.4 Mechanical engineering design criteria, standards and codes

(List)

8.9.5.5 Control and electrical engineering design criteria, standards and codes

(List)

8.9.6 Suppliers of Major Equipment

Provide the information requested below for all major equipment suppliers that have been selected for the Project.

Equipment	Supplier's Name
Combustion Turbine Generators, (State Technology)	
Reciprocating Engine Generators (State technology)	
Heat Recovery Steam Generators	
Once Through Steam Generators	
Steam Turbine Generators	
Step-up Transformers	
Control System	
Solar Modules	
Wind Turbines	
Inverters	
Energy Storage Systems	
Other proven renewable generation technologies	

8.9.7 List of Participants.

Check all of the following that have been selected:

Participant	Check if Selected	Name	Status (letter of intent, contract, etc.)
Architect/Engineer			
Environmental Consulting Firm			
Construction Firm			
Operations & Maintenance Contractor			
Other (describe)			
Power Train Subcontractor			
Guam Legal Counsel			

Financial Advisor/Lender			

8.9.8 Additional Data

Attach the following data clearly labeled. Individual data should be numbered to correspond to the question they are addressing; e.g., data submitted in response to Question 8.9.8.1 should be labeled "Form8, Article 8.9.8.1".

1 Describe the equipment suppliers' experience with the specific models that will be used for each major piece of equipment as specified in Paragraph 9.3.

2 Provide a complete heat and material balance diagram and flow sheet. These diagrams should include sufficient detail to allow GPA to verify the accuracy of the representations. Provide the information for full load, sixty five percent (65%) of full load, and minimum load using performance guarantee conditions listed in paragraph 6.5 of Section C in the IFMSB and assuming the higher heating value (HHV) of the Fuel

3 Provide drawings of the Facility's Site layout and major equipment arrangement. Identify the size of major components and describe areas of key equipment redundancy. Identify the area (m^2) required for the generating station, radiators and/or air coolers (if used), Fuel storage and Fuel handling facilities.

4 Provide any additional technical information that is available (e.g., drawings, specifications, etc.).

5 Provide preliminary generator capability curves and specify the reactive capability and control strategies for the Project. Also describe any voltage or equipment limitation affecting the GPA control center's ability to control the reactive output.

6 Describe the equipment procurement plan. Provide information concerning how commitments to purchase major equipment items relate to the schedules for acquiring permits and financing. Provide information concerning any equipment production space that has been reserved with suppliers of major components. Note that all equipment must be new.

7 Provide descriptions of the fire protection systems to be used including those within any equipment enclosures, any buildings and all general Site facilities.

8 Provide descriptions of equipment enclosures (including buildings) and what protection against the weather will be provided to major machines during periods of maintenance, especially if no high-bay buildings are to be constructed.

9 Provide a description of the overall control system used for the Project equipment, including all local, centralized and remote controlling including the proposed means to communicate with the GPA control center to follow its instructions.

10 Describe how the Facility will be started, including the expected amount of time to synchronize each unit, starting with the equipment in "cold" and "warm" conditions. State the maximum MVA and MW required from the GPA system to start the Facility.

11 Provide a description of the monitoring and protection systems to be used on major equipment including the prime movers, generators, transformers, substations and interconnection lines. Describe how the protection systems will be coordinated with the corresponding GPA installations.

12 Provide a description of the design of the main and auxiliary equipment cooling, potable and waste waters facilities. Provide a description of the water plan for the project including average, minimum, and maximum water intake and discharge, destination, temperature, quantity and quality of plant discharge water; and individual chemicals used with estimated consumption rates. Describe the treatment and/or disposal of discharge waters resulting from periodic cleaning of the equipment.

13 Describe the proposed methods to dispose of solid wastes and sludge produced by the combustion of fuels as well as normal O&M of the Facility.

14 In the case of PV solar generation, describe the proposed method for panel cleaning.

15 Describe provisions for diminishing the probability of fires and contamination of the environment during the handling and storage of the ULSD and Natural Gas including spill prevention control. Describe the proposed methods to measure the Fuel and its calorific content. All calorific content is to be expressed in HHV.

16 Describe how the auxiliary power will be obtained when plant is disconnected from the 115 kV system.

17 Provide design values for seismic, wind and any other data (Refer to paragraphs 6.4 and 6.5 of Section C).

18 Provide/the following data for new and clean conditions at 100% load:

a) Total combustion turbine or reciprocating engine inlet pressure drop, in H_2O _____

b) Exhaust gas temperature, °F _____

19 Describe all material interfaces of Facility.

8.10 Environmental Data

Answer the questions below or attach a detailed environmental impact study that includes answers to at least the following questions:

1 Describe the technology to be used to maintain air emissions and air pollution within the specified guidelines.

2 Describe control devices (if applicable), and proposed monitoring systems and procedures.

3 Provide information concerning the containment measures planned for the Project's Fuel and hazardous substances handling and storage areas.

4 Address the following issues as they relate to design and construction of the Project.

5 Describe the proposed timetable to carry out the environmental impact studies and obtain environmental permits, if you are selected as the Selected

Bidder. Indicate the scope of the environmental impact studies and the methodology to be used to perform these studies and to present findings and recommendations. State the commitment of the Bidder to carry out all suggestions and recommendations of the studies related to environmental permits, including possible design modifications.

6 Threatened and endangered species assessment and mitigation.

7 Cultural and archeological impact (natural, national and state landmarks, historical status and other historical landmarks, graveyards, burial ground proximity to nearby parks and other recreational areas).

8 Noise impact analysis and mitigation; please describe technology to be employed or actions to be taken to reduce noise. Provide the guaranteed maximum sound levels for the Facility at all of the Facility boundaries and at any Facility interfaces with other entities including residential, industrial and others. Provide the guaranteed sound level for the plant at one meter from the equipment enclosures or exterior walls of the powerhouse(s), which should not exceed 85 dB(A). The measurement shall not include the existing background noise.

9 Indicate the height of the proposed exhaust stack(s) for the Facility and indicate reasons for this selection (could include "Prudent Utility Practices", dispersion of pollutants, height of other exhaust stacks in the immediate vicinity, etc.). Why does Bidder feel this height is adequate from an environmental standpoint? Indicate if this height selection could be changed by the environmental impact study and environmental permits requirements.

10 Land use impact mitigation techniques, including the effect on nearby inhabited and tourist areas.

11 Describe the architectural style, exterior materials and exterior color schemes proposed for all plant buildings. Provide samples of proposed exterior colors.

12 Hazardous waste - type generated and disposal.

13 Solid waste - type generated and disposal.

8.10.1 Air Emissions

With regard to projected air emissions, please fill out the following table for the Facility when fired with the Fuels specified.

Table 8.1: ULSD Air Emission Levels

Pollutant	Percent Removal Efficiency at 100% Capacity	Emission Quantity		
		At 100% Capacity	At 50% Capacity	At Minimum Capacity
NO_x		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3

Pollutant	Percent Removal Efficiency at 100% Capacity	Emission Quantity		
		At 100% Capacity	At 50% Capacity	At Minimum Capacity
CO		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
SO_2		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
Particulates		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
VOC		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3

Table 8.2: Natural Gas Ail Emission Levels

Pollutant	Percent Removal Efficiency at 100% Capacity	Emission Quantity		
		At 100% Capacity	At 50% Capacity	At Minimum Capacity
NO_x		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
CO		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3

Pollutant	Percent Removal Efficiency at 100% Capacity	Emission Quantity		
		At 100% Capacity	At 50% Capacity	At Minimum Capacity
SO_2		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
Particulates		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3
VOC		ppmv	ppmv	ppmv
		lb/hr	lb/hr	lb/hr
		lb/MMbtu	lb/MMbtu	lb/MMbtu
		mg/m^3	mg/m^3	mg/m^3

Notes:

1 Capacity is defined as the total gross capacity of one Unit as commissioned.

2 ppmv is defined as volumetric parts per million at 15% O_2.

3 lb/hr is defined as pounds per hour.

4 lb/MMBtu is defined as pounds per Million Btus of heat input.

5 gr/scf is defined as grains per standard cubic foot

Provide total emissions for all air toxics on an aggregate basis, not on an individual basis. Air toxic pollutants are described on the US EPA Web page: http://www.epa.gov/ttn/atw/allabout.html.

8.11 Electric Interconnection Data

8.11.1 Items to Be Provided

1 A detailed single-line diagram from the generators and proposed interconnection to the 115 kV GPA transmission system. Identify the Point(s) of Delivery.

2 Equipment descriptions and functional specifications of:

a) Generators, transformers, switchgear equipment, circuit breakers, etc.

b) Protective relays, current transformers, voltage transformers, etc.

c) Metering System

d) Telecommunication equipment

e) Control and data acquisition system

Any design changes which may affect the interconnection must be reviewed and approved by GPA. This approval does not relieve the Project Company from any contractual responsibility.

8.12 Performance Data

1 Provide a heat rate curve for each Unit in the Facility, assuming that the load will be allocated to each Unit in proportion to its maximum output power level.

2 The Bidder shall also tabulate the heat rates (HHV) corresponding to the percentages of the output power levels stated in Table 8.3 through Table 8.6 below. The Unit heat rate for the purpose of Table 8.3 and Table 8.4 is defined as the Fuel energy consumption expressed in Btu (higher heating value) required to generate one kWh at the generator terminals (Unit gross heat rate). This data is for technical evaluation purposes only and will not be used for economic evaluation.

3 Provide data on the overall performance of the Facility

Table 8.3: Unit ULSD Heat Rates
(Combustion Turbine in Simple Cycle or Reciprocating Engine)

Power Levels - %	Heat Rate (HHV) MBtu/kWh*
100	
85	
65	
50	
25	
10	
Minimum load	

Table 8.4: Unit Natural Gas Heat Rates
(Combustion Turbine in Simple Cycle or Reciprocating Engine)

Power Levels - %	Heat Rate (HHV) MBtu/kWh*
100	
85	
65	
50	
25	
10	
Minimum load	

* Measured at generator terminals.

Table 8.5: Facility ULSD Heat Rates

Power Levels - %	Heat Rate (HHV) MBtu/kWh**
100	
85	
65	
50	
25	
10	
Minimum load	

Table 8.6: Facility Natural Gas Heat Rates

Power Levels - %	Heat Rate (HHV) MBtu/kWh**
100	
85	
65	
50	
25	
10	
Minimum load	

** Measured at the Delivery Point.

Table 8.7: Facility ULSD Performance

Description	Units	Value*
Plant Gross Output	kW	*
Auxiliary Power + Losses	kW	*
Step-up Transformer Losses	kW	*
Total Losses	kW	*
Net Power Output at Delivery Point **	kW	**
Heat Rate (based on HHV)**	Btu/kWh	**
Noise Level **	db(A) @ Facility boundary	**
	Equipment db(A) @ 3 feet	**
Particulate emissions **	ppmv	**

Description	Units	Value*
NO_x Emissions for @ 15% O_2 **	ppmv	**
SO_2 Emissions@ 15% O_2 **	ppmv	**
VOC Emissions@ 15% O_2 **	ppmv	**

* The Bidder shall fill-in data.

** The Bidder shall guarantee these values.

Table 8.8: Facility Natural Gas Performance

Description	Units	Value*
Plant Gross Output	kW	*
Auxiliary Power + Losses	kW	*
Step-up Transformer Losses	kW	*
Total Losses	kW	*
Net Power Output at Delivery Point **	kW	**
Heat Rate (based on HHV)**	Btu/kWh	**
Noise Level **	db(A) @ Facility boundary	**
	Equipment db(A) @ 3 feet	**
Particulate emissions **	ppmv	**
NO_x Emissions for @ 15% O_2 **	ppmv	**
SO_2 Emissions@ 15% O_2 **	ppmv	**
VOC Emissions@ 15% O_2 **	ppmv	**

* The Bidder shall fill-in data.

** The Bidder shall guarantee these values.

8.13 Technology and Design Data

8.13.1 Technical Maturity:

Table 8.9: Similar Technology Experience

Quantity (of all that apply)	Criterion
	One or more similar facility(ies) has (have) achieved an annual equivalent availability equal to or greater than 85% over three consecutive years during commercial operation.
	One or more similar facility(ies) is(are) currently in commercial operation.

	One or more similar facility(ies) is(are) under construction.
	None of the above.

For each of the facilities referenced above, fill out a copy of the form below which describes operating history and statistics.

Table 8.10: Similar Technology Experience

Project Name			
Location			
Contact at Plant			
Name			
Phone Number			
Plant Owner			
Name			
Phone Number			
Power Purchaser			
Name			
Phone Number			
*The Project Came On-line in XXXX.			
Year of Operation:	XXXX	XXXX	XXXX
Operational Months that Year:			
Annual Equivalent Availability			

8.14 Operations and Maintenance Data

8.14.1 Operating Characteristics

Table 8.11: Net Generation Levels

Parameter	Value	Units
a) Maximum emergency level: capacity that may be available during system declared emergencies		MW (net)
		hours available
b) Minimum emergency level: used during system declared emergencies		MW (net)
		hours available

Parameter	Value	Units
c) Net capability: the maximum level that the Facility could be dispatched during normal system conditions		MW (net)
d) Interim operating level: the operating level at which the Facility operates most efficiently (i.e., at the lowest heat rate)		MW (net)
e) Minimum operating level: the minimum level that the Facility could be dispatched during normal system conditions (i.e., the must-run level)		MW (net)

* The Bidder shall fill-in Data.

8.14.2 Operating Parameters

Provide the operating parameters of the Facility measured in minutes in Table 8.12.

Table 8.12: Synchronizing and Load Pick-up Times

Action	Minutes to Achieve Action After Shutdown:		
	Warm Engine	**Cold Engine**	
Reciprocating Engine Generator			
Synchronized (min)	*	*	
Normal Ramp Rate (MW/min)	*	*	
Emergency Ramp Rate (MW/min)	*	*	
Reciprocating Engine Facility at Full Load	*	*	
Combustion Turbine Generator			
	Hot Start	**Warm Start**	**Cold Start**
Synchronized (min)	*	*	*
Normal Ramp Rate (MW/min)	*	*	*
Emergency Ramp Rate (MW/min)	*	*	*
Combustion Turbine Facility at Full Load	*	*	*

* The Bidder shall fill-in Data.

1 Describe the Automatic Generation Control capability of the Facility. Describe how the control will allocate the dispatch orders of increasing or decreasing the generation level.

2 Describe quick start capability.

8.14.2.1 Equivalent Hours of Start-up.

One normal start-up is equivalent to _____ hours of operation.

One emergency start-up is equivalent to _____ hours of operation.

One hour of peak load is equivalent to _____ hours of operation.

8.14.3 Maintenance

Table 8.13: Annual Maintenance Outage Schedule Combustion Turbine Generator (ULSD)

Duration (number of days):	
Time of Year (season):	
Cycle (number of operating hours):	

Table 8.14: Annual Maintenance Outage Schedule Combustion Turbine Generator (Natural Gas)

Duration (number of days):	
Time of Year (season):	
Cycle (number of operating hours):	

Table 8.15: Annual Maintenance Outage Schedule Reciprocating Generator (ULSD)

Duration (number of days):	
Time of Year (season):	
Cycle (number of operating hours):	

Table 8.16: Annual Maintenance Outage Schedule Reciprocating Generator (Natural Gas)

Duration (number of days):	
Time of Year (season):	
Cycle (number of operating hours):	

Note: As a requirement of this solicitation, Bidders must agree to schedule maintenance and planned outages with GPA and accommodate any reasonable request for revisions required by GPA.

Table 8.17: Annual Availability of the Facility

Parameters	Value, %
Annual Availability (Guarantee)*	
Maintenance Outages	

Scheduled Outages	
Forced Outages (Guarantee)*	
Total:	
* The Bidder shall guarantee these values.	

8.14.4 Operations and Maintenance Staff and Services

Attach the following data clearly labeled. Individual data should be numbered to correspond to the question they are addressing; e.g., data submitted in response to Question 8.14.4 Item 1 should be labeled "Form 8, Article 14.4.1".

1 Operator's experience with Facility technology - provide number of unit-years of experience with generating facilities of the same or similar technology and size as the Facility.

2 Provide the plan for operational staffing including, but not limited to, the number, type and responsibilities of operations personnel on each shift.

3 Provide plan of maintenance staffing including, but not limited to, the number of permanent on-site maintenance personnel and their responsibilities; the personnel available for emergency maintenance and their response times; and the personnel that will be utilized for minor and major scheduled maintenance. If contracted, specify contractor, location and experience with this type of equipment.

4 Describe briefly the procedure that will be followed for daily, weekly, monthly and yearly maintenance programs.

5 Provide outline plans for initial and ongoing training of all plant and support personnel, including any qualifications programs.

6 Provide a brief description of plans for the purchasing and warehousing of tools, parts and supplies.

7 Provide a major maintenance schedule.

9 FORM 9 – ADDITIONAL SUPPORTING DATA

1 Bidder shall provide the following information for each participant in the Consortium comprising the Bidder.

- Name and address of each member of the Consortium, starting with the designated Lead Bidder.
- Legal status of each member (i.e. corporation, association, individual).
- Country of registration and home office.
- Name of authorized representative for this project and contact information (i.e. address, telephone and Fax numbers, etc.).
- Percentage of equity contribution by each member. If percentage of voting rights is different than the percentage of equity contribution, please also provide details on allocation of voting rights.

2 Provide to the extent possible, the name of organizations and project managers who will provide the services listed below, along with their relevant experience and qualifications. (Any standard printed material may be included as an attachment.)

- Financial advisor/ arranger
- Legal advisors, local and foreign
- Turnkey construction contractor
- Operation and maintenance contractor
- Detailed engineering for Project
- Environmental consultant
- Engineer for the Project Company (Owner's engineer)
- Insurance advisor

3 Provide an outline description of the insurance coverage including company name, to be put into effect by Bidder/Project Company during the Term, including the amounts for which insurance will be purchased and name the potential insurers.

4 Bidder shall provide a listing of the following Project Information:

- A listing of proposed subcontracts for the major elements of the Project; to include subcontractors' name, address, scope of supply or services, and amount of subcontract.

10 FORM 10 – EXCEPTIONS TO THE IFMSB DOCUMENT

Bidders are advised that any material modification to documents may result in disqualification. If there are no exceptions, please state so for each document.

1 List Exceptions to the IFMSB

   a) Section A – Information for Bidders

   b) Section B - Instructions to Bidders

   c) Section C - Functional Specifications

   d) Section D – Bidder's Proposal Forms and Supportive Data

2 List exceptions to the draft Project Agreements, individually.

   a) Exceptions to the Energy Conversion Agreement

   b) Exceptions to the Land Lease Agreement

   c) Exceptions to the Water Supply Agreement.

11 FORM 11 – BIDDER'S PROJECT SCHEDULE

Bidder shall provide its detailed Bidder's Project Schedule which supports and confirms the construction phase of the Project Milestone Schedule contained in Section A, Article 11, starting from the signing of the ECA.

- Bidder's Project Schedule shall be submitted in a CPM network format which shall address all the milestones in the referenced Article and those additional milestones shown in 11.1 below for financing, engineering, procurement, shipping, construction activities, etc. necessary to demonstrate a complete and accurate knowledge of the Project, as well as his knowledge of procedures and prevailing conditions in Guam.
- The Bidder's Project Schedule shall address all details of the Project financing, engineering, procurement and construction of the Facility, which as a minimum include the following:

11.1 Bidder's Milestone Schedule

By completing the Milestone Schedule below assuming execution of the ECA, WSA and LLA by [TBD], provide a milestone schedule which will result in a Commercial Operation Date on or prior to [TBD]. For all milestones specify the day, month and year for commencing and completing the milestone. Any item not applicable to the Project must be so marked with a brief explanation as to why it is not applicable. This list is not intended to be inclusive, but rather to include appropriate milestones to allow GPA to evaluate proposals. It is the Bidder's sole responsibility to identify and complete all the appropriate milestones necessary for the completion of its Project whether included here or not. This includes the identification and acquisition of all necessary permits.

(Bidder to include its CPM Project Schedule as back-up to Milestone Schedule below)

Table 11.1: Milestone Schedule

Milestone	Start Date	Completion Date
Financing		
• Construction & permanent financial closing		
Engineering		
• Preliminary		
• Detailed		
Solicitation & award of proposals for major equipment		
• Equipment procurement		
• Prime Mover(s)		
• Boilers(s) Contract (if applicable)		
• Electrical equipment procurement		
• Cooling equipment procurement		
• _____ (other)		

Milestone	Start Date	Completion Date
Permits		
• Local site plan approval		
• Local building permits		
• Other)		
Environmental permits		
• Air permits		
• Water permits		
• Other environmental permits		
• Solid Waste		
• _____ (Other) (Any other applicable permit(s), not listed above)		
Construction		
On-site construction activities		
• Foundation		
• Electric interconnection		
• Major equipment installation		
• Fuel Receiving Facilities		
• (other)		
Off-site construction activities		
• Electrical Interconnection Facilities		
• ULSD Supply Infrastructure		
Operation		
• Phase 1 Startup and Commissioning		
• Phase 1 Commercial Operation		
• Phase 2 Start-up and Commissioning		
• Phase 2 Commercial Operation		

12 FORM 12 – BIDDER'S STAFFING PLAN

12.1 BIDDER'S PROPOSED HOME OFFICE (OFF-SHORE) ORGANIZATION

The Bidder shall submit a detailed organization chart showing its home office management organization (off-shore) and its interface with the Project Site in Guam (on-shore) organization. This organization chart shall designate the authorized representative(s) and key personnel. Personnel not specifically designated to the Project will be so identified on the organization chart. The chart shall be supplemented by a narrative outline which indicates the duties, the functional responsibilities, and the designated authority of each member of the home office organization. Bidder's key personnel and Bidder's authorized representative(s) shall include but not be limited to the following:

a) Overall Project Management
b) Home Office Manager
c) Responsible Officer/Director
d) Engineering Functions
e) Procurement, Traffic and Vendor Surveillance
f) Construction Management
g) Planning and Scheduling
h) Quality Program Management
i) Accounting
j) Production Manager

12.2 BIDDER'S PROPOSED SITE (ON-SHORE) ORGANIZATION

The Bidder shall submit a detailed organization chart showing its proposed Site (on-shore) organization, which will be responsible for the execution of the Works. All authorized Contractor Representative(s) and Contract Key Personnel shall be so designated on the organization chart. Specifically, the Bidder's organization chart must indicate the key personnel who will be responsible for performing the following functions:

a) Project Management
b) Engineering Functions
c) Procurement of materials; traffic and logistics
d) Supervision of Construction and Construction Management
e) Health and Safety Management
f) Environmental Compliance Management
g) Community Relations Management
h) Planning and Scheduling
i) Accounting and Commercial Functions

This chart shall be supplemented by a narrative outline that indicates the duties, the functional responsibilities and designated authority of each member designated on Bidder's Site organization chart.

13 FORM 13 – MANDATORY FORMS REQUIRED IN ACCORDANCE WITH GUAM PROCUREMENT LAW

13.1 Major Shareholder Disclosure Affidavit

GUAM POWER AUTHORITY

ATURIDAT ILEKTRESEDAT GUAHAN
P O BOX 2977, AGANA, GUAM 96932-2977

SPECIAL PROVISON
FOR
MAJOR SHAREHOLDERS DISCLOSURE AFFIDAVIT

All Bidders/Offerors are required to submit a current affidavit as required below. Failure to do so will mean disqualification and rejection of the bid/rfp.

5 GCA §5233 (Title 5, Section 5233) states:

"Section 5233 Disclosure of Major Shareholders. As a condition of submitting a bid or offer, any partnership, sole proprietorship or corporation doing business with the government of Guam shall submit an affidavit executed under oath that lists the name and address of any person who has held more than ten percent (10%) of the outstanding interest or shares in said partnership, sole proprietorship or corporation at any time during the twelve (12) month period immediately preceding submission of a bid, or, that it is a not for profit organization that qualifies for tax exemption under the Internal Revenue Code of the United States or the Business Privilege Tax law of Guam, Title 12, Guam Code Annotated, Section 26203©. With the exception of not for profit organizations, the affidavit shall contain the number of shares or the percentage of all assets of such partnership, sole proprietorship or corporation which have held by each such person during the twelve (12) month period. In addition, the affidavit shall contain the name and address of any person who has received or is entitled to receive a commission, gratuity or other compensation for procuring or assisting in obtaining business related to the bid or offer and shall also contain the amounts of any such commission, gratuity or other compensation. The affidavit shall be open and available to the public for inspection and copying."

1. **If the affidavit is a copy, indicate the BID/RFP number and where it is filed.**
2. **Affidavits must be signed within 60 days of the date the bids or proposals are due.**

MAJOR SHAREHOLDERS OF DISCLOSURE AFFIDAVIT

TERRITORY OF GUAM)
)
HAGATNA, GUAM)

I, undersign, _____,
(partner or officer of the company of, etc.)
being first duly sworn, deposes and says:

1. 1. That the person who have held more than ten percent (10%) of the company's shares during the past twelve (12) months are as follows:

Name	Address	Percentage of Shares Held
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total number of shares	_____

2. Persons who have received or are entitled a commission, gratuity or other compensation for procuring or assisting in obtaining business related to the bid/rfp for which this Affidavit is submitted are as follows:

Name	Address	Amount of Commission Gratuity or other Compensation
_____	_____	_____
_____	_____	_____

Further, affiant sayeth naught.

Date:_____ _____
Signature of individual if bidder/offeror is a sole Proprietorship; Partner, if the bidder/offeror is a Partnership Officer, if the bidder/offeror is a corporation.

Subscribe and sworn to before me this _____ day of _____,

20_____.

Notary Public _____

In and for the Territory of Guam

My Commission expires _____.

13.2 Non-Collusion Affidavit

NON-COLLUSION AFFIDAVIT

Guam)

)ss:

Hagatna)

I, _____ first being duly sworn, depose and say:
(Name of Declarant)

1. That I am the _____ of _____.
(Title) (Name of Bidding/RFP Company)
2. That in making the foregoing proposal or bid, that such proposal or bid is Genuine and not collusive or shame, that said bidder/offeror has not colluded, Conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham or to refrain from bidding or submitting a proposal and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid of affiant or any other bidder, or to secure any overhead, project or cost element of said bid price, or of that of any bidder, or to secure any advantage against the GUAM POWER AUTHORITY or any person interested in the proposed contract; and
3. That all statements in said proposal or bid are true.
4. This affidavit is made in compliance with Guam Administrative Rules and Regulations §§3126(b).

_____
(Declarant)

SUBSCRIBED AND SWORN to me before this _____ day of _____, 2018.

)Seal(

_____
Notary Public

13.3 No Gratuities or Kickbacks Affidavit

NO GRATUITIES OR KICKBACKS AFFIDAVIT

AFFIDAVIT
(Offeror)

TERRITORY OF GUAM)
) **SS:**
HAGATNA, GUAM)

_____, being first duly sworn, deposes and says:
As the duly authorized representative of the Offeror, that neither I nor of the Offeror's officers, representatives, agents, subcontractors, or employees has or have offered, given or agreed to give any government of Guam employee or former employee, any payment, gift, kickback, gratuity or offer of employment in connection with Offeror's proposal.

_____
Signature of Individual if Proposer is a Sole Proprietorship;
Partner, if the Proposer is a Partnership;
Officer, if the Proposer is a Corporation

SUBCRIBED AND SWORN to before me this ____day of _____, 2018.

_____
Notary Public
In and for the Territory of Guam
My Commission Expires:

13.4 Ethical Standards Affidavit

ETHICAL STANDARDS AFFIDAVIT

AFFIDAVIT

(Proposer)

TERRITORY OF GUAM)

) SS:

HAGATNA, GUAM)

_____, being first duly sworn, deposes and says:
That I am (the Sole Proprietor, a Partner or Officer of the Offeror)
That Offeror making the foregoing Proposal, that neither he or nor of the Offeror's officers, representatives, agents, subcontractors, or employees of the Offeror have knowingly influenced any government of Guam employee to breach any of the ethical standards set forth in 5 GCA Chapter 5 Article 11, and promises that neither he nor any officer, representative, agent, subcontractor, or employee of Offeror will knowingly influence any government of Guam employee to breach any ethical standard set for in 5 GCA Chapter 5 Article 11.

_____
Signature of Individual if Proposer is a Sole Proprietorship;
Partner, if the Proposer is a Partnership;
Officer, if the Proposer is a Corporation

SUBCRIBED AND SWORN to before me this ____day of _____, 2018.

_____
Notary Public
In and for the Territory of Guam
My Commission Expires:

13.5 Declaration Re-Compliance with U.S. DOL Wage Determination

DECLARATION RE-COMPLIANCE WITH U.S. DOL WAGE DETERMINATION

Procurement No.: _____

Name of Offeror Company: _____
_____ hereby certifies under penalty of perjury:

(1) That I am _____ (the offeror, a partner of the offeror, an officer of the offeror) making the bid or proposal in the foregoing identified procurement;

(2) That I have read and understand the provisions of 5 GCA § 5801 and § 5802 which read:

§ 5801. Wage Determination Established.

In such cases where the government of Guam enters into contractual arrangements with a sole proprietorship, a partnership or a corporation ('contractor') for the provision of a service to the government of Guam, and in such cases where the contractor employs a person(s) whose purpose, in whole or in part, is the direct delivery of service contracted by the government of Guam, then the contractor shall pay such employee(s) in accordance with the Wage Determination for Guam and the Northern Mariana Islands issued and promulgated by the U.S. Department of Labor for such labor as is employed in the direct delivery of contract deliverables to the government of Guam.

The Wage Determination most recently issued by the U.S. Department of Labor at the time a contract is awarded to a contractor by the government of Guam shall be used to determine wages, which shall be paid to employees pursuant to this Article. Should any contract contain a renewal clause, then at the time of renewal adjustments, there shall be made stipulations contained in that contract for applying the Wage Determination, as required by this Article, so that the Wage Determination promulgated by the U.S. Department of Labor on a date most recent to the renewal date shall apply.

§ 5802. Benefits.

In addition to the Wage Determination detailed in this Article, any contract to which this Article applies shall also contain provisions mandating health and similar benefits for employees covered by this Article, such benefits having a minimum value as detailed in the Wage Determination issued and promulgated by the U.S. Department of Labor, and shall contain provisions guaranteeing a minimum of ten (10) paid holidays per annum per employee.

(3) That the offeror is in full compliance with 5 GCA § 5801 and § 5802, as may be applicable to the procurement referenced herein;

_____

Signature of Individual if Proposer is a Sole Proprietorship;
Partner, if the Proposer is a Partnership;
Officer, if the Proposer is a Corporation

SUBCRIBED AND SWORN to before me this ____day of _____, 2018.

_____

Notary Public
In and for the Territory of Guam
My Commission Expires:

13.6 Special Provisions

SPECIAL PROVISIONS

Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property

GCA 5 §5253 Restriction Against Contractors Employing Convicted Sex Offenders from Working at Government of Guam Venues:

(a) No person convicted of a sex offense under the provisions of Chapter 25 of Title 9 Guam Code Annotated, or an offense as defined in Article 2 of Chapter 28, Title 9 GCA in Guam, or an offense in any jurisdiction which includes, at a minimum, all of the elements of said offenses, or who is listed on the Sex Offender Registry, and who is employed by a business contracted to perform services for an agency or instrumentality of the government of Guam, shall work for his employer on the property of the Government of Guam other than public highway.

(b) All contracts for services to agencies listed herein shall include the following provisions: (1) warranties that no person providing services on behalf of the contractor has been convicted of a sex offense under the provisions of Chapter 25 of Title 9 GCA or an offense as defined in Article 2 of Chapter 28, Title 9 GCA, or an offense in another jurisdiction with, at a minimum, the same elements as such offenses, or who is listed on the Sex Offender Registry; and (2) that if any person providing services on behalf of the contractor is convicted of a sex offense under the provisions of Chapter 25 of Title 9 GCA or an offense as defined in Article 2 of Chapter 28, Title 9 GCA or an offense in another jurisdiction with, at a minimum, the same elements as such offenses, or who is listed on the Sex Offender Registry, that such person will be immediately removed from working at said agency and that the administrator of said agency be informed of such within twenty-four (24) hours of such conviction.

(c) Duties of the General Services Agency or Procurement Administrators. All contracts, bids, or Requests for Proposals shall state all the conditions in § 5253(b).

(d) Any contractor found in violation of § 5253(b), after notice from the contracting authority of such violation, shall, within twenty-four (24) hours, take corrective action and shall report such action to the contracting authority. Failure to take corrective action within the stipulated period may result in the temporary suspension of the contract at the discretion of the contracting authority.

SOURCE: *Added by P.L. 28-024:2 ((Apr. 21, 2005). Amended by P.L. 28-098:2 (Feb. 7, 2006).*

_____

Signature of Bidder Date
Proposer, if an individual;
Partner, if a partnership;
Officer, if a corporation.

Subscribed and sworn before me this _____ day of _____, 2018.

_____

Notary Public

13.7 Local Procurement Preference Application

GUAM POWER AUTHORITY
ATURIDÅT ILEKTRESEDÅT GUAHAN
P.O. BOX 2977 HAGÅTÑA, GUAM U.S.A. 96932-2977

Edward J.B. Calvo
Governor

Telephone Nos. (671) 648-3054/55 Fax: 648-3165

Raymond S. Tenorio
Lieutenant Governor

Accountability · Impartiality · Competence · Openness · Value

LOCAL PROCUREMENT PREFERENCE APPLICATION

Based on the law stipulated below, please place a checkmark or an "X" on the block indicating the item that applies to your business:

5GCA, Chapter 5, Section 5008, "Policy in Favor of Local Procurement" of the Guam Procurement Law states:

All procurement of supplies and services shall be made from among businesses licensed to do business on Guam and that maintains an office or other facility on Guam, whenever a business that is willing to be a contractor is:

( ) (a) A licensed bonafide manufacturing business that adds at least twenty-five percent (25%) of the value of an item, not to include administrative overhead, suing workers who are U.S. Citizens or lawfully admitted permanent residents or nationals of the United States, or persons who are lawfully admitted to the United States to work, based on their former citizenship in the Trust Territory for the Pacific Islands; or

( ) (b) A business that regularly carries an inventory for regular immediate sale of at least fifty percent (50%) of the items of supplies to be procured; or

( ) (c) A business that has a bonafide retail or wholesale business location that regularly carries an inventory on Guam of a value of at least one half of the value of the bid or One Hundred Fifty Thousand Dollars ($150,000.0) whichever is less, of supplies and items of a similar nature to those being sought; or

( ) *(d) A service actually in business, doing a substantial business on Guam, and hiring at least 95% U.S. Citizens, lawfully admitted permanent residents or national of the United States, or persons who lawfully admitted to the United States to work, based on their citizenship in any of the nations previously comprising the Trust Territory of the Pacific Islands.

Bidders indicating qualification under (d) may be considered QUALIFIED for the Local Procurement Preference **only if** the Government's requirement is for service. Service is defined Pursuant to 5 GCA Government Operations Subparagraph 5030 entitled DEFINITIONS under Chapter 5 of the Guam Procurement Law.

1. I _____, representative for _____,

have read the requirements of the law cited above and do hereby qualify and elect to be given the LOCAL PROCUREMENT PREFERENCE for Bid No.: GPA _____ _____.

By filling in this information and placing my signature below, I understand that the Guam Power Authority will review this application and provide me with a determination whether or not the 15% preference will be applied to this bid.

2. I _____, representative for _____,

have read the requirements of the law cited above, and do not wish to apply for the Local Procurement Preference for Bid No.: GPA _____.

_____
Bidder Representative Signature

_____
Date

NOTE:
Prospective Bidders not completing this form will automatically be not considered for Local Procurement Preference. Non-completion of this form is not a basis for rejection of the bid or proposal.

13.8 Government of Guam General Terms and Conditions

GOVERNMENT OF GUAM

GENERAL TERMS AND CONDITIONS

SEALED BID SOLICITATION AND AWARD

Only those Boxes checked below are applicable to this bid.

[**X**] 1. **AUTHORITY:** This solicitation is issued subject to all the provision of the Guam Procurement Act (5GCA,

Chapter 5) And the Guam Procurement Regulations (copies of both are available at the Office of the Complier of laws, Department of Law, copies available for inspection at the Guam Power Authority). It requires all parties involved in the Preparation, negotiation, performance, or administration of contracts to act in good faith.

[**X**] 2. **GENERAL INTENTION**: Unless otherwise specified, it is the declared and acknowledged intention and meaning of these General Terms and conditions for the bidder to provide the Government of Guam (Government) with specified services or with materials, supplies or equipment completely assembled and ready for use.

[**X**] 3. **TAXES**: Bidders are cautioned that they are subject to Guam Income Taxes as well as all other taxes on Guam Transactions. Specific information on taxes may be obtained from the Director of Revenue and Taxation.

[**X**] 4. **LICENSING**: Bidders are cautioned that the Government will not consider for award any offer submitted by a bidder who has not complied with the Guam Licensing Law. Specific information on licenses may be obtained from the Director of Revenue and Taxation.

[**X**] 5. **LOCAL PROCUREMENT PREFERENCE**: All procurement of supplies and services where possible, will be made from among businesses licensed to do business on Guam in accordance with section 5008 of the Guam Procurement Act (5GCA, Chapter 5) and Section 1-104 of the Guam Procurement Regulations.

[**X**] 6. **COMPLIANCE WITH SPECIFICATIONS AND OTHER SOLICITATION REQUIREMENTS**: Bidders shall comply with all specifications and other requirements of the Solicitation.

[ ] 7. **"ALL OR NONE" BIDS**: Unless otherwise allowed under this Solicitation. "all or none" bids may be deemed to be non-responsive. If the bid is so limited, the Government may reject part of such proposal and award on the remainder.

NOTE: By checking this item, the Government is requesting all of the bid items to be bided or none at all. **The Government will not award on an itemized basis**. Reference: Section 3-101.06 of the Guam Procurement Regulations.

[**X**] 8. **INDEPENDENT PRICE DETERMINATION**: The bidder, upon signing the Invitation for Bid, certifies that the prices in his bid were derived at without collusion, and acknowledge that collusion and anti-competitive practices are prohibited by law. Violations will be subject to the provision of Section 5651 of that of the Guam Procurement Act. Other existing civil, criminal or administrative remedies are not impaired and may be in addition to the remedies in Section 5651 of the Government code.

[**X**] 9. **BIDDER'S PRICE**: The Government will consider not more than two (2) (Basic and Alternate) item prices and the bidder shall explain fully each price if supplies, materials, equipment, and/or specified services offered comply with specifications and the products origin. Where basic or alternate bid meets the minimum required specification, cost and other factors will be considered. Failure to explain this requirement will result in rejection of the bid.

[**X**] 10. **BID ENVELOPE**: Envelope shall be sealed and marked with the bidder's name, Bid number, time, date and place of Bid Opening.

[**X**] 11. **BID GUARANTEE REQUIREMENT**: Bidder is required to submit a Bid Guarantee Bond or standby irrevocable Letter of Credit or Certified Check or Cashier's Check in the same bid envelope to be held by the Government pending award. The Bid Guarantee Bond, Letter of Credit, Certified Check or Cashier's Check must be issued by any local surety or banking institution licensed to do business on Guam and made payable to the Guam Power Authority in the amount of three million dollars ($3,000,000.00 USD). The Bid Bond must be submitted on Government Standard Form BB-1 (copy enclosed). Personal Checks will not be accepted as Bid Guarantee. If a successful Bidder (contractor) withdraws from the bid or fails to enter into contract within the prescribed time, such Bid guarantee will be forfeited to the Government of Guam. Bids will be disqualified if not accompanied by Bid Bond, Letter of Credit, Certified Check or Cashier's check. Bidder must include in his/her bid, valid copies of a Power of Attorney from the Surety and a Certificate of Authority from the Government of Guam to show proof that the surety company named on the bond instrument is authorized by the Government of Guam and qualified to do business on Guam. For detailed information on bonding matters, contact the Department of Revenue and Taxation. Failure to submit a valid Power of Attorney and Certificate of Authority on the surety is cause for rejection of bid. (GPR Section 3-202.03.3) **Pursuant to Public Law 27-127, all competitive sealed bidding for the procurement of supplies or services exceeding $25,000.00 a 15% Bid Security of the total bid price must accompany the bid package.**

[**X**] 12. **PERFORMANCE BOND REQUIREMENT:** The Bidder may be required to furnish a Performance Bond on Government Standard Form BB-1 or standby irrevocable Letter of Credit or Certified Check or Cashier's Check payable to the Guam Power Authority issued by any of the local Banks or Bonding Institution in the amount of SEVENTY FIVE MILLION ($75,000,000,.00) of of the contract as security for the faithful performance and proper fulfillment of the contract. In the event that any of the provisions of this contract are violated by the contractor, the Chief Procurement Officer shall serve written notice upon both the contractor and the Surety of its intention to terminate the contract. Unless satisfactory arrangement or correction is made within ten (10) days of such notice the contract shall cease and terminate upon the expiration of the ten (10) days. In the event of any such termination, the Chief Procurement Officer shall immediately serve notice thereof upon the Surety. The Surety shall have the right to take over and perform the contract, provided, however, that if the Surety does not commence performance thereof within 10 days from the date of the mailing of notice of termination, the Government may take over and prosecute the same to complete the contract or force account for the account and at the expense of the contractor, and the contractor and his Surety shall be liable to the Government for any excess cost occasioned the Government thereby (GPR Section 3-202.03.4).

[ ] 13. **PERFORMANCE GUARANTEE**: Bidders who are awarded a contract under this solicitation, guarantee that goods will be delivered or required services performed within the time specified. Failure to perform the contract in a satisfactory manner may be cause for suspension or debarment from doing business with the Government and to enforce Section 23 of these General Terms and Conditions. In addition, the Government will hold the Vendor liable

and will enforce the requirements as set forth in Section 41 of these General Terms and Conditions.

[**X**] 14. **SURETY BONDS**: Bid and Performance Bonds coverage must be signed or countersigned in Guam by a foreign or alien surety's resident general agent. The surety must be an Insurance Company, authorized by the government of Guam and qualified to do business in Guam. Bids will be disqualified if the Surety Company does not have a valid Certificate of Authority from the Government of Guam to conduct business in Guam.

[**X**] 15. **COMPETENCY OF BIDDERS**: Bids will be considered only from the such bidders who, in the opinion of the Government, can show evidence of their ability, experience, equipment, and facilities to render satisfactory service.

[**X**] 16. **DETERMINATION OF RESPONSIBILITY OF BIDDERS**: The Chief Procurement Officer reserves the right for securing from bidders information to determine whether or not they are responsible and to inspect plant site, place of business; and supplies and services as necessary to determine their responsibility in accordance with Section 15 of these General Terms and Conditions (GPR Section 3-401).

[**X**] 17. **STANDARD FOR DETERMINATION OF LOWEST RESPONSIBLE BIDDER**: In determining the lowest responsible offer, the Chief Procurement Officer shall be guided by the following:

a) Price of items offered.

b) The ability, capacity, and skill of the Bidder to perform.

c) Whether the Bidder can perform promptly or within the specified time.

d) The quality of performance of the Bidder with regards to awards previously made to him.

e) The previous and existing compliance by the Bidder with laws and regulations relative to procurement.

f) The sufficiency of the financial resources and ability of the Bidder to perform.

g) The ability of the bidder to provide future maintenance and services for the subject of the award.

h) <u>The compliance with all of the conditions to the Solicitation.</u>

[**X**] 18. **TIE BIDS**: If the bids are for the same unit price or total amount in the whole or in part, the Chief Procurement Officer will determine award based on Section 3.202.15.2, or to reject all such bids (GPR Section 3-202.15.2).

[ ] 19. **BRAND NAMES**: Any reference in the Solicitation to manufacturer's Brand Names and number is due to lack of a satisfactory specification of commodity description. Such preference is intended to be descriptive, but nor restrictive and for the sole purpose of indicating prospective bidders a description of the article or services that will be satisfactory. Bids on comparable items will be considered provided the bidder clearly states in his bid the exact articles he is offering and how it differs from the original specification.

[ ] 20. **DESCRIPTIVE LITERATURE**: Descriptive literature(s) as specified in this solicitation must be furnished as a part of the bid and must be received at the date and time set for opening Bids. The literature furnished must clearly identify the item(s) in the Bid. The descriptive literature is required to establish, for the purpose of evaluation and award, details of the product(s) the

bidder proposes to furnish including design, materials, components, performance characteristics, methods of manufacture, construction, assembly or other characteristics which are considered appropriate. Rejection of the Bid will be required if the descriptive literature(s) do not show that the product(s) offered conform(s) to the specifications and other requirements of this solicitation. Failure to furnish the descriptive literature(s) by the time specified in the Solicitation will require rejection of the bid.

[ ] 21. **SAMPLES**: Sample(s) of item(s) as specified in this solicitation must be furnished as a part of the bid and must be received at the date and time set for opening Bids. The sample(s) should represent exactly what the bidder proposes to furnish and will be used to determine if the item(s) offered complies with the specifications. Rejection of the Bid will be required if the sample(s) do not show that the product(s) offered conform(s) to the specifications and other requirements of this solicitation. Failure to furnish the sample(s) by the time specified in the Solicitation will require rejection of the Bid.

[ ] 22. **LABORATORY TEST**: Successful bidder is required to accompany delivery of his goods with a Laboratory Test Report indicating that the product he is furnishing the Government meets with the specifications. This report is on the bidder's account and must be from a certified Testing Association.

[**X**] 23. **AWARD, CANCELLATION, & REJECTION**: Award shall be made to the lowest responsible and responsive bidder, whose bid is determined to be the most advantageous to the Government, taking into consideration the evaluation factors set forth in this solicitation. No other factors or criteria shall be used in the evaluation. The right is reserved as the interest of the Government may require to waive any minor irregularity in bid received. The Chief Procurement Officer shall have the authority to award, cancel, or reject bids, in whole or in part for any one or more items if he determines it is in the public interest. Award issued to the lowest responsible bidder within the specified time for acceptance as indicated in the solicitation, results in a bidding contract without further action by either party. In case of an error in the extension of prices, unit price will govern. It is the policy of the Government to award contracts to qualified local bidders. The government reserves the right to increase or decrease the quantity of the items for award and make additional awards for the same type items and the vendor agrees to such modifications and additional awards based on the bid prices for a period of thirty (30) days after original award. No. award shall be made under this solicitation which shall require advance payment or irrevocable letter of credit from the government (GPR Section 3-202.14.1).

[ ] 24. **MARKING**: Each outside container shall be marked with the Purchase Order number, item number, brief tem description and quantity. Letter marking shall not be less than 3/4" in height.

[ ] 25. **SCHEDULE FOR DELVERY**: Successful bidder shall notify the Guam Power Authority, Dededo Warehouse at (671) 653-2073 and/or Guam Power Authority Cabras Warehouse at (671) 475-3319, at least twenty-four (24) hours before delivery of any item under this solicitation.

[ ] 26. **BILL OF SALE**: Successful supplier shall render Bills of Sale for each item delivered under this contract. Failure to comply with this requirement will result in rejection of delivery. The Bill of Sale must accompany the items delivered but will not be considered as an invoice for payment. Supplier shall bill the Government in accordance with billing instructions as indicated on the Purchase Order.

[ ] 27. **MANUFACTURER'S CERTIFICATE**: Successful bidder is required, upon delivery of any item under this contract, to furnish a certificate from the manufacturer indication that the goods meet the specifications. Failure to comply with this request will result in rejection of delivery

payment. Supplier shall bill the Government in accordance with billing instructions as indicated on the Purchase Order.

[**X**] 28. **INSPECTION**: All supplies, materials, equipment, or services delivered under this contract shall be subject to the inspection and/or test conducted by the Government at destination. If in any case the supplies, materials, equipment, or services are found to be defective in material, workmanship, performance, or otherwise do not conform with the specifications, the Government shall have the right to reject the items or require that they be corrected. The number of days required for correction will be determined by the Government.

[ ] 29. **MOTOR VEHICLE SAFETY REQUIREMENTS**: The Government will only consider Bids on motor vehicles which comply with the requirements of the National Traffic and Motor Vehicle safety Act of 1966 (Public Law 89-563) and Clean Air Act as amended (Public Law 88-206), that are applicable to Guam. Bidders shall state if the equipment offered comply with these aforementioned Federal Laws.

[ ] 30. **SAFETY INSPECTION**: All motor vehicles delivered under this contract must pass the Government

of Guam Vehicle Inspection before delivery at destination.

[**X**] 31. **GUARANTEE**:

a)**Guarantee of Vehicle Type of Equipment**:

The successful bidder shall guarantee vehicular type of equipment offered against defective parts, workmanship, and performance, for a period of not less than one (1) year after date of receipt of equipment. Bidder shall also provide service to the equipment for at least one (1) year. Service to be provided shall include, but will not be limited to tune ups (change of spark plugs, contact points and condensers) and lubrication (change of engine and transmission oil). All parts and labor shall be at the expense of the bidder. All parts found defective and not caused by misuse, negligence or accident within the guarantee period shall be repaired, replaced, or adjusted within six (6) working days after notice from the Government and without cost to the Government. Vehicular type of equipment as used in this context shall include equipment used for transportation as differentiated from tractors, backhoes, etc.

b) **Guarantee of Other Type of Equipment**:

The successful bidder shall guarantee all other types of equipment offered, except those mentioned in 31a, above, against defective parts, workmanship, and performance for a period of not less than three (3) months after date of receipt of equipment. Bidder shall also provide service to the equipment for at least three (3) months. All parts found defective within that period shall be repaired or replaced by the Contractor without cost to the Government. Repairs, adjustments or replacements of defective parts shall be completed by the contractor within six (6) working days after notice from the Government.

c) **Compliance with this Section is a condition of this Bid**.

[**X**] 32. **REPRESENTATION REGARDING ETHICS IN PUBLIC PROCUREMENT**: The bidder or contractor represents that it has not knowingly influenced and promises that it will not knowingly influence a Government employee to breach any of the ethical standards and represents that it has not violated, is not violating, and promises that it will not violate the prohibition against gratuities and kickbacks set forth on Chapter 11 (Ethics in Public Contracting) of the Guam Procurement Act and in Chapter 11 of the Guam Procurement Regulations.

[**X**] 33. **REPRESENTATION REGARDING CONTINGENT FEES**: The contractor represents that it has not retained a person to solicit or secure a Government contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies for the purpose of securing business (GPR Section 11-207).

[**X**] 34. **EQUAL EMPLOYMENT OPPORTUNITY**: Contractors shall not discriminate against any employee or applicant of employment because of race, color, religion, se, or national origin. The contractor will take affirmative action to ensure that employees are treated equally during employment without regards to their race, color, religion, sex, or national origin.

[**X**] 35. **COMPLIANCE WITH LAWS**: Bidders awarded a contract under this Solicitation shall comply with the applicable standard, provisions, and stipulations of all pertinent Federal and/or local laws, rules, and regulations relative to the performance of this contract and the furnishing of goods.

[**X**] 36. **CHANGE ORDER**: Any order issued relative to awards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101-03.1 of the Guam Procurement Regulations.

[**X**] 37. **STOP WORK ORDER**: Any stop work order issued relative to awards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101-04.1 of the Guam Procurement Regulations.

[**X**] 38. **TERMINATION FOR CONVENIENCE**: Any termination order for the convenience of the Government issued relative towards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101.10 of the Government Procurement Regulations.

[**X**] 39. **TIME FOR COMPLETION**: It is hereby understood and mutually agreed by and between the contractor and the Government that the time for delivery to final destination or the timely performance of certain services is an essential condition of this contract. If the contractor refuses or fails to perform any of the provisions of this contract within the time specified in the Purchase Order (from the date Purchase Order is acknowledged by vendor), then the contractor is in default. Defaults will be treated subject to and in accordance with the provisions of Section 6-101-08 of the Guam Procurement Regulations.

[**X**] 40. **JUSTIFICATION OF DELAY**: Bidders who are awarded contracts under this Solicitation, guarantee that the goods will be delivered to their destination or required services rendered within the time specified. If the bidder is not able to meet the specified delivery date, he is required to notify the Chief Procurement Officer of such delay. Notification shall be in writing and shall be receive by the Chief Procurement Officer at least twenty-four (24) hours before the specified delivery date. Notification of delay shall include an explanation of the causes and reasons for the delay including statement(s) from supplier or shipping company causing the delay. The Government reserves the right to reject delay justification if, in the opinion of the Chief Procurement Officer, such justification is not adequate.

[**X**] 41. **LIQUIDATED DAMAGES**: When the contractor is given notice of delay or nonperformance as specified in Article 9 of the ECA, for cure until either the territory reasonable obtains similar supplies or services if the contractor is terminated for default, or until the contractor provides the supplies or services if the contractor is not terminated for default. To the extent that the contractor's delay or nonperformance is excused under Paragraph 40 (Excuse

for Nonperformance or Delayed Performance) of the Termination for Default Clause of this contract, liquidated damages shall not e due the territory. The contractor remains liable for damages caused other than by delay (GPR Section 6-101-09.1).

[**X**] 42. **PHYSICAL LIABILITY**: If it becomes necessary for the Vendor, either as principal, agent or employee, to enter upon the premises or property of the Government of Guam in order to construct, erect, inspect, make delivery or remove property hereunder, the Vendor hereby covenants and agrees to take, use, provide and make all proper, necessary and sufficient precautions, safeguards and protections against the occurrence of any accidents, injuries or damages to any person or property during the progress of the work herein covered, and to be responsible for, and to indemnify and save harmless the Government of Guam from the payment of all sums of money by reason of all or any such accidents, injuries or damages that may occur upon or about such work, and fines, penalties and loss incurred for or by reasons of the violations of any territorial ordinance, regulations, or the laws of Guam or the United States, while the work is in progress. Contractor will carry insurance to indemnify the Government of Guam against any claim for loss, damage or injury to property or persons arising out of the performance of the Contractor or his employees and agents of the services covered by the contract and the use, misuse or failure of any equipment used by the contractor or his employees or agents, and shall provide certificates of such insurance to the Government of Guam when required.

[**X**] 43. **CONTACT FOR CONTRACT ADMINISTRATION**: If your firm receives a contract as a result of this Solicitation, please designate a person whom we may contact for prompt administration.

Name: _____ Title: _____

Address: _____ Telephone: _____

_____

_____

13.9 Sealed Bid Solicitaiton Instructions

GOVERNMENT OF GUAM

SEALED BID SOLICITAITON INSTRUCTIONS

1 **BID FORMS:** Each bidder shall be provided with two (2) sets of Solicitation forms. Additional copies may be provided upon request. Bidders requesting additional copies of said forms will be charged per page in accordance with Section 6114 of the Government Code of Guam. All payments for this purpose shall be by cash, certified check or money order and shall be made payable to the Guam Power Authority.

2 **PREPARATIONS OF BIDS:**

a) Bidders are required to examine the drawings, specifications, schedule, and all instructions. Failure to do so will be at bidder's risk.

b) Each bidder shall furnish the information required by the Solicitation. The bidder shall sign the solicitation and print or type his name on the Schedule. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent are to be accompanied by evidence of this authority unless such evidence has been previously furnished to the issuing office.

c) Unit price for each unit offered shall be shown and such price shall include packing unless otherwise specified. A total shall be entered in the amount column of the Schedule for each item offered. In case of discrepancies between a unit price and extended price, the unit price will be presumed to be correct.

d) Bids for supplies or services other than those specified will not be considered. Time, if stated as a number of days, means calendar days and will include Saturdays, Sundays, and holidays beginning the day after the issuance of a Notice to Proceed. Time stated ending on a Saturday, Sunday or Government of Guam legal holiday will end at the close of the next business day.

3 **EXPLANATION TO BIDDERS:** Any explanation desired by a bidder regarding the meaning or interpretation of the Solicitation, drawings, specifications, etc., must be submitted in writing and with sufficient time allowed for a written reply to reach all bidders before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective bidder concerning a Solicitation will be furnished to all prospective bidders in writing as an amendment to the Solicitation if such information would be prejudicial to uninformed bidders.

4 **ACKNOWLEDGEMENT OF AMENDMENTS TO SOLICITATIONS:** Receipt of an amendment to a Solicitation by a bidder must be acknowledged by signing an acknowledgement of receipt of the amendment. Such acknowledgement must be received prior to the hour and date specified for receipt of bids.

5 **SUBMISSION OF BIDS:**

a) Bids and modifications thereof shall be enclosed in sealed envelopes and addressed to the office specified in the Solicitation. The bidder shall show the hour and date specified in the Solicitation for receipt, the Solicitation number, and the name and address of the bidder on the face of the envelope.

b) Telegraphic bids will not be considered unless authorized by the Solicitation. However, bids may be modified or withdrawn by written or telegraphic notice, provided such notice is received prior to the hour and date specified for receipt (see paragraph 6 of these instructions).

c) Samples of items, when required, must be submitted within the time specified, unless otherwise specified by the Government, at no expense to the Government. If not destroyed by testing, samples will be returned at bidder's request and expense, unless otherwise specified by the Solicitation.

d) Samples or descriptive literature should not be submitted unless it is required on this solicitation. Regardless of any attempt by a bidder to condition the bid, unsolicited samples or descriptive literature will not be examined or tested at the bidder's risk, and will not be deemed to vary any of the provisions of this Solicitation.

6 **FAILURE TO SUBMIT BID:** If no bid is to be submitted, do not return the solicitation unless otherwise specified. A letter or postcard shall be sent to the issuing office advising whether future Solicitations for the type of supplies or services covered by this Solicitation are desired.

7 **LATE BID, LATE WITHDRAWALS, AND LATE MODIFICATIONS:**

a) Definition: Any bid received after the time and date set for receipt of bids is late. Any withdrawal or modification of a bid received after the time and date set for opening of bids at the place designated for opening is late (Guam Procurement Regulations Section 3-202)

b) Treatment: No late bid, late modification, or late withdrawal will be considered unless received before contract award, and the bid, modification, or withdrawal would have been timely but for the action or inaction of territorial personnel directly serving the procurement activity.

8 **DISCOUNTS:**

a) Notwithstanding the fact that prompt payment discounts may be offered, such offer will not be considered in evaluating bids for award unless otherwise specified in the Solicitation. However, offered discounts will be taken if payment is made within the discount period, even though not considered in the evaluation of bids.

b) In connection with any discount offered, time will be computed from date of delivery and acceptance of the supplies to the destination as indicated in the purchase order or contract. Payment is deemed to be made for the purpose of earning the discount on the date of mailing of the Government check.

9 **GOVERNMENT FURNISHED PROPERTY:** No material, labor or facilities will be furnished by the Government unless otherwise provided for in the Solicitation.

10 **SELLERS' INVOICES:** Invoices shall be prepared and submitted in quadruplicate (one copy shall be marked "original") unless otherwise specified. Invoices shall be "certified true and correct" and shall contain the following information: Contract and order number (if any), item numbers, description of supplies or services, sizes, quantities, unit prices, and extended total. Bill of lading number and weight of shipment will be shown for shipments made on Government bills of lading.

11 **RECEIPT, OPENING AND RECORDING OF BIDS:** Bids and modifications shall be publicly opened in the presence of one or more witnesses, at the time, date, and place designated in the Invitation

for Bids. The name of each bidder, the bid price, and such other information as is deemed appropriate by the Procurement Officer, shall be read aloud and recorded, or otherwise made available. The names and addresses of required witnesses shall be recorded at the opening. The opened bids shall be available for public inspection except to the extent the bidder designates trade secrets or other proprietary data to be confidential as set forth in accordance with Section 12 below. Material so designated shall accompany the bid and shall be readily separable from the bid in order to facilitate public inspection of the non-confidential portion of the bid. Prices, makes and models or catalogue numbers of the items offered, deliveries, and terms of payment shall be publicly available at the time of bid opening regardless of any designation to the contrary (Guam Procurement Regulations Section 3-202.12.2).

12 **CONFIDENTIAL DATA:** The Procurement Officer shall examine the bids to determine the validity of any requests for nondisclosure of trade secrets and other proprietary date identified in writing. If the parties do not agree as to the disclosure of data, the Procurement Officer shall inform the bidders in writing what portions of the bid will be disclosed and that, unless the bidders protest under Chapter 9 of the Guam Procurement Act (P.L. 16-124), the bids will be so disclosed. The bids shall be opened to public inspection subject to any continuing prohibition on the disclosure of confidential data (Guam Procurement Regulations Section 3-202.12.3).

13 **MULTI-STEP SEALED BIDDING:**

a) It is defined as two-phase process consisting of a technical first-phase composed of one or more steps in which bidders submit unpriced technical offers to be evaluated by the territory, and a second-phase in which those bidders whose technical offers are determined to be acceptable during the first-step have their priced bids considered. It is designed to obtain the benefits of competitive sealed bidding by award of a contract to t h lowest responsive, responsible bidder, and at the same time obtained the benefits of the competitive sealed proposals procedure through the solicitation of technical offers and the conduct of discussions to evaluate and determine the acceptability of technical offers.

b) In addition to the requirements set forth in the General Terms and Conditions and the Special provisions, the following applies:

1). only unpriced technical offers are requested in the first phase;

2). priced bids will be considered only in the second phase and only from bidders whose unpriced technical offers are found acceptable in the first phase;

3). the criteria to be used in the evaluation at those specified in the Special Provisions and the General Terms and Conditions;

4). the territory, to the extent the Procurement Officer finds necessary, may conduct oral or written discussion of the unpriced technical offers;

5). the bidders, may designate those portions of the unpriced technical offers which contain trade secrets or other proprietary data which are to remain confidential; and,

6). the service being procured shall be furnished generally in accordance with bidder's technical offer as found to be finally acceptable and shall meet the requirements of the Invitation for Bids.

c) **RECEIPT AND HANDLING OF UNPRICED TECHNICAL OFFERS**.

Unpriced technical offers shall not be opened publicly, but shall be opened in front of two or more procurement officials. Such offers shall not be disclosed to unauthorized persons. Bidders may request nondisclosure of trade secrets and other proprietary data identified in writing.

d) **EVALUATION OF UNPRICED TECHNICAL OFFERS.**

The unpriced technical offers submitted by bidders shall be evaluated solely in accordance with the criteria set forth in the Invitation for Bids. The unpriced technical offers shall be categorized as:

1). acceptable;

2). potentially acceptable, that is, reasonably susceptible of being made acceptable; or

3). unacceptable. The Procurement Officer shall record in writing the basis for finding an offer unacceptable and make it part of the procurement file.

The Procurement Officer may initiate Phase Two of the procedure if, in the Procurement Officer's opinion, there are sufficient acceptable unpriced technical offers to assure effective price competition in the second phase without technical discussions. If the Procurement Officer finds such is not the case, the Procurement Officer shall issue an amendment to the Invitation for Bids or engage in technical discussions as set forth in Subsection 3-202.20.5of this Section.

Upon the completion of Phase One, the Procurement Officer shall invite each acceptable bidder to submit a price bid. Upon submission of prices, the Procurement Officer shall prepare the final evaluation and reconsideration for the Chief Procurement Officer's approval.

14 Form 14 - Reserved

ENVELOPE II (Sealed Separately)

15 FORM 15 – PROPOSED PRICE

Bidder warrants that the proposed Price to be inserted in the tables below, is based on the requirements of the IFMSB, and the specific Price instructions of Article 4 of Section B.

Each Bidder shall complete the schedules and tables in the following pages by providing the required data where applicable. There shall be no changes in format allowed to be made to the schedules and tables by any Bidder.

15.1 Schedule of Comercial Operation

Table 15.1: Schedule of Commercial Operation Period

Phase	Commercial Operation Date[1] (dd/mm/yyyy)	Number of Months[2]	Contracted Facility Capacity[3] for ULSD Operation or Non-Fossil Fuel Fired Facility.	Contracted Facility Capacity[4] for Natural Gas Operation.	Guaranteed Amount of Renewable Energy (GARE)[5]	Renewable Component Degradation Guarantee
Phase 1		10	_____ MWs	_____ MWs	_____ MWh/yr	____%
Phase 2		290	_____ MWs	_____ MWs	_____ MWh/yr	____%

Contracted Facility Capacity must be based on the portion of the Facility that is fully dispatchable on a continuous basis.

1 The proposed Date must be the first day of a month.

2 COD must be December 31, 2021 or earlier.

3 Contracted Facility Capacity must be within plus/minus 10% of the preferred capacity of 180 MW.

4 Contracted Facility Capacity must be within plus/minus 10% of the preferred capacity of 180 MW.

5 GARE is based on a Typical Meteorological Year (TMY) and will be demonstrated by means of a PVSyst production forecast (in the case of PV solar) or a WindSim production forecast (in the case of wind).

15.2 Proposed Fixed Capacity Charges (FCCs)

Each Bidder shall complete the FCC table below. These values will be used in Equations 4.1 of Section B to calculate the FCCs to be paid by GPA. Once submitted, there shall be no changes allowed to be made to the table by any Bidder. Bidders are free to propose a different FCC for each Contract year in the table below, but in no event shall the FCC vary by more than 10% (+or-) from one Contract Year to another commencing with Contract Year 2 compared to Contract Year 1. Furthermore, the ratio of the Maximum FCC to the Minimum FCC below shall not exceed 1.50.

Table 15.2: Proposed Fixed Capacity Charge

Agreement Period	FCC[1] (US$/kW/Month)
Contract Year 1 (Phase 1)	
Contract Year 1 (Phase2)	
Contract Year 2	
Contract Year 3	
Contract Year 4	
Contract Year 5	
Contract Year 6	
Contract Year 7	
Contract Year 8	
Contract Year 9	
Contract Year 10	
Contract Year 11	
Contract Year 12	
Contract Year 13	
Contract Year 14	
Contract Year 15	
Contract Year 16	
Contract Year 17	
Contract Year 18	
Contract Year 19	
Contract Year 20	
Contract Year 21	
Contract Year 22	
Contract Year 23	
Contract Year 24	

[1] Contract Years are each of 12 months duration, with Contract Year 1 beginning at COD.

Agreement Period	FCC[1] (US$/kW/Month)
Contract Year 25	

15.3 Fixed Operations & Maintenance Charge (FOMC)

Each Bidder shall complete the FOMC table detailed below. These values will be used in Equation 4.2 of Section B to calculate the FOMC to GPA. The FOMC will be adjusted each year based on the inflation Index. Once submitted, changes will not be allowed to be made to the table by any Bidder. For Projects offering a Fossil Fuel Fired Component, evaluation will be performed based on the FOMC for the Facility operating on ULSD for Contract Years 1 through ? and on Natural Gas for the remainder of the Term.

Table 15.3: Proposed Fixed Operation and Maintenance Charge

Agreement Period	FOMC on ULSD or for Non-Fossil Fuel Fired Facility (US$/kW/Month)	FOMC on Natural Gas (US$/kW/Month)
Phase 1 Commercial Operation Date through Phase 2 Commercial Operation Date		
Phase 2 Commercial Operation Date through end of the Term		

15.4 Variable O&M Charge (VOMC)

Each Bidder shall complete the VOMC as detailed in the table below. These values will be used in Equation 4.3 of Section B to calculate the VOMC to GPA. The VOMC will be adjusted each year based on the inflation Index. Once submitted, changes will not be allowed to be made to the table by any Bidder. For a Project offering a Fossil Fuel Fired Component, evaluation will be performed based on the VOMC for the Facility operating on ULSD for Contract Years 1 through 3 and on Natural Gas for the remainder of the Term.

Table 15.4: Proposed Variable O&M Charge

Agreement Period	VOMC on ULSD of for Non-Fossil Fuel Fired Facility (US$/kWh)	VOMC on Natural Gas (US$/kWh)
Phase 1 Commercial Operation Date through Phase 2 Commercial Operation Date		
Phase 2 Commercial Operation Date through end of the Term		

15.5 Fuel Charge (FC)

The Fuel Charge portion of the Price to the Bidder will be calculated at the end of each billing period based on the Guaranteed Heat Rate, adjusted for the billing period ambient temperatures and Fossil Fuel Fired Component loads using Equations 4.4 for ULSD and/or 4.5 of Section B, as applicable, and the values provided in Tables in this Section 15.5 of Envelope II.

For purposes of evaluation, it will be assumed that the Facility operates at the load profile described in Article 15.7.1 below. It will also be assumed that the Facility uses ULSD for Contract Years 1 through 3 and Natural Gas for the remainder of the ECA Term.

Bidders shall provide their proposed Guaranteed Heat Rates for the Commercial Operation Period in this Section 15.5 based on the Higher Heating Value for Fuel at Site Reference Conditions (SRC) at different Facility outputs. These data shall be used for calculation of allowable Fuel consumption.

The Guaranteed Heat Rate shall not be corrected for degradation at any time during the ECA Term. These Guaranteed Heat Rates shall remain effective for the entire Term of the Project. Bidders must therefore account for heat rate degradation when establishing their proposed Guaranteed Heat Rates. Once submitted, no changes will be allowed to be made to the data in these tables by any Bidder.

Table 15.5: Guaranteed Phase 1 Heat Rates at Site Reference Conditions on ULSD

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
100%	
95%	
90%	
85%	
80%	
75%	
70%	
65%	
60%	
55%	
50%	
45%	
40%	
35%	
30%	

[1] Initial Dependable Capacity must be within plus/minus 10% of the preferred capacity of 180 MW.

[2] Use linear interpolation when the load values fall between the stated percentages.

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
25%	
20%	
15%	
10%	
Minimum Load	

Table 15.6: Guaranteed Phase 1 Heat Rates at Site Reference Conditions on Natural Gas

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
100%	
95%	
90%	
85%	
80%	
75%	
70%	
65%	
60%	
55%	
50%	
45%	
40%	
35%	
30%	
25%	
20%	

[1] Dependable Capacity must within plus/minus 10% of the preferred capacity of 180 MW.

[2] Use linear interpolation when the load values fall between the stated percentages.

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
15%	
10%	
Minimum Load	

Table 15.7: Guaranteed Phase 1 Heat Rate Correction Curve for Air Temperature Variations

Temperature, %F	K_t,%, ULSD	K_t,%, Natural Gas
110		
105		
100		
95		
88.9[1]		
85		
80		
75		
70		
65		
60		

Table 15.8: Guaranteed Phase 2 Heat Rates at Site Reference Conditions on ULSD

Percent of Dependable Capacity[2]	Guaranteed Heat Rate (HHV) (Btu/kWh)[3]
100%	
95%	
90%	
85%	
80%	
75%	
70%	
65%	
60%	
55%	
50%	

[1] Reference Site Condition ambient temperature.

[2] Initial Dependable Capacity must be within plus/minus 10% of the preferred capacity of 180 MW.

[3] Use linear interpolation when the load values fall between the stated percentages.

Percent of Dependable Capacity[2]	Guaranteed Heat Rate (HHV) (Btu/kWh)[3]
45%	
40%	
35%	
30%	
25%	
20%	
15%	
10%	
Minimum Load	

Table 15.9: Guaranteed Phase 2 Heat Rates at Site Reference Conditions on Natural Gas

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
100%	
95%	
90%	
85%	
80%	
75%	
70%	
65%	
60%	
55%	
50%	
45%	
40%	

[1] Dependable Capacity must be within plus/minus 10% of the preferred capacity of 180 MW.

[2] Use linear interpolation when the load values fall between the stated percentages.

Percent of Dependable Capacity[1]	Guaranteed Heat Rate (HHV) (Btu/kWh)[2]
35%	
30%	
25%	
20%	
15%	
10%	
Minimum Load	

Table 15.10: Guaranteed Phase 2 Heat Rate Correction Curve for Air Temperature Variations

Temperature, %F	K_t,%, ULSD	K_t,%, Natural Gas
110		
105		
100		
95		
88.9[1]		
85		
80		
75		
70		
65		
60		

15.6 Supplemental Charges

15.6.1 Startup Charges

The Bidder shall propose in the Tables in this Section 15.6.1 fuel consumption values for startups of the individual Units installed at the Facility under the three different startup conditions. These values will be used to determine the allocation of Fuel cost between the Bidder and GPA depending upon which party is responsible for a particular startup. The Bidders shall provide necessary technical justification for fuel consumption values included this Section 15.6.1. The Bidder shall propose in this Section 15.6.1 costs other than Fuel that are associated with each type of startup,

[1] Reference Site Condition ambient temperature.

such as incremental major maintenance costs. These values will be used to determine Supplemental Charges owed by GPA for GPA dispatch related startups.

Table 15.11: Fuel Consumption per Unit For Startups

Type od Start	Cold Start		Warm Start		Hot Start	
	ULSD	NG	ULSD	NG	ULSD	NG
Fuel Consumption, MMBTU (HHV)						

Table 15.12: Non-Fuel Supplemental Charge For Startups

Type od Start	Cold Start		Warm Start		Hot Start	
	ULSD	NG	ULSD	NG	ULSD	NG
Phase 1 Non-Fuel Supplemental Charge, US$/start						
Phase 2 Non-Fuel Supplemental Charge, US$/start						

15.6.2 Synchronous Condenser O&M Charges

The Bidder shall propose in the Tables in this Section 15.6.2 O&M charges for synchronous condenser. The O&M charges for operation of synchronous condenser will inblude Synchronous Condenser Fixed Hourly Charge for each hour when syncronous condenser is connected to the grid (SCFHC), and Synchronous Condenser VAR Propduction Charge (SCVARPC) for reactive power produced by the synchronous condenser.

Table 15.13: Syncronous Condenser Fixed Hourly Charge

Agreement Period	SCFHC, USD/hr.
Commercial Operation Date through end of the Term	

Table 15.14: Fixed Hourly Charge

Agreement Period	SCVARPC, USD/VARh.
Commercial Operation Date through end of the Term	

15.7 Evaluated Present Value

The Proposals will be evaluated based on the Present Value of the total costs of system generation to GPA assuming the incorporation of the Facility into the system. The Present Value will be calculated using the simplified dispatch and cost spreadsheet to be provided as an Addendum to the IFMSB documents (the "Evaluation Model") and assuming the Facility

characteristics, guarantees, and charges set forth in Bidder's Proposal and the assumptions described below.

15.7.1 Assumptions for Evaluation

1 Inflation Adjusted Indices: For purposes of evaluation, it will be assumed that the annual FOMC and the VOMC charges will remain constant (no index adjustments) for the duration of the ECA Term.

2 Discount Rate: For purposes of evaluation, the discount rate used to calculate the Present Value (PV) will be 7% on an annual basis.

3 Price of Fuel: Evaluation will be performed assuming operation on ULSD for Contract Years 1 through 3 and on Natural Gas for the remainder of the ECA Term. For purposes of evaluation, fuel prices will be based on the GPA fuel price forecast included in Section A, Appensix F

4 Land Lease Rent: GPA does not intend to assess a lease fee .

5 Taxes and Customs Duties: Bidder should include any and all taxes and customs duties that will apply over the term of the Project as of the Bid Date. Assume that there will be no unplanned changes in taxes and customs duties during the Term.

6 Plant Operating Parameters:

a) A 25-year system demand load forecast is provided in the Evaluation Model.

b) A 25-year system solar production forecast is also provided in the Evaluation Model. The evaluation assumes that this solar production is dispatched prior to dispatch of the Facility.

c) The Evaluation Model assumes that certain existing thermal units are dispatched on a forced basis ahead of the Facility for technical and/or contractual reasons.

d) The Facility is assumed to be dispatched to meet any system demand load requirement not met by the combined production from the solar facilities and forced dispatch of the existing thermal units as mentioned above.

e) Any residual demand load not met by the Facility is assumed to be served by dispatch of other existing thermal units prioritized in accordance with lowest marginal cost to the system.

7 Heat Rate: For purposes of evaluation, there will be no correction for changes in temperature or barometric pressure compared to the Reference Site Conditions as defined in Section C, or for degradation. However, the proposed temperature and load correction curves will be evaluated for reasonableness.

8 Supplemental Charges: For purposes of evaluation, it will be assumed that there will be 360 starts per Unit per Contract Year in addition to the annual startup allowance specified in Section B, Article 4.5.

For purposes of evaluation it will also be assumed that the syncronous condenser will be connected to the grid for [TBD] hours and produce [TBD] VARh per year.

9 In the case of a hybrid plant with both a Fossil Fuel Fired Component and a Renewable Component, the evaluation will assume that GPA will dispatch and purchase a certain amount of Excess Energy each Contract Year. The concept of Excess Energy is derived from the Renewable Component's potential to increase available Facility capacity beyond the Contracted Capacity. In the Evaluation Model, it will be assumed that the amount of Excess Energy for each Contract Year equals [TBD] of the Guaranteed Amount of Renewable Energy for such year. The price of the Excess Energy will be equal to VOMC plus Fuel Charge. The Fuel Charge for Excess Energy will be calculated based on the Guaranteed Heat Rate corresponding to 100% load (entry A from Table 15.5 for Contract Years 1 through 3 and Table 15.6 for Contract Years 4 through 25).

15.7.2 Resulting Present Value

Total annual costs will be calculated based on the operating parameters outlined above. A Present Value of all contract years will be the basis of evaluation between bid proposals. The least cost proposal will be selected for award.

[INSERT PROJECT NAME]

ENERGY CONVERSION AGREEMENT

BETWEEN

THE GUAM POWER AUTHORITY
(GPA)

AND

[PROJECT COMPANY]

for a

Gas Dual Fired Power Electric Facility

Located at [Insert Location], Guam

2018

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ENERGY CONVERSION AGREEMENT

THIS ENERGY CONVERSION AGREEMENT (the "**Agreement**") is entered into as of this _____ day of _____, 2018 **BETWEEN** the Guam Power Authority, a public corporation and an enterprise fund of the Government of Guam established by the Guam Power Authority Act of 1968 (herein referred to as "**GPA**"), with principal offices located at Gloria B. Nelson Public Service Building 688 Route 15 Fadian, Mangilao, Guam, **AND** [Project Company], a [insert legal name and description] (herein referred to as the "**Project Company**"), with principal offices at [insert address].

RECITALS

WHEREAS, pursuant to the Invitation For Bids issued by GPA on [insert applicable date] (as amended or supplemented), the Project Company has been chosen to develop, design, permit, finance, construct, test, commission, complete, own, insure, operate and maintain an electric power plant (the "Facility", as hereinafter defined) on a build, own and transfer basis at [insert location], Guam, to provide electric power capacity and net energy output to GPA;

WHEREAS, under [the Guam Power Authority Act of 1968] GPA is authorized to enter into contracts whereby it will purchase electric capacity and net energy output from third parties in Guam;

[INSERT WHEREAS CLAUSE REGARDING RELEVANT AND UPDATED PUC APPROVAL ORDER/S]

WHEREAS, the Project Company desires to sell electric capacity and net energy output of the Facility to GPA in accordance with the terms and conditions set forth in this Agreement; and

WHEREAS, GPA is agreeable to purchasing such electric capacity and net energy output from the Project Company in accordance with the terms and conditions set forth in this Agreement.

NOW THIS AGREEMENT WITNESSETH as follows:

[Note: Sections of this ECA and other IFMSB documents which reference Fuel or Fuel related concepts and defined terms such as Heat Rate, Guaranteed Heat Rate, Fuel Charge, etc... are only applicable to Proposals and Facilities that include a Fossil Fuel Fired Component.

ARTICLE 1
DEFINITIONS

Each of the following capitalized terms shall have the meaning set forth below unless a different meaning is expressly attributed to it in the Agreement. All units of measurement used in this Agreement shall conform to the English System of Units unless explicitly stated otherwise.

"**Abandonment**" means a voluntarily cessation by Project Company of the development, construction or operation of the Facility and either (i) the Project Company expressly declares in writing that development, construction or operation of the Facility will not be resumed; or (ii) such cessation continues for 60 consecutive Days, provided that an Abandonment shall not occur if the Project Company is using commercially reasonable and diligent efforts to commence or reinstate development, construction or operation.

"**Actual Heat Rate**" means the Heat Rate expressed in BTU per kWh as determined by Commercial Operation Tests.

"**AGC**" means automatic generation control.

"**Agent**" has the meaning set forth in Article 5.2.

"**Agreement**" or "**ECA**" means this Energy Conversion Agreement, including its Schedules, as amended, supplemented or modified in accordance with the terms and conditions herein.

"**Allowable Total Outages Energy**" has the meaning set forth in Article 9.3.

"**Allowable Forced Outages Energy**" has the meaning set forth in Article 9.3.

"**Annual Average Dependable Capacity**" means for the relevant Contract Year, an amount equal to (a) the sum of the multiplication of each Dependable Capacity (including Initial Dependable Capacity) in effect during such Contract Year by the number of hours that each such Dependable Capacity was in effect during such Contract Year, divided by (b) the number of hours in such Contract Year.

"**Average Dependable Capacity**" means, for the period from the Phase 1 Commercial Operation Date to the end of the first Contract Year, an amount equal to (a) the sum of the multiplication of each Dependable Capacity (including the Initial Dependable Capacity) in effect during the period by the number of hours that each such Dependable Capacity was in effect during the period, divided by (b) the number of hours in the period.

"**Bank**" means the Federal Reserve Bank of the United States of America.

"**Bank Rate**" means the prime interest rate of the Bank from time to time.

"**Bid Date**" means [ ].

"**Bid Guarantee**" means the security established in accordance with the IFMSB to secure inter alia, Project Company's obligations as set forth in this Agreement, during the period between the execution of this Agreement and Financial Close.

"Black Start" means the process of restoring an electric power station to operation without relying on the external transmission network.

"**British Thermal Unit**" or "**Btu**" means the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

"**Business Day**" means any Day (including partial Days) of the Year on which banks are required to be open for business in Guam.

"**Capacity Charge**" has the meaning set forth in Schedule 5.

"**Capacity Damages**" has the meaning set forth in Article 9.3.

"**Cause**" means, in relation to the issuance, renewal, revocation, amendment or modification of any Government Authorization, any default, neglect or failure by Project Company to abide by any Laws of Guam or any of the terms and conditions of any Government Authorization which entitles the relevant Government Authority to revoke, or refuse to issue or renew, the Government Authorization or make an amendment to its terms and conditions.

"**Change in Law**" means any of the following events occurring as result of any action by any Government Authority:

(a) the adoption, imposition, promulgation, coming into effect, modification or repeal of any Law of Guam that affects the Project or Project Company; or

(b) any change in the manner in which a Law of Guam that affects the Project or Project Company is applied or interpreted; or

(c) the imposition by a Government Authority (other than for Cause) of any material condition or delay in connection with the issuance, renewal, or modification of any Government Authorization,

that establishes or results in requirements that affect or relate to the Project that are materially more or less restrictive or materially more or less costly for Project Company.

"**Commercial Operation Date**" or **"COD"** means, for each of Phase 1 and Phase 2, the earlier of (i) the Day following the Day upon which the Phase is Commissioned; or (ii) the Day following the Day upon which the Phase is deemed Commissioned in accordance with Article 8.

"**Commercial Operation Period**" means, with respect to the Facility, the period of time commencing on the Phase 1 COD and ending on (but including) the last day of the Term.

"**Commercial Operation Tests**" mean the tests specified in Schedule 4 to demonstrate that the standard requirements and the guaranteed values (set out in Schedule 4) are met to achieve the COD with respect to each Phase.

"**Commissioned**" means notification by Project Company, accompanied by a report of the GPA Engineer certifying that the tests for Phase 1 or Phase 2, as the case may be, have been satisfactorily completed in accordance with Schedule 4, and that the Facility meets the relevant characteristics set out in Schedule 1 and Schedule 2, provided that upon receipt of such notice and report the date on which each Phase is Commissioned shall be the date upon which the tests for such Phase (as referred to above) have been satisfactorily completed.

"**Commissioning**" means the process by which a Phase is Commissioned.

"**Connection Agreement**" has the meaning set forth in Article 5.5(i).

"**Construction Contract**" means the agreement/s between Project Company and the Construction Contractor/s for the design, engineering, procurement, construction and Commissioning of the Facility, as amended from time to time.

"**Construction Contractor**" means the construction contractor/s that are party to the Construction Contract.

"**Construction Period**" means the period of time commencing on the Construction Start Date and ending on the Phase 2 Commercial Operation Date.

"**Construction Start Date**" means the day on which Project Company issues the first Notice to Proceed to a Construction Contractor.

"**Contracted Characteristics**" means the characteristics of the Facility described in Schedule 2.

"**Contracted Facility Capacity**" means the net electric power generating capacity of the Facility guaranteed to be provided to the Delivery Point on a continuous basis, adjusted to Site Reference Conditions as set forth in Schedule 2 and to the Fuel being consumed by the Facility at any given time, if applicable.

"**Contracted Phase 1 Capacity**" means the net electric power generating capacity of Phase 1 guaranteed to be provided to the Delivery Point on a continuous basis, adjusted to Site Reference Conditions as set forth in Schedule 2 and to the Fuel being consumed by the Facility at any given time, if appllicable.

"**Contractors**" means the Construction Contractor and the O&M Contractor.

"**Contract Year**" means a period of twelve (12) consecutive months commencing on each consecutive anniversary of the Phase 1 Commercial Operation Date and ending as of the end of the Day preceding the next anniversary of the Phase 1 Commercial Operation Date, except for the first Contract Year which shall start on the Phase 1 Commercial Operation Date.

"**Day**" means a twenty-four (24) hour period beginning and ending at 12:00 midnight Guam time.

"**Declared Capacity**" means the estimated net capacity of the Facility (adjusted to Site Reference Conditions) announced by Project Company pursuant to Article 10.3.

"**Delivery Point**" means the connection point of the Electrical Interconnection Facilities to the 115 kV bus bar at the Facility's switchyard where GPA receives the Net Energy Output from the Project Company, as to be specified in Schedule 2.

"**Dependable Capacity**" means, at any given time, the net capacity of the Facility (excluding any capacity associated with a Renewable Component) operating on ULSD or Natural Gas if and when applicable, measured in kW (adjusted to Site Reference Conditions), at the Delivery Point of the Facility as determined by the most recent Dependable Capacity Test, provided that for purposes of calculating the Capacity Charge, the Dependable Capacity shall not exceed the Contracted Facility Capacity.

"**Dependable Capacity Test**" has the meaning set forth in Schedule 4 and the frequency described in Article 8.2.

"**Dispatch Instruction**" is an instruction issued directly by the PSCC to Project Company in accordance with (i) the dispatch principles and guidelines established by GPA in accordance with the applicable system grid code for the Grid System; (ii) the Operating Procedures; (iii) the Technical Limits; (iv) Prudent Utility Practices; and this Agreement.

"**Dispute**" means any dispute or disagreement of any kind whatsoever between GPA and Project Company in connection with or arising out of this Agreement.

"**Dollars**" or "**USD**" or "**US$**" all mean the lawful currency of the United States of America.

"**Early Transfer Price**" means the applicable price set forth in Schedule 10 for the purchase of the Facility by GPA from Project Company pursuant to Article 5.5 (e), as the case may be.

"**Electrical Interconnection Facilities**" means all of the electrical interconnection facilities and equipment described in Schedule 1 to be constructed by the Project Company and transferred to GPA at the Phase 1 Commercial Operation Date.

"**Emergency**" means a condition or situation that in the reasonable opinion of GPA poses an imminent threat of (a) materially adversely affecting the ability of GPA to maintain safe, adequate and continuous electrical service to its customers, having due regard to the then current standard of electrical energy provided to its customers; or (b) endangering the safety of people, plant, or equipment.

"**Energy Charge**" has the meaning set forth in Schedule 5.

"**Environmental Attributes**" means (a) credits, benefits, reductions, offsets and other beneficial allowances, howsoever named or referred to, with respect to any and all fuel, emissions, air quality, or other environmental characteristics, resulting from the use of Facility generation or the avoidance of the emission of any gas, chemical or other substance into the air, soil or water attributable to the sale of energy generated by the Project during the Term and in which Project Company has property rights or will have property rights upon such attributes coming into existence, and include any of the same arising out of legislation or regulation (i) concerned with (A) oxides of nitrogen, sulfur, or carbon, (B) particulate matter, soot, or mercury, or (C) implementing the United Nations Framework Convention on Climate Change (the "**UNFCCC**") or protocols connected to the UNFCCC or crediting "early action" with a view thereto, and (b) all Environmental Attribute Reporting Rights.

"**Environmental Attribute Reporting Rights**" means the rights to report the ownership of any Environmental Attribute, including those rights accruing under any emissions trading program.

"**Equity Documents**" means any agreements relating to the issuance, subscription, placement or underwriting of Shares or other securities convertible into Shares issued by Project Company and any instruments constituting or evidencing Shares or other securities convertible into Shares issued by Project Company, and any documents or agreements evidencing or relating to indebtedness for money borrowed by Project Company from the Investors or their affiliates which, by its terms, is subordinated to any indebtedness for borrowed money incurred by Project Company under any Financing Document.

"**Excess Energy**" means, for a hybrid Facility, any energy that can be made available by the Facility, for any given hour, in excess of the energy that can be generated by the Facility operating at 100% of Dependable Capacity due to the spare capacity of the Fossil Fuel Fired Component that is available during the periods when the Renewable Component is capable of generating rernewable energy.

"**Excess Energy Output**" means any Excess Energy which is dispatched by the PSCC under a Dispatch Instruction and is subsequently delivered by the Facility to the Delivery Point.

"Excessive Forced Outages Energy" has the meaning set forth in Article 9.3.

"Excessive Total Outages Energy" has the meaning set forth in Article 9.3.

"**Excusable Event**" means events or circumstances constituting a Change in Law or Force Majeure event occurring after the date of this Agreement and prior to Financial Close that prevents Project Company from performing its obligations under this Agreement.

"**Expected Phase 1 Commercial Operation Date**" means [insert applicable date].

"**Facility**" means an electric generating facility with an expected continuously available fully dispatchable capacity of [ ]MW net (when operating on ULSD if the Facility operates on fossil fuel) to be constructed by Project Company at a leased Site in Guam, whether completed or at

any stage of development and construction, including, without limitation or regard to the level of development, the leased land, buildings, engineering and design documents, all power producing equipment and auxiliary equipment including Black Start capability, Fuel handling and storage infrastructures, water intakes and discharges, water treatment and pumping facilities, solid waste disposal facilities, main and plant transformers, plant switchgear, and all other installations as described in Schedule 1.

"Facility Transfer" has the meaning set forth in Article 18.1.

"FERC" means the U.S. Federal Energy Regulatory Commission.

"Final Major Overhaul" has the meaning set forth in Article 18.2.

"**Financial Close**" means the date on which all conditions of the Lenders under the Financing Documents have been met or waived (in accordance with the terms thereof), and initial financing disbursements can take place (as certified by the Agent in writing).

"**Financing Documents**" means the loan agreements, notes, bonds, note or bond purchase agreements, participation agreements, indentures, security agreements, hedging agreements, guarantees, shareholder support agreements, the Lenders' Direct Agreements and other documents relating to the construction and permanent financing (including refinancing) of the Facility or any part thereof provided by any Lender, but excluding any Equity Documents.

"**First Fill**" has the meaning set forth in Article 4.3.2.

"**Fixed Operation and Maintenance Charge**" has the meaning set forth in Schedule 5.

"**Force Majeure**" has the meaning set forth in Article 17.

"**Force Majeure Transfer Price**" means the applicable price set forth in Schedule 10 for the purchase of the Facility by GPA from Project Company pursuant to Article 5.5(g).

"**Forced Outage**" means a failure to make available the Dependable Capacity:

(a) that is not the result of a request by GPA in accordance with this Agreement;

(b) that is not the result of a Scheduled Outage or a Maintenance Outage;

(c) that is not the result of an event or occurrence of a Force Majeure;

(d) that is not the result of a condition caused by GPA or by the Grid System, provided that such condition would not have occurred without the action or inaction of GPA or the condition of the Grid System; or

(f) that does not occur during any period during which the Facility is deemed to provide the Dependable Capacity under Article 8.

"Forced Outages Energy" has the meaning set forth in Article 9.3.

"Fossil Fuel Fired Component" means, for a hybrid plant, the part of the Facility which utilizes Reciprocating Engine Generators or Combustion Turbine Generators.

"Fossil Fuel Fired Net Energy Output" means the portion of the Net Energy Output generated by the Fossil Fuel Fired Component and equal, for any time interval, to the Net Energy Output minus Renewable Net Energy Output.

"**Fuel**" means fuel used by the Facility, which will be ULSD (as specified in Schedule 7) or Natural Gas (as specified in Schedule 9).

"**Fuel Delivery Point**" has the meaning set forth in Schedule 1.

"**Fuel Price (FP)**" has the meaning set forth in Schedule 5.

"**Fuel Supply Requirement**" has the meaning set forth in Article 4.3.1(a).

"**Functional Specifications**" or "**Specification**" means the characteristics (adjusted to Site Reference Conditions) for the design, construction and operation of the Facility, as set forth in Schedule 1.

"**Government**" means the Government of Guam and the Government of the United States, as applicable.

"**Government Authority**" means the Government and/or any national or local governmental authority of Guam with jurisdiction over Project Company, the Project or any part thereof, and/or any department, regulatory, supervisory or competent authority, or political subdivision or instrumentality, agency or judicial body of the Government, or any national or local governmental authority of the Government and/or any person under the direct or indirect control of any of the foregoing.

"**Government Authorizations**" means all formal written permits, licenses, authorizations, consents, decrees, waivers, privileges, approvals and filings required to be obtained from or provided by any Government Authority for the execution, delivery and performance of this Agreement, any other Project Agreement or any Financing Document, including without limitation the design, development, construction, financing, ownership, maintenance and operation of the Facility (and all other activities incidental thereto), as contemplated by this Agreement, the other Project Agreements and the Financing Documents.

"**GPA**" has the meaning set forth in the Preamble hereto.

"**GPA Default Transfer Price**" means the applicable price set forth in Schedule 10 for the purchase of the Facility by GPA from Project Company pursuant to Article 5.5 (d), as the case may be.

"**GPA Engineer**" means the engineering company selected by GPA, the costs of whose appointment and retention shall be paid by GPA.

"**GPA Event of Default**" has the meaning set forth in Article 5.3.

"**Grid System**" means the transmission and distribution facilities through which the Net Energy Output may be transmitted and distributed to users.

"**Guaranteed Heat Rate**" or "**GHR**" means the Heat Rate (at the Site Reference Conditions) guaranteed by the Project Company for the Fossil Fuel Fired Component, for Phase 1 and Phase 2, as set forth in the tables included in Schedule 5.

"**Guam**" or "**Territory of Guam**" means that certain unincorporated and organized territory of the United States in Micronesia.

"**Heat Rate**" expressed in Btu per kWh, means the fuel energy consumption expressed in Btu (higher heating value) required to generate one kWh by the Fossil Fuel Fired Component at the high voltage bushings of the main power transformers.

"**ICC Rules**" means the Rules of Arbitration of the International Chamber of Commerce.

"**IFMSB**" means the invitation for bids issued by GPA on […] and including all updates and amendments thereto between the date of its submission and the date of this Agreement.

"**Independent Engineer**" means a qualified, international, and independent engineering firm selected by Project Company and approved by GPA for purposes of certifying any claim by Project Company that the Facility should be deemed Commissioned in accordance with Article 8.5.

"**Independent Expert**" has the meaning set forth in Article 18.4.

"**Initial Dependable Capacity**" means, at the Commercial Operation Date for Phase 1 or Phase 2, as the case may be, the capacity set upon successful completion of the Dependable Capacity Test for such Phase and used to establish its respective Commercial Operation Date, which is the maximum capacity adjusted for Site Reference Conditions that the Facility is demonstrated to be capable of delivering continuously at the Delivery Point at that time, in accordance with (and subject to) Article 8.1(d)(iii) and is the capacity to apply until the next Dependable Capacity Test occurs after the Phase 2 Commercial Operation Date.

"**Initial Shareholders**" means [ ].

"**Investor**" means a shareholder of Project Company

"**Invoice Due Date**" has the meaning set forth in Article 14.4.

"**Joint Coordinating Committee**" is the committee established by Project Company and GPA pursuant to Article 11.

"**kW**" means kilowatts.

"**kWh**" means kilowatt-hours.

"**Law**" or "**Laws**" means the laws of Guam and the United States of America.

"**Land Lease Agreement**" or "**LLA**" means the agreement entered into by and between Project Company and GPA whereby Project Company will lease the site on which the Facility shall be built.

"**Lenders**" means the lenders, guarantors, credit providers, multilateral agencies, export credit agencies or other financial institutions or insurers providing (or supporting) the financing or refinancing arrangements for the Project pursuant to the Financing Documents, but not including any Investor or affiliate of an Investor with respect to indebtedness for money borrowed by Project Company from any such Investor or affiliate.

"**Lenders' Direct Agreement**" means the agreement entered into by the Project Company, GPA, and the Lenders and/or their security agent on [ ].

"**Liquidated Damages Due Date**" has the meaning set forth in Article 9.7.

"**Liquidated Damages Notice**" has the meaning set forth in Article 9.7.

"**Loss**" means any loss, cost, expense damage, liability, payment or obligation (including reasonable legal fees and expenses but excluding any indirect or consequential loss, cost, expense, damage, liability, payment or obligation or any loss of revenue or loss of profit).

"**Maintenance Outage**" means an interruption or reduction of the generating capability of the Facility that:

(a) is not a Scheduled Outage;

(b) has been scheduled in accordance with Article 10.4(f); and

(c) is for the purpose of performing work on specific components of the Facility which work should not, in the reasonable judgment of Project Company, be postponed until the next Scheduled Outage.

"**Major Overhaul**" means the repair and reconditioning of any Unit of the Facility that is conducted in accordance with Article 10.4(g) and Schedule 2.

"Maximum Natural Gas Switch Quantity" has the meaning set forth in Article 8.2(f).

"**Metering System**" means the measurement system capable of interpreting readings of all pertinent parameters required by the invoicing process.

"**Million Btu**" or "**MMBtu**" means 10^6 Btu.

"**Month**" means a month according to the Gregorian Calendar, and "**Monthly**" shall be construed accordingly.

"**MW**" means megawatts.

"**MWh**" means megawatt hours.

"**Natural Gas**" means natural gas meeting the Fuel specifications contained in Schedule 9.

"**Net Energy Output**" means the energy output delivered by the Facility and accepted by GPA during a given period of time measured in kWh by the Metering System at the Delivery Point (including Excess Energy Output).

"NERC" means North American Electric Reliablity Corporation.

"**Notice**" has the meaning set forth in Article 22.

"**Notice of Intent to Terminate**" has the meaning set forth in Article 5.5(a).

"**Notice to Proceed**" means the initial notice to the Construction Contractor to commence engineering, procurement or construction work pursuant to the Construction Contract.

"**O&M Contract**" means any agreement entered into between Project Company and a third party contractor for the operation and maintenance of the Facility.

"**O&M Contractor**" means the party to any O&M Contract which is responsible for the operation and maintenance of the Facility.

"**Operating Procedures**" means the operating procedures developed by the Parties pursuant to Articles 7.4 and 10.2 and in compliance with the applicable system grid code, as such procedures may be modified from time to time in accordance with Article 7.4 and the applicable system grid code.

"**Outage Hours**" means for each month during the Commercial Operation Period, the total number of full load equivalent hours during such month in which Dependable Capacity is reduced due to Forced Outages, Maintenance Outages and Scheduled Outages which shall be calculated as the summation of the duration of each such outage in the month (in hours) multiplied by the reduction in Dependable Capacity during such outage (in MW) divided by the Dependable Capacity (in MW).

"**Party or Parties**" means GPA and Project Company, either individually or collectively.

"**Performance Bond**" means the security established in accordance with Article 9.6(d) to secure the Project Company's ability to pay liquidated damages in accordance with Article 9.

"**Period of Testing**" means, with respect to each Phase, the period from initial synchronization of a Unit or Facility to the Commercial Operation Date for such Phase, during which period testing occurs and net power is produced.

"**Phase**" means either Phase 1 or Phase 2, or both, as the context indicates.

"**Phase 1**" means all work as required to put the Simple Cycle Unit in case of a combined cycle Facility or full firm base load capacity in case of other technologies into commercial operation.

"**Phase 1 Commercial Operation Date**" means the Commercial Operation Date for Phase 1.

"**Phase 2**" means all work as required to put the entire facility into commercial operation.

"**Phase 2 Commercial Operation Date**" means the Commercial Operation Date for Phase 2.

"**Power System Control Center**" or "**PSCC**" means GPA's main control center located at [ ] or such other control center designated by GPA from time to time (but not more than one center at a time) which shall issue Dispatch Instructions to Project Company.

"**Pre-Existing Site Condition**" means any obstructions on, under, in, or affecting the Site or any contamination that could not have been discovered by an experienced international engineering and construction contractor using the most sophisticated devices and personnel available at the time of Site investigation by such contractor but shall not, for the avoidance of doubt, include archaeological discoveries on the Site.

"**Pre-Existing Site Condition Period**" means the period from the date of this Agreement to the date falling 12 months after the issuance of Notice to Proceed under the Construction Contract.

"**Price**" means the price of electricity charged by Project Company to GPA and calculated in accordance with the formulas in Schedule 5.

"**Project**" means the development, design, engineering, financing, refinancing, insurance, procurement, construction, startup, testing, Commissioning, completion, ownership, operation and maintenance of the Facility, all activities incidental thereto, and the Facility itself.

"**Project Agreements**" means collectively, the Energy Conversion Agreement, Land Lease Agreement, O&M Contract (if applicable), Construction Contract, and any other document, contract, or agreement executed subsequent to the date hereof by Project Company that is relevant to the construction and development of the Project or the ownership or management of Project Company (other than any Financing Document, Equity Document or Government Authorization) or otherwise mutually agreed in writing to constitute a "Project Agreement".

"**Project Company**" has the meaning set forth in the Preamble hereto.

"**Project Company Default Transfer Price**" means the applicable price set forth in Schedule 10 for the purchase of the Facility by GPA from Project Company pursuant to Article 5.5(f).

"**Project Company Event of Default**" has the meaning set forth in Article 5.2.

"**Prolonged Force Majeure**" means a condition in which a Force Majeure event has caused 50% or more of the Contracted Facility Capacity to be unavailable for dispatch for eighteen (18) consecutive months or more and is continuing.

"**Proposal**" means Project Company's written offer and amendments based on the covenants, terms and conditions as contained in the IFMSB for the development, financing, construction, ownership, operation and transfer of the Project.

IFMSB"**Prudent Utility Practices**" means those practices, methods, techniques and standards, as changed from time to time, that are generally accepted internationally for use in electric utility industries (taking into account conditions in Guam), and commonly used in prudent engineering and operation to design, engineer, construct, test, operate and maintain equipment lawfully, safely and economically as applicable to power stations of the size, service, and type (and operating with the contemplated Fuels) as the Facility.

"**PUC**" means the Public Utilities Commission of Guam.

"**Remedial Actions**" has the meaning set forth in Article 9.2.

"Renewable Component" means, for a hybrid plant, the part of the Facility which utilizes solar or wind power generation technology.

"Renewable Component Degradation Guarantee" means the Bidder's guaranteed rate of degradation for the Renewable Component as provided in Table 15.1 of Section D.

"Renewable Net Energy Output" means the portion of the Net Energy Output generated by the Renewable Component.

"**Required Phase 1 Commercial Operation Date**" means, with respect to Phase 1, the date falling [•] Days from Notice to Proceed, or such later date as may apply in accordance with the provisions of this Agreement.

"**Required Phase 2 Commercial Operation Date**" means, with respect to Phase 2, the date falling [•] Days from Notice to Proceed, or such later date as may apply in accordance with the provisions of this Agreement.

"**Required Financial Closing Date**" means [ ], or such later date as may apply in accordance with the provisions of this Agreement.

"**Scheduled Outage**" is a planned interruption of the generating capability of the Facility that:

(a) is not a Maintenance Outage;

(b) has been scheduled in accordance with Article 10; and

(c) is for inspection, testing, Major Overhauls, preventive and corrective maintenance, repairs, replacement or improvement of the Facility.

"**Security**" means any one or more of the following: the Bid Guarantee, the Performance Bond, or the Transfer Security.

"**Security Package**" consists of:

(a) this Agreement;

(b) the LLA;

(e) the Construction Contract;

(f) the O&M Contract (if applicable);

(g) the Financing Documents;

(i) the bylaws and articles of Project Company;

(j) the Equity Documents;

(k) the insurance policies required to be obtained by Project Company pursuant to Article 15;

(m) the documents creating or evidencing the security for the Lenders (including the Lenders' Direct Agreement);

(n) all Government Authorizations, including a generation license issued in accordance with [ ]; and

(o) any other Project Agreements to which Project Company is party.

"**Shares**" means shares of Project Company with voting or other rights of management and/or control.

"**Simple Cycle Unit**" means the unit of the Facility formed by the combustion turbines and the supplementary equipment for generation of electric power.

"**Site**" means the land on which the Facility is to be installed (defined by the boundaries [Insert site plot designation or coordinates]), and has been leased by GPA to Project Company by means of the LLA.].

"**Site Reference Conditions**" means the physical and meteorological conditions at which the Facility would be operating under hypothetical representative circumstances as defined in Schedule 1.

"**Start**" means the process of starting up a Unit or the Facility until its synchronization, when the corresponding Unit or Facility has been shut down.

"**Supplemental Charge**" means any additional charges agreed by the Parties which are payable by GPA to Project Company as part of the Price payments.

"**Technical Limits**" means the limits and constraints described in Schedule 2 relating to the operation and maintenance of the Facility, and which shall be in accordance with the Functional Specifications.

"**Term**" has the meaning set forth in Article 5.1.

"**Termination Notice**" has the meaning set forth in Article 5.5(b).

"**Testing**" means the process of testing the Facility pursuant to Article 8.

"**Threshold Capacity**" means a Dependable Capacity equal to ninety (90%) per cent of the Contracted Facility Capacity.

"**Transfer Date**" means the date upon which all ownership, custody and control of the Facility shall be transferred from Project Company to GPA, which date shall be the final day of the Term unless mutually agreed otherwise.

"**Transfer Security**" has the meaning set forth in Article 18.4.

"Typical Meteorological Year" or "TMY" – means, for a hybrid or renewable Facility, the set of meteorological conditions relevant to the performance of such Facility's Renewable Component or a renewable Facility, which was provided by the awarded Bidder including any subsequent changes made by GPA.

"ULSD" means means ultra-low sulfur diesel fuel with maximum sulfur content of 15 ppm suitable for firing by diesel engine generators or combustion turbine generators meeting Fuel quality specifications contained in Schedule 7.

"ULSD Bulk Storage" means GPA's existing GPA ULSD bulk storage located near the existing Cabras power station to be modified by the Project Company as required under this Agreement.

"**ULSD Storage Facilities**" has the meaning set forth in Article 4.3.1(g).

"ULSD Supply Infrastructure" means the ULSD Bulk Storage, and the ULSD supply pipeline between the ULSD Bulk Storage and the Site with all its associated systems, equipment, and accessories to be constructed by the Project Company and transferred to GPA on the Phase 1 Commercial Operation Date.

"**Unit**" means an individualgas turbine-gernerator, reciprocating engine-generator, or wind turbine-generator unit.

"**Unit Available Capacity**" means the capacity of each Unit (adjusted to Site Reference Conditions) announced by Project Company pursuant to Article 10.3(e).

"U.S. EPA" means the United States Environmental Protection Agency.

"**Variable Operation and Maintenance Charge**" has the meaning set forth in Schedule 5.

"**Wilful Misconduct**" means an intentional, conscious or reckless default in announcing an accurate Declared Capacity by a director, officer, manager or employee of Project Company exercising apparent authority to announce, or cause to be announced, a Declared Capacity, provided, however, that Wilful Misconduct shall not include any error of judgement or mistake made in good faith in the exercise of any function, authority or discretion arising under or in connection with the performance of this Agreement.

"**Year**" means a calendar year according to the Gregorian calendar beginning at midnight December 31 in Guam.

ARTICLE 2
INTERPRETATION

In this Agreement (including its Schedules), unless otherwise stated:

2.1 Any references to:

(a) any agreement (including this Agreement) or document shall be construed, at any particular time, as including a reference to the relevant agreement or document as it may have been amended, novated, assigned, modified or supplemented in accordance with its terms;

(b) the Preamble, Recitals or a particular Article or Schedule, shall be a reference to the Preamble, Recitals or relevant Article or Schedule in or to this Agreement;

(c) a particular paragraph or sub-paragraph, if contained in an Article or Schedule, shall be a reference to the relevant paragraph or sub-paragraph of that Article or Schedule; and

(d) a Party or any other person includes its successors in title, permitted assigns and permitted transferees.

2.2 Words in the singular may be interpreted as referring to the plural and vice versa.

2.3 A requirement that a payment be made on a Day which is not a Business Day shall be construed as a requirement that the payment be made on the next following Business Day.

2.4 The words "including" and "include" are to be construed as being at all times followed by the words "without limitation", unless the context otherwise requires.

2.5 For the purpose of any calculation under this Agreement, references to any period or periods of an hour or hours shall be rounded up to the nearest 1/10th of an hour.

2.6 The Schedules contained herein form an integral part of this Agreement. In the event of an inconsistency between the body of this Agreement and the Schedules thereto, the provisions of the body shall govern.

2.7 Where reference is made in this Agreement to a period or periods of time the periods in question shall be deemed to end at midnight on the last Day of such period unless otherwise stated.

2.8 Unless otherwise stated, whenever a consent or approval is required by one Party from the other Party, such consent or approval shall not be unreasonably withheld or delayed.

2.9 In carrying out its obligations and duties under this Agreement, each Party shall have an implied obligation of good faith.

2.10 Any capitalized term used but not defined in this Agreement shall have the meaning attributable thereto in the IFMSB.

2.11 The Parties agree that, should a situation arise where the provisions of Schedule 1 require clarification, then Form [ ] of the Proposal, to the extent relevant, would be used to interpret the provisions of Schedule 1, provided that this process in no event results in the modification of the Project Company's obligations hereunder or the imposition of obligations additional to those included in this Agreement.

2.12 Any reference to GPA's successors and permitted assigns shall be a reference to such successors and permitted assigns in all of GPA's capacities.

ARTICLE 3
RESERVED

ARTICLE 4
SALE AND PURCHASE OF CAPACITY AND ENERGY

4.1 Energy and Capacity

Subject to and in accordance with the terms and conditions of this Agreement, Project Company agrees to maintain and make available and deliver exclusively to GPA, and GPA agrees to accept and purchase from Project Company, from and after the Phase 1 Commercial Operation Date, for the consideration described in Article 14 and Schedule 5, the entire Dependable Capacity and, subject to Dispatch Instructions, the Net Energy Output of the Facility. GPA further agrees to pay to Project Company all amounts (and adjustments to amounts) described in Article 14.1 in the circumstances contemplated in Article 14.1. [Any Environmental Attributes associated with Dependable Capacity and Net Energy Output shall accrue to GPA's benefit.]

4.2 Sales to Third Parties and Test Energy

4.2.1 No Sales to Third Parties

The Parties agree that Project Company shall not during the Term sell or deliver electric capacity or energy produced by the Facility to any other entity than GPA.

4.2.2 No Payment for Test Energy

Prior to the Phase 1 Commercial Operation Date, GPA shall not pay for energy delivered to GPA during Testing and Commissioning.

4.3 Fuel Supply

4.3.1 Fuel Supply After COD

(a) Commencing as of the Phase 1 Commercial Operation Date, GPA shall deliver Fuel to Project Company in compliance with the Fuel Specifications for each day of operation, at such times as it may be required by Project Company to satisfy the hourly dispatch requirements to be provided by GPA (the "**Fuel Supply Requirement**"). All Fuel required to be delivered by GPA to Project Company under this Article shall be delivered to the corresponding Fuel Delivery Point and shall be measured at the corresponding Fuel Measurement Point in accordance with the provisions set forth in Schedule 12. Project Company shall be responsible for the installation, operation and maintenance of the Fuel measurement facilities.

(b) Unless Project Company informs GPA otherwise, the Fuel Supply Requirement shall be consistent with the Guaranteed Heat Rate specified in Schedule 2, adjusted to Site Conditions and expressed in BTUs per kWh. In the event the expected operating heat rate applicable to any period of operation is higher than the corresponding Guaranteed Heat Rate, Project Company shall inform the magnitude of the deviation, the likely cause of such deviation, and the way this deviation is going to be corrected. Project Company shall use its best efforts to meet the Guaranteed Heat Rate. GPA shall supply the Fuel Supply Requirement even if the expected operating heat rate is higher than the Guaranteed Heat Rate.

(c) Each Party shall cooperate reasonably with the other Party to coordinate the supply and transportation of Fuel to the Fuel Delivery Point with the operation of the Plant as follows: (x) by providing the other Party such information as the first Party shall reasonably request regarding the supply and transportation of the Fuel to the Fuel Delivery Point (on both a historical and estimated future basis); and (y) by maintaining personnel available at all times to address scheduling of Fuel supply and transportation.

(d) Subject to the foregoing, GPA shall have the right to change the quantities of Fuel nominated and received on a daily basis, or more frequently, to the extent permitted, so long as such changes do not disrupt Project Company's operations.

(e) GPA shall be deemed to be in exclusive control of, and responsible for any damage or personal injury caused by, Fuel up to the Fuel Delivery Point. Project Company shall be deemed to be in exclusive control of, and responsible for any losses of Fuel, and any damages or injury caused by, such Fuel at and from the Fuel Delivery Point. GPA warrants that Fuel caused to be delivered hereunder to Project Company shall be free and clear of all liens or other encumbrances. Title to and risk of loss of all Fuel shall transfer from GPA to Project Company upon delivery to the Fuel Delivery Point.

(f) GPA undertakes that all Fuel delivered at the Fuel Delivery Point shall meet the Fuel Specifications. Project Company shall have the right to reject Fuel which fails to meet the Fuel Specification at the Fuel Delivery Point ("Non-Conforming Fuel") provided that Project Company has made commercially reasonable efforts to receive such Non-Conforming Fuel. If Project Company erroneously rejects Fuel that in fact meets the Fuel Specification, Project Company shall be liable to GPA for all damages caused by said rejection and shall indemnify and hold GPA harmless therefor. If either Party becomes aware that Fuel that is being or will be delivered by GPA to the Project Company fails to meet the Fuel Specification, such Party shall inform the other Party of this fact as soon as possible after becoming aware thereof.

(g) Project Company shall, in accordance with Schedule 1, construct and maintain storage facilities at the Site for the supply of ULSD for the operation of the Facility (the "ULSD Storage Facilities"). Such storage facilities shall be capable of holding an inventory equivalent to the amount of ULSD necessary to operate the Facility at the full Contracted Facility Capacity (in accordance with the Guaranteed Heat Rate) for at least fourteen (14) consecutive Days or such larger quantities as may be required by Lenders.

(h) Project Company shall, in accordance with Schedule 1 finance, design and construct the ULSD Supply Infrastructure and transfer it to GPA at no cost on the Phase 1 Commercial Operation Date. GPA will own, operate, and maintain the ULSD Supply Infrastructure during the Term of the ECA.

4.3.2 Fuel Supply During Testing and Commissioning

(a) GPA shall procure and deliver the Fuel required for start-up and commissioning prior to the Phase 1 Commercial Operation Date to the ULSD Bulk Storage pursuant to the specifications in Schedule 7. GPA shall pay for the Fuel required for start-up and commissioning up to a maximum of [ ]MMBtu and Project Company shall pay for any Fuel required and delivered in excess thereof. The Project Company shall be responsible for the operation and maintenance of the ULSD supply infrastructure prior to the Phase 1 Commercial Operation Date and the cost of first fill of ULSD in an amount equal to the Fuel storage requirements in Article 4.3.1(g) (the "First Fill"). At least eighteen (18) Months prior to the Expected Phase 1 Commercial Operation Date, Project Company and GPA shall agree to a procedure to periodically estimate and forecast the necessary amount of Fuel expected to be required for commissioning and start-up, provided, however, that the final amount of Fuel required shall be set no later than 120 days prior to the Expected Phase 1 Commercial Operation Date.

4.4 Natural Gas Supply

The following is applicable for Natural Gas if and when it becomes available and if and when GPA so elects to supply Natural Gas to the Facility.

4.4.1 Natural Gas Procurement

At any time after the Phase 1 Commercial Operation Date, GPA, in its sole discretion may elect to supply Natural Gas to the Facility and require that the Facility burn Natural Gas. The procedure set forth in Article 8.2(f) and (g) of this Agreement shall apply to the implementation of this election.

4.4.2 Natural Gas Nominations by the Project Company

After receiving the daily Dispatch Instructions, the Project Company shall provide to GPA the Natural Gas daily nominations as required by the Project Company to satisfy the Dispatch Instructions. The detailed procedure for daily nominations and for renominations shall be determined by the Joint Coordinating Committee.

4.5 Fuel Cost Allocation

When GPA receives bills for Fuel supply and transportation for the Facility, GPA shall send a copy to the Project Company. Once received by the Project Company, the Joint Coordinating Committee shall meet to distribute the cost between the Parties. The Project Company shall be responsible for the cost of any Fuel consumed in excess of the quantity of Fuel that should have been required to produce the applicable amount of Net Energy Output had the Facility operated in compliance with the Guaranteed Heat Rate as adjusted to the operating parameters provided in the applicable Dispatch Instructions. In the event that, in any given hour or portion thereof, the Facility is unavailable to operate at 100% load due to a reason other than the fault of GPA, and this event does not occur during a Scheduled Outage or Maintenance Outage or occurs during a Scheduled Outage or Maintenance Outage after the Facility has exceeded its Allowable Total Outages Energy for the applicable Contract Year pursuant to Article 9.3, then the Guaranteed Heat Rate used to calculate the Fuel cost allocation shall be the Guaranteed Heat Rate applicable to the load at which the Facility would have been dispatched had the Facility been available to operate at 100% load.

4.6 Set-off for Fuel Costs

Any amounts owed to GPA by the Project Company with respect to Fuel, if any, shall be deducted from the monthly invoice as set forth in Article 14.

4.7 Non-Conforming Fuel

(a) If Fuel supplied by GPA fails to conform to the specifications set out in Schedule 7 or Schedule 9 as the case may be ("Non-Conforming Fuel"), Project Company may send a Notice to GPA notifying that Project Company has received Non-Conforming Fuel.

(b) GPA shall, promptly upon becoming aware of such delivery or promptly upon receipt of the Notice from Project Company referred to in paragraph (a) above, send a Notice to Project Company stating, to the extent known to GPA, the period during which the Non-Conforming Fuel was delivered, the quantity thereof

and how its specifications vary from the ones set out in Schedule 7 or Schedule 9, as the case may be.

(c) If, after exercising commercially reasonable efforts to receive the Non-Conforming Fuel, Project Company determines that it is unable to accept, or operate the Facility, on such Non-Conforming Fuel, then it shall be under no obligation to accept such fuel. In the event that the Dependable Capacity would otherwise be available but for the delivery of Non-Conforming Fuel, then GPA shall remain obligated to pay the Capacity Charge.

ARTICLE 5
TERM, DEFAULTS AND REMEDIES

5.1 Term of Agreement

(a) Except for the provisions of Article 1, 2, 5, **Error! Reference source not found.**, 7, 11, 16, 17, 19, 20, 22, 23, and 23 (which shall commence and be effective upon the date of signature of this Agreement), the term of this Agreement ("**Term**") shall commence and be effective upon Financial Close (provided that this Agreement shall be effective upon satisfaction or waiver of all conditions precedent other than the condition to achieve Financial Close if the only condition precedent to Financial Close that is not satisfied or waived is that any or all of this Agreement or other Project Agreement is not in full force and effect because Financial Close has not occurred) and shall terminate twenty five (25) Contract Years after the Phase 1 Commercial Operation Date, unless extended or earlier terminated pursuant to the provisions of this Agreement. The termination of this Agreement shall be without prejudice to all rights and obligations of the Parties accrued under this Agreement prior to the date of such termination.

(b) On or before the end of the twenty-first (21st) Contract Year the Parties shall meet to discuss whether the Term of this Agreement shall be extended. To the extent the Parties agree to extend the Term, then the terms and conditions of this Agreement shall be negotiated and mutually agreed by the Parties, as required and appropriate. To the extent this Agreement is not extended, then this Agreement shall terminate in accordance with its terms and conditions, and the Parties shall commence the implementation of the Facility Transfer procedures set forth in Article 18.

5.2 Project Company Events of Default

The Project Company shall be in default under this Agreement upon the occurrence of any of the following events set forth in subsections (a) to (r) below (each a "**Project Company Event of Default**"); provided, however, that none of such events shall constitute a Project Company Event of Default if such event (a) results from a breach or default by GPA under this Agreement or the LLA or (b) occurs as a result of, or during, a Force Majeure pursuant to Article 17.

Subject to the provison in the preceding sentence, the following are Project Company Events of Default:

(a) the failure of Project Company to achieve Financial Close by the Required Financial Closing Date [due to the failure of the Project Company, in the reasonable opinion of GPA, to use commercially reasonable efforts to do so];

(b) the failure of Project Company to issue Notice to Proceed to the Construction Contractor within two (2) Business Days after Financial Close;

(c) prior to the achievement of the Phase 1 Commercial Operation Date, an Abandonment occurs without GPA's prior written consent and continues for a period of thirty (30) consecutive Days from the receipt of a Notice from GPA;

(d) the failure of Project Company to achieve the Phase 1 Commercial Operation Date within a period of one hundred and twenty (120 Days) after the Required Phase 1 Commercial Operation Date;

(e) the failure of the Project Company to achieve the Phase 2 Commercial Operation Date within one hundred and twenty (120) Days after the Required Phase 2 Commercial Operation Date;

(f) the failure of Project Company to submit the Performance Bond on or before Financial Close;

(g) the failure of the Project Company to establish and maintain any Security in accordance with the terms of this Agreement; after the Phase 1 Commercial Operation Date, an Abandonment occurs without the prior written consent of GPA and continues for a period of fifteen (15) consecutive Days from receipt of a Notice from GPA;

(h) the failure of the Facility to achieve the Threshold Capacity upon completion of the Phase 2 Commercial Operation Tests under Article 8.1 or, after the Phase 2 Commercial Operation Date, the failure of the Facility to (A) achieve a Dependable Capacity level equal to eighty-five (85%) per cent of the Initial Dependable Capacity after any Dependable Capacity Test and (B) achieve such level of Dependable Capacity after a later Dependable Capacity Test or otherwise make available to GPA such level of capacity, in each case no later than six (6) Months after the test mentioned in (A) above, provided that, in the case of a failure of equipment where the Project Company can demonstrate that replacement equipment has been ordered, or that a repair has been undertaken, as soon as reasonably practicable after the failure (taking into account the amount of time required to determine whether a repair can be achieved), but in any event no later than the end of such 6 Month period, such period shall be extended for as long as Project Company is awaiting delivery of such equipment or is otherwise diligently pursuing a cure of the cause of the failure, up to a maximum of fifteen (15) Months;

(i) should the Facility experience more than 285 Outage Hours in each month for a period of six (6) consecutive Months, provided that, in the case of a failure of equipment where the Project Company can demonstrate that replacement equipment has been ordered, or that a repair has been undertaken, as soon as reasonably practicable after the failure (taking into account the amount of time required to determine whether a repair can be achieved), but in any event no later than the end of such six (6) Month period, such period shall be extended for as long as the Project Company is awaiting delivery of such equipment or is otherwise diligently pursuing a cure of the Forced Outage, up to a maximum of fifteen (15) Months;

(j) Project Company's failure to operate, maintain, modify, or repair the Facility in accordance with Prudent Utility Practices and applicable environmental Laws, such that safety of persons and property (including the Facility) is materially adversely affected, and such failure shall continue unremedied for a period of thirty (30) Days after Notice from GPA, provided that where Project Company has implemented a remedial plan approved by GPA, such failure shall continue unremedied for a period of ninety (90) Days after Notice from GPA;

(k) the occurrence of any of the following events: (i) the passing of a resolution by the Investors for voluntary liquidation (or other similar relief) of Project Company; (ii) the appointment of a liquidator by Project Company or by the Controller of Companies for liquidation of Project Company; (iii) submission of an application to a court of competent jurisdiction for mandatory liquidation of Project Company which application is not dismissed within ninety (90) Days, (iv) the issuance of a final and conclusive order by a court of competent jurisdiction for liquidation or winding up of Project Company; or (v) except as otherwise permitted under and pursuant to the Financing Documents or the Project Agreements, the transfer, conveyance, loss, or relinquishment to any person of Project Company's right to own and/or operate the Facility or any material part thereof or to occupy the Site without the prior written approval of GPA;

(l) any statement, representation or warranty by Project Company in this Agreement proves to have been incorrect, in any material respect, when made and such failure or incorrect statement, representation, or warranty has a material and adverse effect on Project Company's ability to perform its obligations under this Agreement;

(m) the failure of Project Company to make any payment or payments required to be made by it hereunder (other than payments disputed by Project Company in good faith and by Notice to GPA) within fifteen (15) Days of the due date for such payment;

(n) any material breach by Project Company of this Agreement (other than any such breach referred to elsewhere in this Article 5.2), that is not remedied within sixty (60) Days after Notice from GPA to Project Company (which Notice shall (i) state that a material breach of this Agreement has occurred that could result in the termination of the Agreement; (ii) identify the material breach in question in reasonable detail; and (iii) demand remedy thereof);

(o) the occurrence of a Project Company Event of Default under any project agreement (as such term is defined in each of such agreements respectively), which is not cured within the applicable cure period (if any) provided for therein;

(p) Project Company makes an assignment of this Agreement or transfers or creates a lien on the Project in violation of Article 21.2;

(q) The failure of Project Company to obtain or maintain the Governmental Authorizations which is not remedied within ninety (90) Days after Notice from GPA;

(r) Except as otherwise provided in this Article 5.2, Project Company shall fail to comply with any of its other obligations under this Agreement and such failure

has a material adverse effect upon GPA, and such failure shall continue uncured for sixty (60) Days after notice thereof by Company, provided that if such failure is not capable of being cured within such period of sixty (60) Days with the exercise of commercially reasonable efforts, then such cure period shall be extended for an additional reasonable period of time (not to exceed one-hundred-twenty (120) Days) so long as Project Company is exercising commercially reasonable efforts to cure such failure;

GPA shall deliver to the Lenders' agent ("**Agent**") (in accordance with the Lenders' Direct Agreement) a copy of any Notice given under this Article 5.2.

5.3 GPA Events of Default

GPA shall be in default under this Agreement upon the occurrence of any of the following events set forth in subsections (a) to (e) (each a "**GPA Event of Default**"); provided, however, that none of such events will constitute a GPA Event of Default if such event (i) results from a breach or default by Project Company under this Agreement or the LLA, or (ii) occurs as a result of a Force Majeure pursuant to Article 17. Subject to the proviso in the preceding sentence, the following are GPA Events of Default:

(a) the submission for voluntary liquidation (or other similar relief) of GPA by GPA or any Government Entity with the authorization to make such submission, the appointment of a liquidator by GPA [or the Public Utilities Commission], the submission of an application to a court of competent jurisdiction for mandatory liquidation of GPA which application is not dismissed within ninety (90) Days, or the issuance of a final and conclusive order by a court of competent jurisdiction for liquidation or winding up of GPA;

(b) any default or defaults by GPA in the making of any payment or payments (other than payments disputed by GPA in good faith and by Notice to Project Company) required to be made by it within thirty (30) Days of the due date for such payment;

(c) any material breach by GPA of this Agreement (other than any such breach referred to elsewhere in this Article 5.3) that is not remedied within sixty (60) Days after Notice from the Project Company to GPA (which Notice shall (i) state that a material breach of this Agreement has occurred that could result in the termination of this Agreement, (ii) identify the material breach in reasonable detail and (iii) demand remedy thereof);

(d) any statement, representation, or warranty made by GPA in this Agreement proves to have been incorrect in any material respect when made, and such failure or incorrect statement, representation, or warranty has a material and adverse effect on GPA's ability to perform its obligations under this Agreement; or

(e) the occurrence of a GPA Event of Default under the LLA (as such term is defined therein) which is not cured within the applicable cure period (if any) provided for therein.

The Project Company shall deliver to the Agent a copy of any Notice given under this Article 5.3.

5.4 GPA Early Termination and Termination for Prolonged Force Majeure

(a) GPA shall have the right to terminate this Agreement for convenience at any time subject to the terms and procedures set forth in Article 5.5(e).

(b) GPA shall have the right to terminate this Agreement during a Prolonged Force Majeure, subject to the terms and procedures set forth in Article 5.5(g), unless the Project Company is exercising its [best efforts] to resolve the impact of the underlying Force Majeure event on the Project's performance and that such resolution is reasonably expected to occur within three (3) months and result in the Facility operating, on a continuing basis, with an annual availability of 90% or more.

5.5 Termination Notices and Rights

(a) Upon the occurrence of a GPA Event of Default or a Project Company Event of Default, as the case may be, the non-defaulting Party may, subject to the Lenders' Direct Agreement at its option, initiate termination of this Agreement by delivering a Notice (a "**Notice of Intent to Terminate**") of its intent to terminate this Agreement to the defaulting Party and the Agent. The Notice of Intent to Terminate shall specify in reasonable detail the Project Company Event of Default or the GPA Event of Default, as the case may be, giving rise to such Notice.

(b) Following the delivery of a Notice of Intent to Terminate, the Parties shall consult for a period of up to forty-five (45) Days in the case of a failure by either Party to make payments when due, and up to sixty (60) Days with respect to any other Event of Default (or such longer period as the Parties may mutually agree), as to what steps shall be taken with a view to mitigating the consequences of the relevant Event of Default taking into account all the circumstances. During the period following the delivery of the Notice of Intent to Terminate, the Party in default may continue to undertake efforts to cure the Event of Default, and if the Event of Default is cured at any time prior to the delivery of a Termination Notice in accordance with Article 5.5(b) then the non-defaulting Party shall have no right to terminate this Agreement in respect of such cured Event of Default.

(c) Upon expiration of the consultation period described in Article 5.5(a) and unless the Parties shall have otherwise agreed or unless the Event of Default giving rise to the Notice of Intent to Terminate shall have been remedied, the Party having given the Notice of Intent to Terminate may, subject to the Lenders' Direct Agreement and the conditions set forth in sub-sections (d)-(h) below, terminate this Agreement by delivery of a Notice (a "**Termination Notice**") to the other Party and the Agent, whereupon, subject to the Lenders' Direct Agreement, this Agreement shall immediately terminate.

(d) In the event of a termination by Project Company due to a GPA Event of Default, GPA shall have the right, but not the obligation, to acquire the Facility from Project Company for the applicable GPA Default Transfer Price set forth in Schedule 10. In order to exercise such right, GPA shall provide Project Company with Notice of its election to acquire the Facility within sixty (60) Days of receiving the applicable Notice of Intent to Terminate from Project Company, after which the Parties will commence working together diligently and in good

faith to effect such transfer within forty-five (45) Days or as soon as practicable thereafter.

(e) In the event of an early termination by GPA for convenience pursuant to Article 5.4, GPA shall be required to acquire the Facility from Project Company for the applicable Early Transfer Price set forth in Schedule 10. The Parties shall work together diligently and in good faith to effect such transfer within forty-five (45) Days of Project Company's receipt of GPA's early termination Notice or as soon as practicable thereafter.

(f) In the event of a termination by GPA due to a Project Company Event of Default, GPA shall have the right, but not the obligation, to acquire the Facility from Project Company for the applicable Project Company Default Transfer Price set forth in Schedule 10. In order to exercise such right, GPA shall provide Project Company with Notice of its election to acquire the Facility within sixty (60) Days of the date Project Company received the Notice of Intent to Terminate from GPA, after which the Parties shall commence working together diligently and in good faith to effect such transfer within forty-five (45) Days or as soon as practicable thereafter.

(g) In the event of a termination by GPA due to a Prolonged Force Majeure pursuant to Article 5.4, GPA shall have the right, but not the obligation, to acquire the Facility from Project Company for the applicable FM Transfer Price set forth in Schedule 10. In order to exercise such right, GPA shall provide Project Company with Notice of its election to acquire the Facility within sixty (60) Days of the date Project Company receives the applicable Notice of Intent to Terminate from GPA, after which the Parties will commence working together diligently and in good faith to effect such transfer within ninety 90 days or as soon as practicable thereafter.

(h) Any transfer contemplated in sub-sections (d)-(g) above shall be free and clear of all liens or other encumbrances and shall include all right, title and interest in and to the Facility including all fixtures, fittings, plant and equipment (including all test equipment, special tools, as-built drawings, software, documents, reports, analyses, all relevant files, plant procedures and forms as reasonably required and necessary for GPA to effectively operate the Facility after the transfer) and all improvements comprising the Facility.

5.6 Other Remedies

(a) The exercise of the right of a Party to terminate this Agreement, as provided herein, does not preclude such Party from exercising other remedies that are provided herein or available at law, provided that, notwithstanding the above:

i. no Party may terminate this Agreement other than in accordance with the express terms of this Agreement;

ii. the termination rights, rights to liquidated damages, and right to draw under the Performance Bond as expressly set out in this Agreement shall be the sole and exclusive remedies available to GPA against Project Company or the Project for any delay in Commissioning or failure of the Facility to be available or to meet the Dependable Capacity and/or outage requirements set out in this Agreement; and

iii. The termination right and right to draw under the Bid Guarantee shall be the sole and exlcusive remedies available to GPA against Project Company for failure to achieve Financial Close by the Required Financial Closing Date.

(b) Subject to Article 5 and paragraph (a) above, remedies are cumulative, and the exercise of, or failure to exercise, one or more of them by a Party shall not limit or preclude the exercise of, or constitute a waiver of, other remedies by such Party.

ARTICLE 6
COVENANTS, REPRESENTATIONS AND WARRANTIES

6.1 Project Company Covenants

The Project Company hereby covenants and agrees with GPA to:

(a) Develop, design, permit, engineer, finance, construct and complete the Facility in a good and workmanlike manner, only with materials and equipment that are new and of international utility-grade quality, and in all material respects in accordance with:

i. the Functional Specifications set forth in Schedule 1;

ii. the plans and specifications prepared in accordance with this Agreement;

iii. the Technical Limits set forth in Schedule 2;

iv. the EPA requirements;

v. all applicable Laws and the Government Authorizations;

vi. Prudent Utility Practices; and

vii. FERC and NERC requirements.

(b) Design, engineer, construct and complete the Facility in such a manner as to provide, with proper maintenance and operation, that the useful life of the Facility will be at least equal to 30 years;

(c) After the Phase 1 Commercial Operation Date, operate and maintain the Facility in all material respects, in accordance with:

i. the operating procedures developed pursuant to Article 7.4 and the Dispatch Instructions;

ii. the Technical Limits set forth in Schedule 2;

iii. the Guam and U.S. EPA requirements;

iv. all applicable Laws and the Government Authorizations; and

v. Prudent Utility Practices.

(d) Use all reasonable efforts to procure and maintain all Government Authorizations necessary for its performance under this Agreement;

(e) Engage only such advisors, representatives and experts as are experienced in the development, engineering, construction, financing, operation and maintenance of power stations similar to the Facility;

(f) Provide at its own risk and expense the necessary facilities and services for the safety, comfort and protection of its personnel;

(g) Work and cooperate in good faith with GPA with respect to all of GPA's obligations and rights hereunder.

6.2 GPA Covenants

GPA hereby covenants and agrees with Project Company to:

(a) Work with and cooperate in good faith with Project Company with respect to all of Project Company's obligations and rights hereunder;

(b) [Upon request by Project Company, GPA shall use its reasonable efforts to support Project Company in obtaining the Government Authorizations required by the provisions of Article 7.]

6.3 The Project Company Representations and Warranties

The Project Company hereby represents and warrants at the date of this Agreement that:

(a) The Project Company is a company duly organised, validly existing and in good standing under the Laws of Guam, and Project Company has all requisite corporate power and authority to conduct its business, to own its properties, and to execute, deliver, and perform its obligations under this Agreement;

(b) The execution, delivery and performance by Project Company of this Agreement have been duly authorised by all necessary corporate action on the part of Project Company, and do not and will not:

i. require any consent or approval of Project Company's Board of Directors, shareholders or partners other than those which have been obtained (evidence of which consents and approvals shall be, if it has not heretofore been, delivered to GPA upon its request), or

ii. violate or result in a breach of, or constitute a default under any provisions of Project Company's articles and memorandum of association or bylaws or other organic documents, or any material indenture, contract, or agreement to which it is a party or by which it or its properties may be bound, or any material law, rule, regulation, order, writ, judgment,

injunction, decree, determination, or award presently in effect applicable to Project Company.

(c) To the best of Project Company's knowledge, no Government Authorization or approval by any other Government Authority is necessary for the due execution, delivery and performance by Project Company of this Agreement;

(d) This Agreement is a legal, valid and binding obligation of Project Company, enforceable against Project Company in accordance with its terms; and

(e) There is no pending or, to the best of Project Company's knowledge, threatened action or proceeding against Project Company before any court, Government Authority or arbitrator that could materially and adversely affect the financial condition or operation of Project Company or the ability of Project Company to perform its obligations hereunder, or that could affect the legality, validity or enforceability of this Agreement (as in effect on the date hereof).

6.4 GPA Representations and Warranties

GPA hereby represents and warrants at the date of this Agreement that:

(a) GPA is a public corporation and an enterprise fund of the Government of Guam established by the Guam Power Authority Act of 1968, duly organised, validly existing, and in good standing under the Laws of Guam, and has all requisite corporate power and authority to conduct its business, to own its properties, and to execute, deliver, and perform its obligations under this Agreement.

(b) The execution, delivery and performance by GPA of this Agreement have been duly authorised by all necessary corporate or Government action, and do not and will not:

i. require any consent or approval of GPA's Board of Directors, shareholders, officers, or officials other than those which have been obtained (evidence of which consents and approvals shall be, if it has not heretofore been, delivered to the Project Company upon its request);

ii. violate or result in a breach or constitute a default under any provisions of GPA's articles and memorandum of association or bylaws, or other organic documents, or any material indenture, contract, or agreement to which it is a party or by which it or its properties may be bound, or any material law, rule, regulation, order, writ, judgment, injunction, decree, determination, or award presently in effect applicable to GPA.

(c) To the best of GPA's knowledge, no Government Authorization or approval by any other Government Authority is necessary for the due execution, delivery and performance by GPA of this Agreement other than [ ].

(d) This Agreement is a legal, valid, and binding obligation of GPA, enforceable against GPA in accordance with its terms.

(e) There is no pending or, to the best of GPA's knowledge, [threatened action or proceeding against GPA before any court], Government Authority, or arbitrator

that could materially and adversely affect the financial condition or operation of GPA or the ability of GPA to perform its obligations hereunder, or that could affect the legality, validity or enforceability of this Agreement (as in effect on the date hereof).

6.5 Not used.

6.6 Not used.

ARTICLE 7
PRE-OPERATIONAL PERIOD

7.1 Permits, Licenses and Approvals

Prior to the Phase 2 Commercial Operation Date, Project Company shall, at its own expense, obtain and maintain all Government Authorizations or any other permit, license, approval or authorization required to be obtained and maintained by Project Company as and when required to comply with its obligations under this Agreement, including reaching Financial Close by the Required Financial Closing Date, achieving the Phase 1 Commercial Operation Date by the Required Phase 1 Commercial Operation Date, and achieving the Phase 2 Commercial Operation Date by the Required Phase 2 Commercial Operation Date.

7.2 Documents to be Submitted by Project Company

Project Company shall provide the following documents to GPA:

(a) As soon as available but no later than the earlier of Financial Close and Notice to Proceed, a complete copy of the Construction Contract, including all exhibits and schedules thereto, and complete plans and specifications for the construction of the Facility, including drawings and interconnection points for SCADA and AGC, as soon as practical as these are completed, provided that the Project Company shall be entitled to request approval from GPA to redact certain commercial terms from the copy of the Construction Contract.

(b) As soon as available but no later than the earlier of Financial Close and Notice to Proceed, a complete copy of the O&M Contract (if applicable), including all exhibits and schedules thereto, provided that Project Company shall be entitled to request approval from GPA to redact certain commercial terms from the copy of the O&M Contract supplied to the GPA.

(c) As soon as available but no later than Financial Close, a complete copy of [placeholder for any other relevant agreements].

(d) On or before Financial Close, complete copies of all Government Authorizations that have been issued to Project Company for the design, financing, construction, operation and maintenance of the Facility.

(e) As soon as available, copies of all Government Authorizations other than those provided under the preceding clause that have been issued to Project Company or the Contractors (as applicable) for the design, financing, construction, operation and maintenance of the Facility.

(f) On or before Financial Close, a copy of Project Company's quality control program, [safety program, environmental compliance program, and security (including cybersecurity) program, each] with respect to all aspects of the design, engineering, equipping, construction, and operation and maintenance of the Facility.

(g) On or before the Construction Start Date, complete copies of all insurance policies and certificates of insurance required for construction as indicated in Article 15, provided that Project Company shall be entitled to redact from the copy of the insurance policies supplied to GPA, all commercial terms and all other information that Project Company reasonably considers to be of a confidential or proprietary nature.

(h) As soon as available, but not later than the Phase 1 Commercial Operation Date, complete copies of all insurance policies and certificates of insurance obtained pursuant to Article 15 other than those provided under the preceding clause.

(i) At least one hundred and twenty (120) Days (or such other period as shall be agreed between the Parties) before the scheduled commencement of the Testing and Commissioning for Phase 1, detailed programs and protocols to be used during the Testing and Commissioning of the Facility consistent with the provisions of this Agreement, including Article 8 and Schedule 4. The GPA Engineer and GPA shall have the opportunity to comment on the proposed program and protocols within thirty (30) Days of receipt from Project Company of said documentation, and the GPA Engineer, GPA, and Project Company will work together to agree on the procedures and protocols to be used for Testing and Commissioning not later than sixty (60) Days prior to the scheduled commencement of the respective Testing and Commissioning.

(j) At least sixty (60) Days before the scheduled commencement of the Phase 1 Commercial Operation Tests, the intended start up and test schedule.

(k) Not later than thirty (30) Days after the Commercial Operation Date for each Phase, copies of all test results, certified by the GPA Engineer, for the Commercial Operation Tests performed with respect to such Phase.

(l) All the drawings, manuals, procedures, and other technical documents listed in Schedule 1 at the time specified in Schedule 1.

7.3 Supply of Power

(a) The Project Company will arrange for the supply of all electrical energy and capacity required for construction of the Facility through (i) self-generation, or (ii) to the extent available, through making arrangements to purchase construction power from the GPA.

(b) GPA will arrange for backfeed power to be available at the Harmon Substation as required for testing and commissioning in accordance with the parameters set forth in Schedule 8. Any such backfeed power shall be charged to Project Company at the prevailing rates applicable to such power.

(c) Project Company will arrange for the supply of all electrical energy and capacity required for the maintenance and operation of the Facility by (i) generating it with Project Company's own facilities, or (ii) to the extent available, using backfeed power through GPA's Harmon substation. Any such backfeed power, to the extent it is supplied by GPA, shall be paid to GPA by Project Company at the then current rate for electricity at that location.

7.4 Operating Procedures

(a) Not later than one hundred eighty (180) Days before the Required Phase 1 Commercial Operation Date, Project Company shall provide GPA with a first draft of its proposed operating procedures dealing with all operation interfaces between GPA and Project Company, including the method of day-to-day communication, key personnel lists, clearances and switching practices, outage scheduling, capacity and energy reporting, operating log and reactive power support, which procedures shall be consistent with this Agreement, the designs of the Facility and the Grid System (including the principles and guidelines developed by GPA for the Grid System as part of and in accordance with the applicable system grid code and as provided to Project Company), and Prudent Utility Practices (the "Operating Procedures"). GPA shall cooperate with Project Company, including by providing responses to reasonable requests for information submitted by Project Company in preparation of the Operating Procedures.

(b) Within ninety (90) Days after GPA's receipt of the first draft of the Operating Procedures, GPA shall notify Project Company of any requested deletions, amendments or additions which, in the exercise of GPA's reasonable judgment, are necessary or desirable. Project Company shall make any deletions, amendments or additions that GPA reasonably requests unless such requests would be inconsistent with this Agreement, the designs of the Facility, and the Grid System or Prudent Utility Practices. GPA may, from time to time, require the Operating Procedures to be revised to conform to any duly established grid code binding on GPA to the extent that those revisions are not inconsistent with the terms of this Agreement, the designs of the Facility, the Grid System (including the principles and guidelines developed by GPA as part of and in accordance with the applicable system grid code for the Grid System), and Prudent Utility Practices.

7.5 GPA Observation Visits

GPA shall have the right, upon reasonable prior Notice, and subject to the safety rules and regulations of Project Company, to have its agents or employees at the Site at any time; provided that (i) such visits do not unreasonably interfere with the construction, testing, Commissioning, operation or maintenance of the Facility and (ii) such visits are at GPA's own expense. All persons visiting the Facility on behalf of GPA shall comply with the reasonable instructions and directions of Project Company and/or its Contractors. GPA shall bear responsibility for any claim, demand, action, proceeding, loss or damage to such persons or any property of Project Company caused by the negligence or wilful misconduct of any persons visiting pursuant to this Article 7.5 or the negligence or wilful misconduct of GPA during such visits. Insurance policies issued to Project Company must also cover GPA personnel and the GPA Engineer during their visits to the Site during the Term.

7.6 Project Company Progress Reports

Commencing on the date of this Agreement and continuing until the end of the Term, the Project Company shall submit progress reports to GPA prior to the fifteenth (15th) Day of each Month. Such reports shall cover in reasonable detail the progress in the development, permitting, financing, procurement, construction, and operation of the Facility for the preceding Month.

Prior to the Phase 2 Commercial Operation Date, the progress report shall include, as a minimum, an updated critical path schedule, a list of activities completed in the preceding month, a list of activities behind schedule and reasons therefor, a recovery plan for activities more than 30 days behind schedule, a safety report specifying all safety related incidents (e.g. fatalities, lost time accidents, and near misses), and a list and description of outstanding issues or concerns impacting, or reasonably expected to impact, the Project or its implementation schedule.

Subsequent to the Phase 1 Commercial Operation Date, the progress report shall include, as a minimum, an operational performance report (including hours of operation, gross and net capacity, heat rate, auxiliary load, number of trips, outages, or derations), description of maintenance activity, an updated maintenance plan, a safety report specifying all safety related incidents (e.g. fatalities, lost time accidents, and near misses), a list and detailed description of any environmental or security violations and a list and description of outstanding issues or concerns impacting the operation and maintenance of the Facility.

ARTICLE 8
TESTING OF THE FACILITY

8.1 Testing of the Facility Prior to the Commercial Operation Date

(a) Project Company shall provide to GPA on an on-going basis relevant information regarding its program for testing the Facility, including any delay suffered, or reasonably anticipated to be suffered, in the date of synchronization of a Unit (or Facility) or to the Expected Phase 1 or Phase 2 Commercial Operation Dates.

(b) Not less than sixty (60) Days prior to each of the Expected Phase 1 Commercial Operation Date and Phase 2 Commercial Operation Date, Project Company will deliver to GPA in writing the final program for testing, including the expected duration of Project Company's start-up and testing program and a tentative schedule for conducting all tests required by Schedule 4. Project Company shall advise GPA in writing of its final schedule for the testing program not less than fifteen (15) Days prior to the commencement of the tests required by Schedule 4. If the schedule for any test required by Schedule 4 is adjusted after Project Company has provided GPA with the final testing program schedule, Project Company shall advise GPA not less than seventy-two (72) hours prior to the commencement of any such test. On each Day beginning with the Day on which testing commences, Project Company shall provide GPA with a schedule of the tests to be conducted on the following Day or Days, if such test will continue for more than one (1) Day. All testing of the Facility shall satisfy the requirements provided in Schedule 4 and the procedures and protocols agreed upon by GPA, Project Company, and the GPA Engineer pursuant to Article 7.2(i). GPA will make all reasonable efforts to accept all the

energy generated by the Facility during the Period of Testing and enable full load operation of the Facility during Dependable Capacity Tests.

(c) If GPA is unable to accommodate the schedule for such test or tests as provided by Project Company in the final schedule for the program of tests pursuant to the foregoing Article 8.1(b), GPA will give Project Company a Notice regarding deferral of any test or tests within seventy-two (72) hours of its receipt of the final schedule for testing, and the Parties will mutually agree on a date for any deferred test or program of tests.

(d) Additional Commercial Operation Tests

i. Project Company shall be entitled to attempt as many Commercial Operation Tests as are necessary to ensure that each Phase is Commissioned in accordance with the requirements of this Agreement. Project Company shall give GPA not less than seventy-two (72) Hours' Notice of each additional Commercial Operation Test it desires to attempt.

ii. Notwithstanding Article i, if the results of a Commercial Operation Test satisfy the applicable minimum performance criteria for successful completion of such Commercial Operation Test, but Project Company is not satisfied with the results of such Commercial Operation Test, Project Company may request additional tests to establish the results of the Commercial Operation Test with at least seventy-two (72) Hours' prior Notice provided to GPA prior to a subsequent test; provided, however, that Project Company will continue to be responsible for any delay liquidated damages under Article 9.1 and will not be paid for capacity until it has notified GPA that Project Company has designated the test as the Commercial Operation Test in accordance with sub-clause (iii) below.

iii. When Project Company is satisfied with a test to establish the Phase 1 Commercial Operation Date or Phase 2 Commercial Operation date, as the case may be, Project Company shall notify GPA that Project Company has designated such test as the Commercial Operation Test. The Initial Dependable Capacity shall be set at any level successfully demonstrated during the Commercial Operation Test up to the Contracted Facility Capacity.

iv. The Phase 1 Commercial Operation Date and the Phase 2 Commercial Operation Date shall occur and payment for Capacity Charges shall commence as of the first Day after the Day the relevant Phase is Commissioned. In the event that Project Company is unable to demonstrate in the Phase 2 Commercial Operation Tests (carried out in accordance with the foregoing subparagraph (d)(i)) that the Facility is capable of operating at Threshold Capacity, GPA may terminate this Agreement as a Project Company Event of Default in accordance with Article 5.5.

8.2 Testing of Dependable Capacity and Heat Rate of the Facility after the Commercial Operation Date

The following provisions with respect to Testing the Facility after the Phase 2 Commercial Operation Date shall apply:

(a) Dependable Capacity shall be tested annually after the Phase 2 Commercial Operation Date at times mutually agreed upon by Project Company and GPA. Project Company may, within twenty-four (24) hours of completion of a Dependable Capacity Test, reject the test and may conduct a retest at a time to be mutually agreed; provided, however, that Project Company cannot conduct more than two (2) retests of any Dependable Capacity Test before the level of capacity achieved during such a test is set as the Dependable Capacity. Project Company shall give GPA at least forty eight (48) hours' prior Notice of the first retest and twenty four (24) hours' prior Notice of the second retest, and any retest shall be conducted within ten (10) Days after the completion of the rejected test.

(b) The test period for the Dependable Capacity Test shall be for six (6) continuous hours for a fossil fuel fired Facility or a Fossil Fuel Fired Component of the hybrid Facility. The test shall be run using the Metering System and plant instrumentation for measurements, unless otherwise decided by the Joint Coordinating Committee. The Dependable Capacity shall be the Net Energy Output (excluding any Excess Energy) during those six (6) hours corrected for Site Reference Conditions divided by six (6), but may not exceed the Contracted Facility Capacity. If, as the result of a Dependable Capacity Test, the tested capacity is shown to be above the Dependable Capacity in effect prior to such test, Project Company shall set the Dependable Capacity at the new tested capacity up to the Contracted Facility Capacity, and payments for the Dependable Capacity shall be increased accordingly, effective the Day such Dependable Capacity Test is completed. If, as a result of the Dependable Capacity Test, the tested capacity is shown to be below the Dependable Capacity in effect prior to such test, the Dependable Capacity will be reduced to the newly tested capacity, and payments for the Dependable Capacity shall be decreased to the tested level, effective the Day Dependable Capacity Test is completed.

(c) Between annual tests, GPA may request one (1) additional Dependable Capacity Test if GPA reasonably believes that the currently set Dependable Capacity does not accurately reflect the Dependable Capacity previously declared to GPA. GPA shall provide written Notice of its request to test fourteen (14) Days prior to the requested test date. Project Company shall be entitled to one (1) retest of such Dependable Capacity Test before the level of capacity achieved during such a test is set as the Dependable Capacity provided that it rejects the test within twenty-four (24) hours of completing the Dependable Capacity Test. Each such Dependable Capacity Test and, as appropriate, any retest, shall be conducted in accordance with the foregoing Subsection (b), within ten (10) Days of its request or, as the case may be, the rejection, and Project Company shall give GPA not less than seventy-two (72) hours Notice of its intention to perform such retest.

(d) Between annual tests, Project Company may:

i. conduct one additional Dependable Capacity Test; and

ii. in addition to Project Company's right to request an additional Dependable Capacity Test under Article i above, conduct (at Project Company's cost) one additional Dependable Capacity Test if GPA has elected to conduct an additional Dependable Capacity test mentioned in Article 8.2 (c) during a Forced Outage,

in each case, if Project Company reasonably believes that the currently set Dependable Capacity does not accurately reflect the Dependable Capacity that the Facility is able to achieve.

Each such Dependable Capacity Test carried out pursuant to this Article 8.2(d) shall be conducted in accordance with Article 8.2(b) and Project Company shall give GPA not less than seventy-two (72) hours' Notice of its intention to perform each such Dependable Capacity Test.

(e) Notwithstanding anything to the contrary in this Agreement, no Dependable Capacity Test will be conducted during a Scheduled or Maintenance Outage, during the occurrence of a Force Majeure that affects the Facility, or while the consequences of such Force Majeure continue to affect the Facility. For the avoidance of doubt, the additional Dependable Capacity Test mentioned in Article 8.2(c) may be conducted during a Forced Outage.

(f) If GPA requires the Facility to operate on Natural Gas in accordance with the provisions of Article 4.4:

i. GPA shall issue a Notice to Project Company stating the date, which shall not be less than 60 Days from the date of the Notice, starting from which it could start the supply of Natural Gas;

ii. Project Company shall be allowed a period of twenty five (25) Days following the date set forth in the above-mentioned Notice to implement the switch to Natural Gas and to perform the tests set forth in Schedule 4;

iii. during such twenty five (25) Day period, which shall be extended in case of occurrence of any Force Majeure event or unavailability of Natural Gas:

(A) The Facility shall be deemed to provide the Dependable Capacity and the Project Company shall receive the full Capacity Charge;

(B) GPA shall provide sufficient quantities of Natural Gas in order to allow Project Company to implement the switch;

(C) Provision of Natural Gas by GPA to Project Company up to [ ] MMBtu of Natural Gas (the "**Maximum Natural Gas Switch Quantity**") shall be at GPA's cost;

(D) Provision of Natural Gas by GPA to Project Company in quantities exceeding the Maximum Natural Gas Switch Quantity shall be at Project Company's cost;

(E) and Project Company shall perform the tests referred to in Schedule 4 and shall be required to conduct (including after the expiry of such period) as many retests as necessary to pass these tests in accordance with the provisions of Schedule 4.

(g) The Parties agree that the provisions of paragraph (f) above shall only apply when GPA elects to burn Natural Gas for the first time during the Term.

(h) GPA shall have the right to request that the Facility's heat rate be tested concurrently with any Dependable Capacity Test and Project Company shall be obligated to comply with such request.

8.3 Notice of and Compliance with Testing Procedures

Project Company shall carry out Commissioning of Phase 1 and Phase 2, the testing of the Initial Dependable Capacity at or prior to the Phase 1 and Phase 2 Commercial Operation Dates and the testing of the Dependable Capacity of the Facility thereafter in accordance with Articles 8.2 and Schedule 4. GPA shall use its reasonable efforts to comply promptly with all reasonable requests made by Project Company for assistance in carrying out such testing and Commissioning. GPA shall be given prior Notice of the testing or Commissioning procedure in accordance with Article 8.2 and shall be entitled to be present and observe any such testing and Commissioning. The procedures and results of such Tests shall be certified by the GPA Engineer.

8.4 Copies of Test Results

Project Company shall provide GPA with copies of the results of all tests performed pursuant to Schedule 4 and after every Major Overhaul of a generating Unit at the Facility. GPA shall not use or disclose such results other than in connection with the administration and enforcement of this Agreement or subject to applicable Law.

8.5 Deemed Commissioning

(a) In the event that for any reason (other than a breach by Project Company of its obligations under this Agreement or any other Project Agreement):

i. Due to (A) any action or inaction by GPA which is inconsistent with the terms of this Agreement (including any default or breach), [(B) the discovery of a Pre-Existing Site Condition, (C) any failure by GPA or any third party appointed by GPA to carry out remediation work in accordance with Article **Error! Reference source not found.**] or (D) unavailability of Fuel, a Commercial Operation Test is delayed beyond the date falling fourteen (14) Days before the Required Phase 1 Commercial Operation Date or Required Phase 2 Commercial Operation date (whichever is applicable), then upon receipt of a certificate from an Independent Engineer to the effect that the Facility is, or would have been, ready for testing by the relevant Required Commercial Operation Date, the Facility shall be deemed Commissioned for the respective Phase fifteen (15) Days after the relevant Required Commercial Operation Date (provided that for the avoidance of doubt the Project Company shall in no event be required to pay delay liquidated damages under Article 9.1 for such fifteen (15) Day period) and the Facility shall be deemed to be

providing Initial Dependable Capacity equal to the applicable Contracted Facility Capacity for the purposes of payments of Capacity Charges to be made by GPA to Project Company.

If the Facility has been deemed Commissioned for a Phase, the Commercial Operation Tests for such phase shall be conducted at the first available opportunity after such deemed Commissioning, and the Initial Dependable Capacity adjusted as a result of such test in accordance with subsection (b) below. Project Company shall use reasonable efforts to mitigate the delay caused by any of the events mentioned in this Article 8.5(a).

(b) In the event that the Initial Dependable Capacity of the Facility at the Commercial Operation Tests after the Phase has been deemed Commissioned, is less than the applicable Contracted Facility Capacity, Project Company shall refund to GPA an amount equal to:

i. the difference, if any, between the applicable Contracted Facility Capacity and the Initial Dependable Capacity divided by the applicable Contracted Facility Capacity; times

ii. the total Capacity Charges paid between the date of deemed Commissioning and the date upon which the Initial Dependable Capacity Tests take place; provided, however, that in the event that the Initial Dependable Capacity for Phase 2 is less than the Threshold Capacity, the Project Company shall refund all Capacity Charges received based on deemed Commissioning.

(c) If, due to a delay mentioned in Article 8.5(a), either or both of the actual Phase 1 Commercial Operation Date or the actual Phase 2 Commercial Operation Date does not occur within one (1) month of the relevant Required Commercial Operation Date, GPA shall indemnify Project Company for (i) the actual reasonable documented costs of demobilisation and remobilisation of personnel of Project Company, the O&M Contractor and of the Construction Contractor, and (ii) for any other actual reasonable documented costs payable to the Construction Contractor.

ARTICLE 9
LIQUIDATED DAMAGES PAYABLE BY PROJECT COMPANY

9.1 Delay in Commissioning

Project Company covenants that Phase 1 shall be Commissioned on or before the Required Phase 1 Commercial Operation Date. If the Phase 1 Commercial Operation Date has not occurred by the Required Phase 1 Commercial Operation Date, the Project Company shall pay GPA, as liquidated damages, for the delay in Phase 1 Commissioning a sum equal to US$ [TBD] for each Day of delay or fraction thereof.

Project Company covenants that Phase 2 shall be Commissioned on or before the Required Phase 2 Commercial Operation Date. If the Phase 2 Commercial Operation Date has not occurred by the Required Phase 2 Commercial Operation Date, the Project Company shall pay GPA, as liquidated damages,

for the delay in Phase 2 Commissioning a sum equal to US$ [TBD] for each Day of delay or fraction thereof.

In no event shall the damages assessed under this Article 9.1 exceed [US$40,000,000].

9.2 Failure to Meet Contracted Facility Capacity

(a) Project Company covenants that the Initial Dependable Capacity of Phase 1 shall not be less than the Contracted Phase 1 Capacity. In the event that upon completion of the Dependable Capacity Test used to establish the Initial Dependable Capacity of Phase 1 at or prior to the Phase 1 Commercial Operation Date, pursuant to Article 8, the Initial Dependable Capacity for Phase 1 is less than the Contracted Phase 1 Capacity, Project Company shall have the option for a period of up to six (6) months from the Phase 1 Commercial Operation Date to undertake any necessary actions ("**Remedial Actions**") to increase the Initial Dependable Capacity to the Contracted Phase 1 Capacity at its own cost. Within 15 Days of the expiration of such period or any decision by Project Company not to undertake Remedial Actions (whichever is the earlier to occur), Project Company shall pay to GPA, as liquidated damages, an amount equal to US$ [TBD] per kW of the shortfall between the most recently determined Initial Dependable Capacity and the Contracted Phase 1 Capacity.

(b) Project Company covenants that the Initial Dependable Capacity of Phase 2 shall not be less than the Contracted Phase 2 Capacity. In the event that upon completion of the Dependable Capacity Test used to establish the Initial Dependable Capacity of Phase 2 at or prior to the Phase 2 Commercial Operation Date, pursuant to Article 8, the Initial Dependable Capacity for Phase 2 is less than the Contracted Phase 2 Capacity (but greater than the Threshold Capacity), Project Company shall have the option for a period of up to six (6) months from the Phase 2 Commercial Operation Date to undertake Remedial Actions to increase the Initial Dependable Capacity to the Contracted Phase 2 Capacity at its own cost. Within 15 Days of the expiration of such period or any decision by Project Company not to undertake Remedial Actions (whichever is the earlier to occur), Project Company shall pay to GPA, as liquidated damages, an amount equal to US$ [TBD] per kW of the shortfall between the most recently determined Initial Dependable Capacity and the Contracted Phase 2 Capacity.

(c) In no event shall the damages assessed under this Article 9.2 exceed [US$ 35,000,000].

(d) Results of all Initial Dependable Capacity Tests and Dependable Capacity Tests shall be valid only to the extent such tests are performed while the Facility operates within the requirements of all Government Authorizations and the environmental permits.

9.3 Excessive Outages

(a) Excessive Forced Outages

Project Company covenants that, in respect of each Contract Year, the Excessive Forced Outages Energy ("**EFOE**") for such Contract Year shall be less than or equal to zero (0).

In the event that, during any Contract Year other than the first Contract Year, the Excessive Forced Outages Energy is greater than zero (0), then Project Company shall pay to GPA, as liquidated damages, the Capacity Damages, calculated as follows:

Capacity Damages (US$) =

Capacity Damages Amount (US$/MW) x 1.4 x Excessive Forced Outages Energy (MWh)/ eight thousand seven hundred sixty (8760) hours)

Where the Capacity Damages Amount equals the product of (i) the Capacity Charge per MW per Month prevailing during the relevant Contract Year and (ii) 12 Months.

i. The Excessive Forced Outages Energy (EFOE) for any Contract Year, other than as modified in Article 9.3 for the first Contract Year, will be the sum of the actual Forced Outages (FOE) minus the Allowable Forced Outages Energy (AFOE), , namely:

Excessive Forced Outages Energy (MWh) = [FOE – (AFOE)] (each term expressed in MWH)

FOE (MWh)	=	the summation of all periods of Forced Outage of this product: duration of outage (hours) x reduction in Dependable Capacity (MW).
AFOE (MWh)	=	Annual Average Dependable Capacity (MW) x [insert guaranteed maximum forced outage hours included in Bidder's Proposal] hours.

ii. If the EFOE for any Contract Year is less than or equal to zero, no liquidated damages are due.

(b) Excessive Total Outages

Project Company covenants that, in respect of each Contract Year, the Excessive Total Outages Energy ("**ETOE**") for such Contract Year shall be less than or equal to zero (0).

In the event that, during any Contract Year other than the first Contract Year, the Excessive Total Outages Energy is greater than zero (0), then Project Company shall pay to GPA, as liquidated damages, the Capacity Damages, calculated as follows:

Capacity Damages (US$) =

Capacity Damages Amount (US$/MW) x 1.4 x Excessive Total Outages Energy (MWh)/ eight thousand seven hundred sixty (8760) hours)

Where the Capacity Damages Amount equals the product of (i) the Capacity Charge per MW per Month prevailing during the relevant Contract Year and (ii) 12 Months.

i. The Excessive Total Outages Energy (ETOE) for any Contract Year, other than as modified in Article 9.3 for the first Contract Year, will be the sum of the actual total outages (FOE, MOE and SOE) minus the Allowable Total Outages Energy (ATOE), minus the difference between the Forced Outages (FOE) and the Allowable Forced Outages Energy (AFOE), namely:

Excessive Total Outages Energy (MWh) = [FOE + MOE + SOE - (ATOE)] - [FOE – (AFOE)] (each term expressed in MWH)

FOE (MWh)	=	the summation of all periods of Forced Outage of this product: duration of outage (hours) x reduction in Dependable Capacity (MW).
MOE (MWh)	=	the summation of all periods of Maintenance Outage of this product: duration of outage (hours) x reduction in Dependable Capacity (MW).
SOE (MWh)	=	the summation of all periods of Scheduled Outage of this product: duration of outage (hours) x reduction in Dependable Capacity (MW).
ATOE (MWh)	=	Annual Average Dependable Capacity (MW) x [insert guaranteed maximum total outage hours pursuant to the availability guarantee included in Bidder's Proposal] hours.
AFOE (MWh)	=	Annual Average Dependable Capacity (MW) x [insert guaranteed maximum forced outage hours pursuant to the forced outage rate guarantee included in Bidder's Proposal] hours.

ii. If the ETOE for any Contract Year is less than or equal to zero, no liquidated damages are due.

9.4 Failure to Meet Guaranteed Amount of Renewable Energy

If the Facility is a hybrid Facility, the Project Company guarantees that, for each Contract Year, the Net Energy Output derived from the Renewable Component shall be equal to or greater than the Guaranteed Amount of Rewable Energy. After the end of each Contract Year, GPA shall verify the amount of Net Energy Output derived from the Renewable Component for such year and if it is less than the Guranteed Amount of Renewable Energy applicable to such year, the Project Company shall be liable for Renewable Component Liquidated Damages which shall be payable as part of the next monthly invoice. Renewable Component Liquidated Damages shall be equal to the amount of the annual shortfall (in kWh) multiplied by the average Energy Charge (in $/kWh) for the applicable Contract Year.

9.5 Waiver of Defences

Notwithstanding that GPA may be substantially damaged in amounts that may be difficult or impossible to determine in the event that a Phase or Renewable Component (i) is not Commissioned by the date required, (ii) is not capable of achieving and maintaining the Contracted Phase 1 Capacity or the Contracted Facility Capacity or the Guaranteed Amount of Renewable Energy, (iii) cannot minimise the number of Forced Outages, or (iv) cannot achieve the designated operating levels, the Parties agree that the sums set out in this Article 9 constitute a genuine pre-estimate of the loss to GPA and as a result are fair and reasonable as liquidated damages and it is further understood and agreed that the payment of liquidated damages is in lieu of actual damages for such occurrences. Project Company hereby waives any defence as to the validity of any liquidated damages in this Agreement on the grounds that such damages are void as penalties.

9.6 Financial Close and Security Deposits

(a) Notice of Possible Delays to Financial Close

Project Company shall, promptly (and in no event later than seven (7) Days after becoming aware thereof) give written notice to GPA of the occurrence of any event which delays, or is reasonably likely to delay, Financial Close beyond the Required Financial Closing Date. Within fourteen (14) Days after any such initial notice, Project Company shall provide GPA with a further written notice substantiating such occurrence in reasonable detail, its effect on Project Company's ability to achieve Financial Close, and its effects, if any, on the Project, including financial implications. Further, Project Company shall thereafter provide such further information and updates as GPA may reasonably request from time to time in order to substantiate such occurrence and/or such effects.

(b) Extension of Required Financial Closing Date

If Project Company does not achieve Financial Close by the Required Financial Closing Date due to reasons other than an Excusable Event or other than Project Company's failure, then the Required Financial Closing Date shall be extended until the date that is ninety (90) Days after the original Required Financial Closing Date, provided that prior to any such extension, the validity period of the Bid Guarantee shall have been extended (by written amendment thereto delivered to GPA) until the extended Required Financial Closing Date.

(c) Failure to Achieve Financial Closing

In the event that Project Company fails to achieve Financial Close by the Required Financial Closing Date or extended Required Financial Closing Date, either Party may terminate this Agreement. In the event of such termination, GPA shall be entitled to cash the Bid Guarantee, in which event neither Party shall have any further liability or obligation to the other under this Agreement, except for liabilities accrued hereunder prior to or upon such termination (including liability for any breach of this Agreement by the Project Company).

(d) Financial Closing

At Financial Close, GPA shall return the Bid Guarantee to Project Company and Project Company shall provide to GPA a security deposit (the "**Performance Bond**") in an amount in Dollars equal to US$75,000,000 to ensure Project Company's obligations to pay liquidated damages in accordance with Articles 9.1 and 9.2. The Performance Bond shall terminate three (3) Months after the Phase 2 Commercial Operation Date (or, in the case that Project Company opts to pursue Remedial Actions, six (6) months thereafter), at which point GPA shall return the Performance Bond to Project Company. The Performance Bond shall consist of either: (i) an unconditional and irrevocable direct pay letter of credit issued by an international bank with an investment grade rating in form and substance reasonably acceptable to GPA; (ii) a bank guarantee issued by an international bank with an investment grade rating in form and substance reasonably acceptable to GPA; or (iii) a performance bond issued by an international surety with an investment grade rating in form and substance reasonably acceptable to GPA.

9.7 Payments of Liquidated Damages

(a) Within fourteen (14) Days after the end of (i) each Month in respect of amounts due pursuant to Articles 9.1 and 9.2, and (ii) each Contract Year in respect of amounts due pursuant to Article 9.3 and 9.4, GPA shall compute and advise Project Company by Notice (a "**Liquidated Damages Notice**") of the amount of liquidated damages, if any, due to GPA pursuant to this Agreement for the preceding Month or Contract Year, as the case may be. Subject to Article 9.7(b), Project Company shall pay to GPA the amount of liquidated damages shown on the Liquidated Damages Notice within ten (10) Business Days of the date of the Liquidated Damages Notice (the "**Liquidated Damages Due Date**"). If Project Company fails to pay any amount due pursuant to Article 9.1, 9.2, 9.3, and 9.4 by the Liquidated Damages Due Date, GPA shall be entitled to draw such amount from the Performance Bond. Interest shall accrue on any unpaid and undrawn amount from the Liquidated Damages Due Date until the date payment is made at the rate of the Bank Rate. Save to the extent that the amount of liquidated damages reflected on the Liquidated Damages Notice is paid to GPA by Project Company or, with respect to liquidated damages pursuant to Article 9.1, 9.2, 9.3, and 9.4, drawn from the Performance Bond, the amount of liquidated damages pursuant to Article 9.1, 9.2, 9.3, or 9.4 plus accrued interest due to GPA may be set off against amounts owed to Project Company by GPA on the next statement(s) submitted to GPA pursuant to Article 14.

(b) In the event of any Dispute as to the computation or payment of liquidated damages, Project Company shall provide Notice to GPA specifying the amount disputed and the reason therefor. In such event, the amounts not disputed shall be paid as described in this Article 9 and the Dispute shall be settled in accordance with the Dispute resolution procedures set forth in Article 19. If any such Dispute is resolved in favor of GPA, the determination of amounts due to GPA shall include interest at the rate specified for late payment in Article 9.7(a). Upon resolution, the Project Company shall pay the amount determined to be owed to GPA within ten (10) Days of such resolution, failing which GPA shall be entitled to claim such amount from the Performance Bond, as applicable.

ARTICLE 10
CONTROL AND OPERATION OF THE FACILITY

10.1 Operating Procedures

The Facility shall be operated and maintained in accordance with the Operating Procedures.

10.2 Dispatch

(a) The PSCC will issue Dispatch Instructions to establish the Net Energy Output that the Facility is expected to feed into the Grid System during forthcoming periods of time. In coordination with GPA, Project Company shall be responsible for determining the operating modes (including but not limited to the determination of how to load each Unit) that will result in the most efficient and reliable operation.

(b) Project Company shall notify GPA and the PSCC whenever a Dispatch Instruction results in a part of or the whole Facility being operated beyond the Technical Limits. Project Company never has an obligation to operate and GPA never has a right to dispatch the Facility beyond the Technical Limits. The Operating Procedures shall establish the circumstances under which Project Company will trip a Unit, prior to such Unit being tripped by a protective device.

(c) Dispatch Instructions shall indicate the total amount of Net Energy Output required during the relevant period, expressed as an amount in MW, which amount may not exceed the Declared Capacity unless and to the extent Excess Energy is available.

10.3 Scheduling of Capacities and Energy

GPA and Project Company shall cooperate in establishing the following scheduling for the Facility's Dependable Capacity and Net Energy Output:

(a) Year-Ahead Notification: Not less than ninety (90) Days before the scheduled Commercial Operation Date for a Phase and thereafter not less than ninety (90) Days before the beginning of each Contract Year, GPA shall provide to Project Company good faith estimates of its requirements on a Monthly basis, for the Net Energy Output and the maximum capacity required during that Contract Year, but shall not be bound by those figures. GPA will also indicate the desired maintenance periods for the upcoming Contract Year.

(b) Quarter-Ahead Notification: Not less than sixty (60) Days before each quarter of each Contract Year, GPA shall provide to Project Company good faith estimates of its requirements, on a week-by-week basis for the Net Energy Output and maximum capacity required during that quarter and also provisionally for the following quarter, but shall not be bound by those figures.

(c) Month-Ahead Notification: Not less than fourteen (14) Days before each Month, GPA shall provide to Project Company good faith estimates of its requirements on a day-by-day basis, for the Net Energy Output and maximum capacity

required during that Month and also provisionally for the following Month, but shall not be bound by those figures.

(d) Week-Ahead Notification: Not later than 12:00 noon on Thursday before each week beginning on each Saturday, GPA shall:

(i) provide Project Company estimated requirements, on an hour by hour basis, for the Net Energy Output and maximum capacity required during that week and also provisionally, during the following week, but shall not be bound by these figures; and

(ii) determine which Fuel shall be used each hour during that week.

(e) Declared Capacity Notification: To enable GPA to give final schedules of requirements, Project Company shall notify the PSCC, by 8:00 a.m. each Day, of the Declared Capacity available during each hour of the following Day. However, Project Company may notify the PSCC, not less than twelve (12) hours prior to its scheduled occurrence, of any reasonable modification to the Declared Capacity schedule. The Notices that Project Company is required to send to GPA pursuant to this Article 10.3(e) shall include the number of MW available for each Unit during each hour of the following day and the amount and type of Fuel required to comply with the expected dispatch. The availability of the Facility shall be based, for the purposes of determining the Declared Capacity or calculating Outage Hours, on the availability of the Facility with the Fuel that GPA instructs the Project Company to run.

(f) Day-Ahead Notification: Not less than 8 hours before the start of each Day the PSCC shall provide to Project Company firm requirements in accordance with Article 10.2(c), on an hour-by-hour basis for capacity during that Day and also, provisionally, during the following Day. The firm requirements shall be binding upon GPA; provided, however, Project Company shall not unreasonably withhold its consent to any reasonable request from GPA for an alteration to its requirements.

(g) Information Related to Renewable Component: Project Company shall provide the PSCC with [real time] updates of the current production and the seven (7) day hourly production forecast for the Renewable Component.

(h) The methods for scheduling the capacity may be modified from time to time. Such modifications may be initiated by GPA, the PSCC, or Project Company and must be approved by the Joint Coordinating Committee.

10.4 Scheduled Maintenance.

(a) Project Company shall submit its desired schedule of Scheduled Outage periods (including the duration of each such period) to GPA six (6) months before the Required Phase 2 Commercial Operation Date and thereafter on [ ] 1st of each calendar year. Project Company shall use commercially reasonable efforts to schedule any Scheduled Outage periods during the period from [insert applicable month] to [insert applicable month] only or such other alternative periods as GPA may specify, provided that GPA does specify at least one (1) year in advance the alternative period and that the period available for Scheduled Outages is of equal duration to the period specified

herein. Within thirty (30) Days of receipt of such schedule, GPA shall notify Project Company in writing as to the acceptability of such schedule. Project Company shall use all reasonable efforts to make each such Scheduled Outage period of relatively short duration consistent with the Technical Limits, Prudent Utility Practices, and the recommendations of the manufacturers of the various components of the Facility. The Project Company shall use all reasonable efforts to perform maintenance of equipment connected with photovoltaic solar production between the hours of [8:00pm and 6:00am].

(b) If GPA does not accept any one or more of the requested Scheduled Outage(s) periods, GPA shall advise Project Company within thirty (30) Days of the receipt of Project Company's notification in accordance with sub-section (a) above of the acceptable period when GPA determines any such unacceptable Scheduled Outage can be rescheduled. The rescheduled time shall be as close as reasonably practicable to the requested time, shall be consistent with the Technical Limits, Prudent Utility Practices and the recommendations of the manufacturers of the various components of the Facility, and shall be of the same duration as the requested period. If GPA fails within such thirty (30) Day period to object to any Scheduled Outage for which it receives Notice pursuant to subsection (a) above or fails within such period to advise Project Company of a substitute time, Project Company may schedule and conduct the Scheduled Outage(s) as initially requested.

(c) Project Company shall schedule Scheduled Outages only at times determined as aforesaid; provided, however, that GPA may not require Project Company to schedule Scheduled Outages in a manner or time which is outside the Technical Limits, is inconsistent with Prudent Utility Practices or the recommendations of the manufacturers of the various components of the Facility.

(d) Notwithstanding the fixing of a time for a Scheduled Outage pursuant to subsections (a), (b) and (c) above, GPA may, upon at least ninety (90) Days prior Notice and upon agreeing to pay the documented increased cost, if any, to the Project Company resulting therefrom, require Project Company to reschedule a Scheduled Outage; provided, however, (i) GPA shall not require such Scheduled Outage to be rescheduled for a period of shorter or longer duration or in a manner or time that is outside the Technical Limits, or inconsistent with Prudent Utility Practices or the recommendations of the manufacturers of the various components of the Facility, (ii) GPA shall not require that a single Scheduled Outage period be split into two or more periods without compensating Project Company for any additional costs incurred thereby, and (iii) GPA shall not require that a Scheduled Outage be brought forward any earlier than sixty (60) Days from the date of such Notice without the consent of Project Company.

(e) Notwithstanding the fixing of a time for a Scheduled Outage pursuant to sub sections (a), (b) and (c) above, Project Company may request a rescheduling of any Scheduled Outage upon ninety (90) Days prior written Notice to GPA. GPA shall respond to such request within ten (10) Business Days and shall not unreasonably withhold its permission for such rescheduling.

(f) When the need arises for a Maintenance Outage, Project Company shall advise GPA of such need and of the commencement and estimated duration of such work, and GPA shall allow Project Company to schedule such Maintenance Outage within a period of time that is reasonable under the circumstances, but in any event not to exceed the time required by the Technical Limits and Prudent Utility Practices. Project Company shall use all reasonable efforts to conduct such Maintenance Outage during off-peak hours, provided, however, that with respect to equipment used for photovoltaic solar production, the Project Company shall use all reasonable efforts to perform maintenance between the hours of [8:00pm and 6:00am]. Project Company may advise GPA orally of the above matters set forth in this subsection (f), and GPA shall respond orally within twenty-four (24) hours of such notice. GPA shall confirm its communication in writing within one (1) week of such oral notice.

(g) For those years in which Project Company plans to conduct a Major Overhaul, Project Company shall submit its Major Overhaul schedule (including the number of Units subject to Major Overhaul and outage duration of each Unit for such period) to GPA, for each Contract Year, one year in advance by Notice. It is expected that a Major Overhaul will take place approximately every [ ] operating hours, both as defined by the manufacturer and will not exceed [ ] Days in any Contract Year. Project Company shall use commercially reasonable efforts to not schedule a Major Overhaul during the months of [insert month] through [insert month] inclusive. Within thirty (30) Days of receipt of this schedule, GPA shall notify Project Company in writing as to the acceptability of such schedule. If GPA does not accept this schedule, GPA shall advise Project Company within thirty (30) Days of receipt of such Schedule of the time when GPA determines the Major Overhaul can be rescheduled. The rescheduled time shall be as close as reasonably practicable to the requested time, shall be consistent with the Technical Limits, Prudent Utility Practices, and the recommendations of the manufacturers of the various components of the Facility, and shall be of equal duration as the requested period. If GPA fails within the allowed period to object to any Major Overhaul for which it receives Notice pursuant to this Article, or fails within such period to advise Project Company of a substitute time, Project Company may schedule the Major Overhaul as initially requested.

10.5 Emergencies

(a) Project Company shall cooperate with GPA in establishing agreed Emergency plans for the Facility at least ninety (90) Days before the Required Phase 1 Commercial Operation Date, including recovery from a local or widespread electrical blackout and voltage reduction in order to curtail load.

(b) On or after the Phase 1 Commercial Operation Date, Project Company shall, during an Emergency, within no more than fifteen (15) minutes of GPA's request, and more quickly if possible consistent with Prudent Utility Practices, supply such power as the Facility is able to generate; provided, however, that Project Company shall not be obligated to operate the Facility beyond the Technical Limits or beyond the limits which Project Company reasonably believes could result in a trip. If a Scheduled Outage or Maintenance Outage occurs or would occur coincident with an Emergency, Project Company, upon consultation

with GPA and at GPA's sole cost and expense, shall make all reasonable efforts to reschedule the Scheduled Outage or Maintenance Outage or, if the Scheduled Outage or Maintenance Outage has begun, expedite the completion of the work to restore power supply as soon as possible.

10.6 Maintenance of Operating Records

(a) Each Party shall keep complete and accurate records and all other data required by each of them for the purposes of proper administration of this Agreement. Among, but not limited to, other records and data required hereby or elsewhere in this Agreement, Project Company shall maintain an accurate and up-to-date operating log at the Facility with records of:

i. Net Energy Output production for each demand period and Delivery Point, and bus voltage at all times (for this purpose Project Company shall install a computerized system that will maintain an agreed data base of all pertinent parameters, as determined by the Joint Coordinating Committee).

ii. Changes in operating status, Scheduled Outages, Maintenance Outages and Forced Outages; and

iii. Any unusual conditions found during inspections.

(b) All such records required under Article 10.6(a) shall be maintained for a minimum of sixty (60) Months after the creation of such record or data; provided, however, that the Parties shall not dispose of or destroy any such records after such sixty (60) Month period without thirty (30) Days' prior Notice to the other Party. Either Party shall have the right, upon reasonable prior Notice to the other Party, and at reasonable times during normal office hours, to examine the records and data of the other Party relating to this Agreement or the operation and dispatch of the Facility within the Grid System at any time during the period such records and data are required hereunder to be maintained.

10.7 Annual Report

Project Company shall deliver to GPA an annual operating and maintenance report for each Contract Year, within two (2) Months following the expiration of each Contract Year. Such annual report must include the operation and maintenance report for the prior year and the anticipated operation and maintenance plan and Emergency plan for the upcoming year.

10.8 Facility Improvements

Subject to the prior written consent of Project Company and the Agent (in accordance with the Lenders' Direct Agreement), if Project Company shall be requested by GPA to (a) increase the generation capacity of the Facility or (b) add equipment, then Project Company shall (once all relevant details have been agreed by Project Company and GPA) implement and prosecute such request at GPA's expense.

Notwithstanding the first sentence of this Article 10.8, the Project Company shall not prosecute and implement such request until:

(a) GPA and the Project Company shall have agreed on the feasibility, schedule and cost of such implementation and additional construction (if any), with capital costs and operational costs being recoverable through Supplemental Charges or by direct cost-plus reimbursement at the discretion of the Project Company;

(b) the financing for such implementation and construction (if any) has been obtained; and

(c) appropriate adjustments to the Price (if any), including the Capacity Charge and the Energy Charge, have been agreed, and taking into account any lost revenue due to necessary Facility outages and all other costs or Losses to be incurred by Project Company consequent upon implementation of such changes.

10.9 Reactive Power

If, due to instability in the Grid System, GPA requests Project Company to operate the Facility in a power factor range outside the range mentioned in Schedule 2, Project Company shall comply with such request, provided that (i) it shall not have any obligation to operate the Facility in such a way for more than 1 hour at a time if, in the opinion of Project Company, it could damage the Facility and (ii) Project Company shall never be required to operate the Facility in a manner that is inconsistent with the Functional Specifications or the Technical Limits and the Contracted Characteristics.

10.10 GPA Acces to Site

Project Company shall allow GPA to have reasonable access to the Site subject to prior notice by GPA. GPA personnel will be required to comply with all Project Company safety rules and procedures when accessing the site.

GPA will be allowed to access the on-site ULSD Storage Facilities, without the need for prior notice, to fuel GPA's tanker trucks at no charge.

10.11 Employment of former GPA Employees by the Project Company

GPA power facilities maintenance and operations employees who may be adversely affected or separated as a result of the commissioning of the Project, shall be granted a right of first refusal by the Project Company for employment at the Facility in positions for which they are qualified. For each case of hiring an existing GPA maintenance and/or operating employee, the Project Company shall advise GPA of their plan for hiring such employee and allow a minimum of six [6] months before beginning the employment period to allow GPA to adjust its' plant operation and maintenance activities. If requested by GPA, Project Company will make reasonable efforts to assist GPA with finding a temporary labor pool for positions at their existing power plants that will be vacated by personnel hired by the Project Company.

ARTICLE 11
JOINT COORDINATING COMMITTEE

11.1 Membership

Within ninety (90) Days from the date of this Agreement, the Parties shall establish a Joint Coordinating Committee of ten (10) members, with Project Company and GPA each appointing five (5) members. Each Party shall also appoint two (2) substitutes for each of its members. The substitutes must be appointed at least thirty (30) Days prior to being able to substitute for one of the members. Substitutes may attend the Joint Coordinating Committee meetings but cannot participate in them unless they are replacing a regular member.

The Joint Coordinating Committee shall meet at least once per month.

The chairmanship of the Joint Coordinating Committee shall rotate each year between the Parties, and the first chairman shall be appointed by GPA. The Joint Coordinating Committee shall develop procedures for holding meetings, keeping minutes of meetings, maintaining records and appointing and operating sub-committees as may be required.

11.2 Duties

The power and duties of the Joint Coordinating Committee shall include only the following:

(a) coordination of the respective programs of the Parties for the permitting, design, construction and Commissioning of the Facility, the Fuel supply and transportation interfacing, and the Electrical Interconnection Facilities, and agreement where necessary upon the respective Commissioning procedures;

(b) discussion of the steps to be taken upon shutdown or reduction in capacity for Force Majeure or any other reason;

(c) coordination and modification, if required, of Operating Procedures, including day-to-day communications, dispatching procedures, and Emergency plans and procedures, and compliance with Operating Procedures;

(d) coordination and modification, if required, of scheduled maintenance programs and scheduling and acceptance of performance tests and periodic tests;

(e) review of maintenance records, including results of periodic tests, for compliance with manufacturers' maintenance instructions and recommendations;

(f) coordination of annual, monthly, weekly, and daily forecasts or requirements for the Facility;

(g) developing, monitoring, and auditing the procedures to record Dependable Capacity, reliability, Net Energy Output, and any other parameters that may influence the billing or liquidated damages arising from operation;

(h) developing protocols for invoicing and for measuring Dependable Capacity and Net Energy Output;

(i) developing detailed procedures with respect to Natural Gas (when available) daily nominations and renominations based on Dispatch Instructions, ambient conditions for the next day and data provided in the tables entitled "Guaranteed Heat Rates at Guaranteed Conditions" and "Guaranteed Heat Rate Correction Curve" contained in Schedule 5;

(j) dealing with safety and security matters affecting the Facility, the Parties, and their Contractors;

(k) consultation on Emergency plans developed by the Parties for recovery from a local or widespread electrical blackout;

(l) review of metering and protective schemes and devices; and

(m) any other matter agreed by the Parties affecting the operation of the Facility and the Grid System.

11.3 Scope and Effect

The Parties agree and acknowledge that the jurisdiction of the Joint Coordinating Committee shall be limited to liaison and consultation only and that any decisions or agreements of the committee shall not be binding upon the Parties absent express written agreement to the contrary. The resolutions, considerations and discussions taking place from time to time within the Joint Coordinating Committee shall at all times remain subject to the express provisions of this Agreement, and, accordingly the respective rights and obligations of the Parties under this Agreement (or otherwise) shall not be affected by Articles 11.1 to 11.2.

11.4 Special Reporting

During any period in which either of the six (6) Month periods mentioned in Article 5.2(g) or Article 5.2(h) are extended in accordance with Article 5.2(g) and Article 5.2(h), as applicable, the Joint Coordinating Committee will meet every fourteen (14) Days and the members of the Joint Coordinating Committee appointed by Project Company will report on the status of the measures taken by Project Company to cure the deficiency.

ARTICLE 12
ELECTRICAL INTERCONNECTION

12.1 Electrical Interconnection Facilities

The Electrical Interconnection Facilities shall be designed, procured, and constructed by Project Company. Upon achieving the Phase 1 Commercial Operation Date and GPA's written acceptance thereof, the ownership, custody and control of the Electrical Interconnection Facilities shall be transferred by Project Company to GPA, after which the latter will operate and maintain the facilities in accordance with Prudent Utility Practices and the applicable system grid code at no cost to the Project Company. The transfer of the Electrical Interconnection Facilities shall be at no cost to GPA.

12.2 Testing

The Parties shall cooperate in testing the Electrical Interconnection Facilities from time to time prior to the scheduled synchronization dates of each Phase and at such other times

thereafter as either Party may reasonably require. All such testing shall be carried out on a timely basis.

ARTICLE 13
METERING

13.1 Electrical Metering

The standards for performance measurement systems and testing are specified in Schedule 6.

(a) All electrical metering devices used to measure Net Energy Output pursuant to this Agreement, and to monitor and coordinate operation of the Facility, shall be purchased, owned, installed and maintained by Project Company according to the specifications in Schedule 6. All electrical metering will be done jointly by the Parties, and each Party shall designate a representative for performing such metering. All electrical metering devices used to provide data for the computation of payments due under this Agreement shall be sealed, and the seal shall be jointly broken by the designated representatives of the Parties when such metering devices are to be inspected and tested or adjusted in accordance with Article 13.1(b) below. The number, type and location of such electrical metering devices shall be on the 115 kV high voltage bushings of the main power transformers and according to the single line diagram presented by Project Company and approved by GPA.

(b) Project Company shall inspect, test, and calibrate all electrical metering devices upon installation and at least once every five (5) years thereafter. Project Company shall provide GPA with reasonable advance Notice of, and allow a representative of GPA to witness and verify such inspections, tests, and calibrations. Upon the written request by GPA, and in the presence of GPA, Project Company shall perform additional inspections, tests, or calibrations of the electrical metering devices within twenty (20) Days following the date of such written request. The actual expense of any such requested additional inspection, tests, or calibration shall be borne by GPA, unless, upon such inspection, tests or calibration, a metering device is found to register inaccurately by more than 0.2%, in which event the expense of the requested additional inspection or testing shall be borne by Project Company. If an electrical metering device is found to be defective or inaccurate, whether or not within the accuracy and repeatability tolerances set forth in Table 6.1 of Schedule 6, Project Company shall, at its own expense, adjust, repair, replace, and/or recalibrate the electrical metering device as near as practicable to a condition of zero error.

(c) GPA may elect to install and maintain, at its own expense, back-up electrical metering devices at the Delivery Point in addition to (and identical to) those installed and maintained by Project Company, which installation and maintenance by GPA shall be in a manner reasonably acceptable to Project Company.

13.2 Adjustment for Inaccurate Electrical Meters.

If an electrical metering device fails to register, or if the measurement made by a metering device is found upon testing to be inaccurate, an adjustment shall be made

correcting all measurements by the inaccurate or defective electrical metering device for the Project for the amount of the inaccuracy and the period of the inaccuracy, in the following manner:

(a) By (i) integrating the capacity measurements obtained by the MW-meter readings which are registered every thirty (30) minutes in the PSCC, or (ii) by using the Declared Capacity, whichever is applicable; or

(b) As may be agreed upon by the Parties; or

(c) In the event that the Parties cannot agree on the amount of the adjustment necessary to correct the measurements made by any inaccurate or defective electrical metering device, the Parties shall use GPA's back-up electrical metering device, if installed, to determine the amount of such inaccuracy; so long as such electrical metering devices are tested and maintained in the same manner as Project Company's. In the event GPA's back-up electrical metering devices are also found to be outside the accuracy and repeatability tolerances set forth in Table 6.1 of Schedule 6, as are applied to Project Company's electrical metering devices under Article 13.1(b) above, the Parties shall estimate the amount of the necessary adjustment on the basis of deliveries of Net Energy Output during periods of similar operating conditions when the electrical metering device was registering accurately.

(d) In the event that the Parties cannot agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted shall be the shorter of (i) the last one-half of the period from the last previous test of the electrical metering device, or (ii) the (120) Days immediately preceding the test which found the electrical metering device to be defective or inaccurate.

To the extent that the adjustment period covers a period of deliveries for which payment has already been made by GPA, GPA shall use the corrected measurements as determined in accordance with Article 13.2(a), (b), (c), or (d) hereof to recompute the amount due for the period of the inaccuracy and shall subtract the previous payments by GPA for this period from such recomputed amount. If the difference is a positive number, the difference shall be paid by GPA to Project Company. If the difference is a negative number, the difference shall be paid by Project Company to GPA, or in the sole discretion of GPA, the difference may take the form of an offset to payments due to Project Company by GPA. Payment of such difference by the owing Party shall be made not later than thirty (30) Days after the owing Party receives Notice of the amount due, unless GPA elects payment via an offset.

13.3 Natural Gas Metering

(a) Natural Gas Metering Equipment

i. GPA at its cost shall be responsible to install and maintain primary Natural Gas measurement equipment at the gas metering station in the Natural Gas pipelines supplying Natural Gas to the Facility in accordance with Schedule 6. GPA shall read its meter(s) at that point and such readings shall be considered official meters.

ii. Project Company may install Natural Gas backup measurement equipment downstream of GPA's measurement equipment for Natural Gas. In such case, Project Company shall be responsible for installing and maintaining the Natural Gas backup measurement equipment.

iii. GPA's Natural Gas metering devices shall be inspected, tested, and calibrated by GPA at least once each three (3) years. If Project Company at any time desires a special test of any meter or the computer used in the operation of the GPA's Natural Gas metering devices, it will promptly notify GPA and the Parties will then co-operate to secure a prompt test. All tests of GPA's Natural Gas metering devices shall be made at GPA expense, except that Project Company shall bear the GPA's reasonable cost of special tests made at the Project Company's request if the inaccuracy is found to be within 1%. Following each test, GPA shall ensure that GPA's Natural Gas metering devices shall be adjusted as required to record centrally and accurately.

iv. Project Company's Natural Gas metering devices shall be inspected, tested, and calibrated by Project Company at least once each three (3) years. If GPA at any time desires a special test of any meter or the computer used in the operation of Project Company's Natural Gas metering devices, it will promptly notify Project Company and the parties will then co-operate to secure a prompt test. All tests of Project Company's Natural Gas metering devices shall be made at Project Company's expense, except that GPA shall bear Project Company's reasonable cost of special tests made at GPA's request if the inaccuracy is found to be within 1%. Following each test, Project Company shall ensure that Project Company's Natural Gas metering devices shall be adjusted as required to record centrally and accurately.

(b) Adjustment for Inaccurate Natural Gas Meters.

i. If, for any reason, GPA's Natural Gas meters are out of service or registering outside the specified limits, so that the quantity of Natural Gas delivered cannot be ascertained or computed from the reading thereof, the Natural Gas delivered during the period such meters are out of service shall be determined upon the basis of the best data available, using the first of the following methods which is feasible:

(A) By using the quantity recorded by Project Company's Natural Gas meters, if installed and accurately registering;

(B) By adjusting for the error, if the extent of the error is ascertainable by calibration, test or mathematical calculation; or

(C) By estimation on the basis of deliveries (Net Energy Output) during preceding periods of similar demand under similar conditions when the equipment was registering accurately, and for purposes of this estimation, the Parties may agree upon using data from measurements from outside of the measurement facility.

ii. In the event that the Parties cannot agree on the actual period during which the inaccurate measurements were made, the period during which

the measurements are to be adjusted shall be the shorter of (i) the last one-half of the period from the last previous test of the Natural Gas metering device, or (ii) the (120) Days immediately preceding the test which found the Natural Gas metering device to be defective or inaccurate.

To the extent that the adjustment period covers a period of deliveries for which payment has already been made by GPA, GPA shall use the corrected measurements as determined in accordance with Articles 13.3(b) (i) or (ii) hereof to recompute the amount due for the period of the inaccuracy and shall subtract the previous payments by GPA for this period from such recomputed amount. If the difference is a positive number, the difference shall be paid by GPA to Project Company. If the difference is a negative number, the difference shall be paid by Project Company to GPA, or in the sole discretion of GPA, the difference may take the form of an offset to payments due to Project Company by GPA. Payment of such difference by the owing Party shall be made not later than thirty (30) Days after the owing Party receives Notice of the amount due, unless GPA elects payment via an offset.

13.4 ULSD Metering

(a) ULSD Fuel Metering Equipment

i. GPA shall be responsible at its cost for installing and maintaining primary ULSD measurement equipment at the ULSD metering station in the ULSD pipelines supplying ULSD to the Facility in accordance with Schedule 6. GPA shall read its meter(s) at that point and such readings shall be considered official meters.

ii. Project Company may install ULSD backup measurement equipment downstream of GPA's measurement equipment for ULSD. In such case, Project Company shall be responsible for installing and maintaining the ULSD backup measurement equipment.

iii. GPA's ULSD metering devices shall be inspected, tested, and calibrated by GPA at least once each three (3) years. If Project Company at any time desires a special test of any meter or the computer used in the operation of the GPA's ULSD metering devices, it will promptly notify GPA and the Parties will then co-operate to secure a prompt test. All tests of GPA's ULSD metering devices shall be made at GPA expense, except that Project Company shall bear the GPA's reasonable cost of special tests made at the Project Company's request if the inaccuracy is found to be within 1%. Following each test, GPA shall ensure that GPA's ULSD metering devices shall be adjusted as required to record centrally and accurately.

iv. Project Company's ULSD metering devices shall be inspected, tested, and calibrated by Project Company at least once each three (3) years. If GPA at any time desires a special test of any meter or the computer used in the operation of Project Company's ULSD metering devices, it will promptly notify Project Company and the parties will then co-operate to secure a prompt test. All tests of Project Company's ULSD metering devices shall be made at Project Company's expense, except that GPA shall bear Project Company's reasonable cost of special tests made at

GPA's request if the inaccuracy is found to be within 1%. Following each test, Project Company shall ensure that Project Company's ULSD metering devices shall be adjusted as required to record centrally and accurately.

v. Project Company shall, or shall have other party(ies) on its behalf, install and maintain measurement equipment at the ULSD truck delivery stations with the coordination and approval of GPA. The specifications and the location for ULSD Fuel meters and the associated metering system are set forth in Schedule 12. The measurement equipment for each Fuel shall be installed next to the storage tank dedicated to the respective Fuel.

vi. The Project Company's ULSD metering devices shall be inspected tested and calibrated in accordance with the provisions of Schedule 12.

(b) Adjustment for Inaccurate ULSD Meters.

i. If, for any reason, Project Company's main ULSD meters are out of service or registering outside the specified limits, so that the quantity of ULSD consumed cannot be ascertained or computed from the reading thereof, the ULSD consumed during the period such meters are out of service shall be determined upon the basis of the best data available, using the first of the following methods which is feasible:

(A) By using the quantity recorded by Project Company's back-up ULSD meters, if accurately registering; or

(B) By adjusting for the error, if the extent of the error is ascertainable by calibration, test or mathematical calculation.

ii. In the event that the Parties cannot agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted shall be the shorter of (i) the last one-half of the period from the last previous test of the ULSD metering device, or (ii) the (120) Days immediately preceding the test which found the ULSD metering device to be defective or inaccurate.

To the extent that the adjustment period covers a period of deliveries for which payment has already been made by GPA, GPA shall use the corrected measurements as determined in accordance with Articles 13.4(a) (i) or (ii) hereof to recompute the amount due for the period of the inaccuracy and shall subtract the previous payments by GPA for this period from such recomputed amount. If the difference is a positive number, the difference shall be paid by GPA to Project Company. If the difference is a negative number, the difference shall be paid by Project Company to GPA, or in the sole discretion of GPA, the difference may take the form of an offset to payments due to Project Company by GPA. Payment of such difference by the owing Party shall be made not later than thirty (30) Days after the owing Party receives Notice of the amount due, unless GPA elects payment via an offset.

ARTICLE 14
BILLING AND PAYMENT

14.1 Invoices

(a) Invoices shall be prepared monthly by Project Company in accordance with this Article 14 for payment by GPA in Dollars, as specified in this Article 14.

(b) GPA and Project Company shall read directly by their representatives or via billing centers the metering devices on the first Day of each Month at 00:00 or 10:00 a.m., commencing with the first Month of the Period of Testing.

(c) Project Company shall render an itemized invoice to GPA by the tenth (10th) Day of each Month of the Term, commencing in respect of amounts due by GPA for deliveries of Net Energy Output and/or Dependable Capacity hereunder, with the first Month immediately following the Month in which the Phase 1 Commercial Operation Date occurs.

(d) Not used.

(e) Each itemized invoice for amounts due by GPA to Project Company under Article 14.1(c) for deliveries of Net Energy Output and/or Dependable Capacity hereunder in respect of any month from and after the Phase 1 Commercial Operation Date shall show, calculated, where applicable, in accordance with Schedule 5:

i. Net Energy Output delivered to GPA during each half hour of the previous Month and the total Net Energy Output for such Month;

ii. The Energy Charge for such Net Energy Output, and the Capacity Charge for the previous Month;

iii. Supplemental Charges, if any;

iv. any adjustments or offsets pursuant to Article 13, Article 9.7, or Article 18 hereof;

v. any adjustments pursuant to Article 14.3;

vi. any adjustments pursuant to Article 7.3(c);

vii. any adjustment pursuant to Article 4.3.2(a);

viii. the total amount in Dollars that is due from GPA to Project Company with respect to such deliveries of Net Energy Output and Dependable Capacity during the preceding Month, including, for the avoidance of doubt, the full Capacity Charge for the Dependable Capacity in the event that the Dependable Capacity is unavailable, in whole or in part, due to a request by GPA in accordance with this Agreement, due to a Scheduled Outage, due to a Maintenance Outage, due to a Forced Outage, due to a condition caused by GPA or by the Grid System, or due to the unavailability of Fuel during any period during which the Facility is deemed to provide the Dependable Capacity in Article 8.

14.2 Payment

Each invoice shall be paid within thirty (30) Days of receipt thereof, with those portions of the Price to be adjusted and calculated in accordance with Schedule 5.

GPA intends to make an initial lump sum payment of approximately $50 million upon COD to reduce interest fees and payments over the contract term.

14.3 Estimates

In order that invoices may be rendered promptly after the end of each Month, it may be necessary, from time to time, to estimate certain factors involved in calculating the monthly billing. Adjustments for errors in such estimates shall be included in the invoice for the first Month following the time when the information necessary to make such corrections or adjustments becomes available.

14.4 Late Payment

If an invoice is not paid within thirty (30) Days of receipt thereof (the "**Invoice Due Date**"), interest on unpaid amounts shall accrue daily from the Invoice Due Date until the date upon which payment is made at the Bank Rate plus two percent (2%).

14.5 Disputed Amounts

In the event of any Dispute as to the Capacity Charge, Energy Charge, or the Supplemental Charges, GPA shall notify Project Company of the amount in dispute. In such event, the amounts not disputed shall be paid as described in this Article 14 and GPA shall either deposit in escrow with a commercial bank selected by GPA and reasonably acceptable to Project Company an amount equal to the disputed amounts on the date such amounts, if undisputed, would otherwise be due or furnish to Project Company an irrevocable and unconditional letter of credit issued by a commercial bank selected by GPA and reasonably acceptable to the Project Company in an amount equal to the disputed amounts. This letter of credit shall be in a form and substance reasonably satisfactory to Project Company. The Dispute will be settled in accordance with the Dispute resolution procedures set forth in Article19. The resolution of the disputed amount shall include interest at the rate specified for late payment in Article 14.4. Upon resolution, the funds in the escrow account shall be disbursed in accordance with the resolution of the matter under Article 19.

14.6 Billing Errors

Any claim regarding an error in invoices previously paid shall be made (in accordance with Article 14.5 or 14.7) within fifteen (15) Business Days from the date of discovery of such error, but in any event no later than the date six (6) Months after the date of issuance of such invoice. If such claim is not made within the six-month period referred to in the previous sentence, the original invoice and the calculations therein shall be binding upon the Parties.

14.7 Inaccurate Meters

In the event adjustments to an invoice are required as a result of corrected measurements made with respect to inaccurate meters as described in Article 13.2, the Parties shall use the method of correcting measurements described in Article 13.2 to

recompute the amounts due from or to GPA for the Net Energy Output and, in the event of corrected measurements made in respect of any Dependable Capacity Test, the Dependable Capacity sold under this Agreement during the period of inaccuracy. If the total amount, as recomputed, due from a Party for the period of one inaccuracy varies from the total amount due as previously computed, and payment of the previously computed amount has been made, then, following agreement by the Parties on the amount due as a result of the recomputation, Project Company shall promptly issue an adjusted billing statement. The owing Party shall pay any amount owed as shown on such billing statement within thirty (30) Days of the issuance of the adjusted billing statement.

ARTICLE 15
INSURANCE REQUIREMENTS

15.1 Terms and Conditions

(a) All insurance policies are subject to the jurisdiction and laws of the United States.

(b) All insurance policies should be effected through insurers registered in the United States to the extent required by the Laws of Guam.

(c) Re-insurance of all policies should be in accordance with the effective instructions issued by the insurance commission or any substitute authority and accordingly, insurers should prove that they have implemented the aforesaid instructions.

(d) Insurance is subject to cut through clause and insured have the right to claim from either insurers or reinsurers or both of them.

(e) Project Company shall not be obliged to obtain any insurance policies covering sabotage, war or terrorism risk.

15.2 Maintenance of Insurance Policies

(a) Project Company shall obtain and maintain from and after Financial Close and throughout the term of this Agreement the policies of insurance set forth in the minimum coverage amounts (or if not set forth, on terms and conditions, including sub-limits, deductibles and exclusions that are obtained by independent power generators of comparable size, technology and location) and during the periods, provided, however, that such minimum amounts may be changed from time to time with the written consent of GPA, which consent may not be unreasonably withheld or delayed. In addition to the foregoing, the Project Company may obtain any additional coverage required by the Lenders or the Laws of Guam, or deemed necessary by Project Company. Project Company shall not be in breach of its obligations hereunder if and to the extent that any particular insurance policy, or amount of coverage or any particular term of policy is not or ceases to be available on commercially reasonable terms for reasons other than any negligence or default by, or the deterioration of the financial condition of Project Company from the date of execution of this Agreement.

(b) In the event that any particular insurance policy or amount of coverage required to be maintained hereunder ceases to be available on commercially reasonable terms for reasons other than any negligence or default by, or the deterioration of the financial condition of Project Company from the date of this Agreement, Project Company shall notify GPA of such occurrence promptly upon becoming aware of it, and GPA shall have the option to procure such particular policy or amount of coverage and to require Project Company to reimburse it for the cost thereof up to an amount not exceeding the premium paid by Project Company immediately prior to such insurance becoming unavailable on commercially reasonable terms (provided that the terms of such policy and the insurers and reinsurers providing it are otherwise substantially the same as those of the policy that it replaces).

15.3 Insurance Requirements for the Construction Period

(a) Cargo transportation insurance (imports and re-exported items):

This insurance shall cover all materials, equipments, machineries, spares and other items for incorporation into the Facility against all risks of physical loss or damage while in transit by sea and\or air and/or by land conveyance and/or sending by post from the country of origin anywhere in the world to the site, or vice versa, from the time the insured items leave the warehouse or the factory and\or place of storage for shipment to the site (final destination named in the policy), plus war, strikes, riot and civil commotions in accordance with the provisions of institute cargo clause "**A**", war, strikes, and civil commotions or land transit "All Risks clause".

Coverage shall be in an amount equal to the cost, freight and all other expenses and fees.

In the alternative, Project Company may satisfy its obligations hereunder by requiring the vendor of such items to insure them in the manner specified herein, provided the vendor names Project Company and the other parties and first provides Project Company with evidence of such insurance, a copy of which shall be provided to GPA upon request.

Name of insureds include Project Company, GPA and all other concerned parties.

(b) Delay in start up following cargo transport insurance:

This insurance shall cover debt service and fixed costs incurred following delays in reaching the Required Commercial Operation Date as a direct result of physical loss or damage to the materials, equipments, machineries and other items in transit by sea and/or air and/or by motor truck to the site to the extent covered under the cargo transport insurance.

This insurance shall indicate indemnity period not less than one calendar year as from the date of the occurrence of the risk covered under the transport policy.

15.4 Insurances Required During Construction Period Plus Erection, Trial Testing and Commissioning Period Plus Debt Service and Fixed Operation and Maintenance Costs Loss Due to Delay

(a) Contractors all risks policy (C.A.R. Policy):

This insurance shall cover all permanent and temporary works at the site in the course of execution, including machinery and equipment for incorporation in the Facility, against all risks of physical loss or damage (other than nuclear risk, penalties, consequential losses, cash, vehicles, vessels and aircraft) and shall include cover for loss or damage caused by faulty design, defective workmanship and defective material. Coverage shall be not less than the probable maximum loss value of the items covered.

Coverage also shall include equipment, machinery used by the concerned parties plus removal of debris, and third party liability plus cross liability during the period of construction plus one calendar year maintenance period.

(b) Delay in start up following C.A.R. incidents:

This insurance shall cover debt service and fixed operation and maintenance costs incurred following delays in reaching the Required Commercial Operation Date as a direct result of physical loss or damage to the works to the extent that such loss or damage is covered under the C.A.R. policy.

(c) Professional indemnity policy:

This policy, which the Project Company shall have the option to obtain and maintain if it considers it necessary taking into account the financial standing of the Construction Contractor, covers any loss or damage due to negligence, error, mistakes, faults and/or defaults or any other risks cover under P.I. policy which occurred during the period of construction or erection.

This policy shall include a sum insured equal to the said losses and/or damage.

15.5 Insurances Requirements after Construction Stage

(a) Properties insurance:

Subject to all risks policy to cover buildings, structures, fittings, equipments, machineries, appliances and/or other items.

This insurance to cover the said properties against:

ix. Fire and other allied perils plus debt service and fixed operation and maintenance costs due to fire and/or other allied perils.

x. To cover the physical loss or damage due to sudden and unforeseen cause.

xi. This policy shall include the machinery breakdown perils subject to Munich-Re specimen or similar policy wording and also to cover debt

service and fixed operation and maintenance costs due to machinery breakdown.

Note: Coverage shall be not less than the probable maximum loss value of the items covered. Indemnity period for debt service and fixed operation and maintenance costs due to fire or due to machinery breakdown is not less than one calendar year as from the date of occurrence of the original risk.

(b) Workmen's compensations policy for all workers and employees in accordance with the provisions of Guam labour law.

(c) Employer's liability towards temporary workers and other employees.

(d) Motor insurance policy (comprehensive cover) to include third party liability plus the cars and all vehicles and spares and appliances.

(e) Public liability insurance policy to cover any legal liability (bodily injuries and damages to property). Such policy should be sufficient to cover, at a minimum, US$ [ ] for any one occurrence and in aggregate US$ [ ] for bodily injuries and US$ [ ] for property damages.

ARTICLE 16
LIABILITY AND INDEMNIFICATION

16.1 Limitation of Liability

Except as expressly provided in this Article 16, without prejudice to any rights to damages that either Party may have as expressly provided for in Articles 5, 9 and 17, neither Party shall be liable to the other Party in contract, tort, warranty, strict liability or any other legal theory for any indirect, consequential, incidental, punitive or exemplary damages or for loss of revenue or loss of profits. In respect of a breach of the provisions of this Agreement, neither Party shall have any liability to the other Party save as expressly stated in this Agreement; provided, however, that this provision is not intended to constitute a waiver of any rights of one Party against the other with regard to matters unrelated to this Agreement or to any activity not contemplated by this Agreement.

16.2 Indemnification

(a) GPA

Subject to Article 16.5, GPA shall indemnify Project Company and Project Company's officers, directors, shareholders and employees against, and hold Project Company and Project Company's officers, directors, shareholders and employees harmless from, at all times after the date hereof, any and all Losses, and any and all actions, claims and demands in respect of such Losses, incurred, suffered, sustained, or required to be paid, directly or indirectly, by, or sought to be imposed upon, Project Company or Project Company's officers, directors, shareholders or employees for personal injury or death to persons or damage to property arising out of the negligent or intentional acts or omissions of GPA in connection with this Agreement.

(b) The Project Company

Subject to Article 16.5, Project Company shall indemnify GPA and GPA's officers, directors, shareholders and employees against, and hold GPA and GPA's officers, directors, shareholders and employees harmless from, at all times after the date hereof, any and all Losses, and any and all actions, claims and demands in respect of such Losses, incurred, suffered, sustained, or required to be paid, directly or indirectly, by, or sought to be imposed upon, GPA or GPA's officers, directors, shareholders or employees for personal injury or death to persons or damage to property arising out of the negligent or wilful default of Project Company in connection with this Agreement.

(c) Joint Negligence

Subject to Article 16.5, in the event that any Loss results from the joint or concurrent negligent or intentional acts or omissions of the Parties, each Party shall be liable under this indemnification in proportion to its relative degree of fault.

16.3 Indemnification for Fines and Penalties

Any fines or other penalties incurred by Project Company for non-compliance with the applicable Laws of Guam or the Government Authorizations shall not be reimbursed by GPA but shall be the sole responsibility of Project Company, except to the extent that such non-compliance is caused by the negligence or intentional acts or omissions of GPA.

16.4 Notice of Proceedings

Each Party shall promptly notify the other Party of any Loss, claim, action, demand or proceeding in respect of which it is or may be entitled to indemnification under Article 16.2. Such Notice shall be given as soon as reasonably practicable after the relevant Party becomes aware of the Loss, claim, action, demand or proceeding. Failure to give such Notice in a timely fashion shall not affect the indemnified Party's rights to indemnification except to the extent that the indemnifying Party is materially prejudiced thereby.

16.5 Limitation on Indemnification

(a) Each Party shall be solely liable, and shall not be entitled to assert any claim for indemnification under this Agreement for any Loss that would otherwise be the subject of indemnification under this Agreement until all Losses of such Party arising during the current Contract Year exceed the equivalent of two hundred thousand Dollars (US$ 200,000) in the aggregate in which case only the amount of Loss greater than two hundred thousand Dollars (US$ 200,000) shall be subject to indemnification. For purposes of this Article 16.5, a Loss (or claim for indemnification) shall be deemed to arise in the Contract Year during which the event giving rise to the Loss (or claim for indemnification) occurred or, in the case where the event is continuing in more than one Contract Year, in the Contract Year during which the event ends, provided that a Party shall not be obliged to refrain from making a claim under this Article 16.5 (where it is otherwise entitled to do so) at the end of a given year ("**Year End**") by reason of the fact that the event in question ("**Relevant Event**") is still continuing, and

provided further that in the event that such Party does make such a claim at the Year End it shall continue to be able to claim in relation to all remaining Losses arising from the Relevant Event regardless of when they occur.

(b) Neither Party shall be entitled to the indemnity under Article 16.2 if and to the extent that a Party has received payment in respect of a Loss or proceeding under the indemnities contained in the Lease Agreement or any other document comprising the Security Package in respect of the relevant act or omission.

16.6 Defence of Claims

(a) The indemnifying Party shall be entitled, at its option, to assume and control the defence of such claim, action, suit or proceeding at its expense with counsel of its selection and the indemnified Party shall provide it with a power of attorney if required for this purpose, provided it gives prompt Notice of its intention to do so to the indemnified Party and reimburses the indemnified Party for the reasonable costs and expenses incurred by the indemnified Party prior to the assumption by the indemnifying Party of such defence.

(b) Unless and until the indemnifying Party acknowledges in writing its obligation to indemnify the indemnified Party and assumes control of the defence of a claim, suit, action or proceeding in accordance with Article 16.6(a), the indemnified Party shall have the right, but not the obligation, to contest, defend and litigate, with counsel of its own selection, any claim, action, suit or proceeding by any third party alleged or asserted against the indemnified Party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and the reasonable costs thereof shall be subject to the indemnification obligations of the indemnifying Party hereunder.

(c) Upon assumption by the indemnifying Party of the control of the defence of a claim, suit, action or proceeding, the indemnifying Party shall reimburse the indemnified Party for the reasonable costs and expenses of the indemnified Party in the defence of the claim, suit, action or proceeding prior to the indemnifying Party's acknowledgement of the indemnification and assumption of the defence.

(d) Following the acknowledgement of the indemnification and the assumption of the defence by the indemnifying Party, the indemnified party shall have the right to employ its own counsel and such counsel may participate in such claim, suit, action or proceeding, but the fees and expenses of such counsel shall be at the expense of such indemnified Party, when and as incurred, unless (i) the employment of counsel by such indemnified Party has been authorised in writing by the indemnifying Party, (ii) the indemnified Party shall have reasonably concluded that there may be a conflict of interest between the indemnifying Party and the indemnified Party in the conduct of the defence of such action, (iii) the indemnifying Party shall not in fact have employed independent counsel reasonably satisfactory to the indemnified party to assume the defence of such action and shall have been so notified by the indemnified Party, or (iv) the indemnified Party shall have reasonably concluded and specifically notified the indemnifying Party either that there may be specific defences available to it that are different from or additional to

those available to the indemnifying Party or that such claim, action, suit or proceeding involves or could have a material adverse effect upon it beyond the scope of this Agreement. If clauses (ii), (iii) or (iv) of the preceding sentence shall be applicable, then counsel for the indemnified Party shall have the right to direct the defence of such claim, action, suit or proceeding on behalf of the indemnified Party and the reasonable fees and disbursements of such counsel shall constitute legal or other expenses hereunder, subject to the indemnification obligations of the indemnifying Party hereunder.

ARTICLE 17
FORCE MAJEURE

17.1 Definition

For the purposes of this Agreement, a "**Force Majeure**" means a cause or event (i) that is beyond the reasonable control of the affected Party and was not due to the fault or negligence of the affected Party and that prevents such Party's performance of its obligations under or pursuant to this Agreement, and (ii) which the affected Party is unable to prevent, overcome or remedy by the exercise of diligence and reasonable care, or avoid by the exercise of reasonable foresight and mitigation [, it being understood and agreed that reasonable care includes the expenditure of sums of money ("**Mitigating Costs**") to protect the Facility from a casualty event, which sums are reasonable in light of the likelihood of such event, the probable effect of such event if it should occur, and the likely efficacy of the protection measures].

"**Force Majeure**" shall include the following events and circumstances, but only to the extent that each satisfies the above requirements:

(a) floods, hurricanes, tornadoes, typhoons, cyclones, earthquakes and other natural calamities;

(b) fires or explosions that could not have been prevented by acting in accordance with industry standards or Prudent Utility Practices, as applicable;

(c) war (declared or undeclared), riots, insurrection, rebellion, civil disturbance, acts of the public enemy, acts of terrorism and sabotage, blockades, embargoes or sanctions;

(d) strikes which are widespread within the Territory of Guam, regional and industry-wide labor disputes unless affecting only or caused by Project Company or its Contractors (or their subcontractors of any tier) or their employees;

(e) any Change in Law:

(f) the unavailability of Fuel supply or Fuel transportation as a result of Force Majeure.

Force Majeure shall expressly not include the following conditions, except and to the extent that they result from a Force Majeure:

(a) the absence of sufficient financial means to perform obligations or the failure to make payments in accordance with this Agreement;

(b) weather conditions that could reasonably be expected to occur by an experienced contractor or electric generator in Guam other than extreme or unusually severe weather conditions that constitute a Force Majeure event in accordance with clause above;

(c) shortages, unavailability, late delivery, or changes with respect to materials, spare parts, supplies, consumables or components of equipment for the Project;

(d) price fluctuations with respect to materials, spare parts, supplies, consumables or components of equipment for the Project;

(e) late delivery of materials, supplies or components of equipment;

(f) economic hardship;

(g) shortages of manpower;

(h) the delay, default or failure to perform by a contractor or subcontractor;

(i) machinery or equipment breakdown;

(j) customs procedures

(k) flaws in the Final Technical Specifications prepared by Contractor which require Contractor to re-design or re-engineer any portion of the Project or otherwise change or modify the Work.

(l) normal wear and tear or random flaws in materials and equipment or breakdowns in equipment.

No event, whether or not it constitutes "Force Majeure" will excuse GPA from the obligation to:

(a) make any payment when due and payable under this Agreement, provided that if the occurrence or effects of a Force Majeure affects the operation of all or a portion of the Facility, GPA shall continue, during the continuance of such Force Majeure or its effects, to pay the Capacity Charge for each MW of Dependable Capacity, after deducting from the Capacity Charge an amount determined by multiplying the Capacity Charge by a fraction, the numerator of which is the capacity that is unavailable due to the Force Majeure, and the denominator of which is the Dependable Capacity.

(b) fulfill payment obligations under this Agreement including payment of the full Capacity Charge for the Dependable Capacity.

In the event that the Facility and associated energy is unavailable, in whole or in part, due to:

i. the unavailability of Fuel supply or, subsequent to the transfer of the Electrical Interconnection Facilities to GPA, the unavailability of the Electrical Interconnection Facilities or electric transmission or distribution service sufficient to export the entire output of the Facility; or

ii. a condition caused by GPA or the Grid System,

the Facility, to the extent it is unavailable due to the foregoing reasons, shall be deemed available and providing the Dependable Capacity for the purposes of calculating liquidated damages under Article 9.

17.2 Notification Obligations

(a) The Party affected by a Force Majeure shall give Notice to the other Party of any event constituting a Force Majeure as soon as reasonably practicable. Any Notice shall include full particulars of the event constituting a Force Majeure, of its effects on the Party claiming relief and the remedial measures proposed, including estimated cost and time to restore the Project, if appropriate. The Party affected by a Force Majeure shall coordinate with the other Party and give the other Party regular reports on the progress of those remedial measures and such other information as the other Party may reasonably request.

(b) The Party affected by a Force Majeure shall give Notice to the other Party of (i) the cessation of the relevant event constituting a Force Majeure, and (ii) the cessation of the effects of such event constituting a Force Majeure on the enjoyment by such Party of its rights or the performance by it of its obligations under this Agreement, as soon as reasonably practicable after becoming aware of each of (i) and (ii) above.

17.3 Duty to Mitigate

The affected Party shall be responsible to use all reasonable efforts to mitigate the effects and costs of a Force Majeure.

17.4 Term Extension

If, during any period, the Dependable Capacity is not available due to the occurrence or effects of a Force Majeure and this Agreement is not terminated earlier than the original Term, the Term of this Agreement and the Lease Agreement shall be extended by the number of Days that the Dependable Capacity was not available due to the occurrence or effects of such Force Majeure.

17.5 Delay Caused by Force Majeure

Except as otherwise set forth below, neither Party shall be responsible or liable for or deemed in breach hereof because of any failure or delay in complying with its obligations (other than an obligation to make a payment) under or pursuant to this Agreement due to one or more events of Force Majeure or its or their effects or by any combination thereof, and the periods allowed or dates required (including the Required Commercial Operation Dates) for the performance by Parties of such obligation(s) shall be extended on a day-for-day basis to account for such event(s), effects or combination thereof; provided that no relief shall be granted to the Party claiming Force Majeure pursuant to this Article 17 to the extent that such failure or delay would have nevertheless been experienced by that Party had such Force Majeure not occurred.

17.6 Adjustments for Change in Law

(a) In the event of a Change in Law which is of the type described in the Change in Law definition and has an impact on the Project that is equal or greater to [$500,000] for a Contract Year , GPA shall pay to Project Company (without double recovery) a Supplemental Charge under this Agreement in such amount as is necessary to compensate Project Company for, and make Project Company whole with respect to any such additional costs and/or adverse affect on the expected financial benefit suffered as a result of such Change in Law.

(b) In the event of a Change in Law that has a positive impact on the Project Company that is equal to or greater than [US$500,000] for a Contract Year , Project Company shall adjust the Capacity Charge under this Agreement in such amount as is necessary to return the benefit of such increase to GPA.

ARTICLE 18
TRANSFER OF OWNERSHIP

18.1 Facility Transfer

(a) On the Transfer Date, Project Company shall transfer to GPA, free from any lien or encumbrance and without the payment of compensation, all right, title and interest in and to the Facility including all fixtures, fittings, plant and equipment (including all test equipment, special tools, as-built drawings, software, documents, reports, analyses, all relevant files, plant procedures and forms as reasonably required and necessary for GPA to effectively operate the Facility after the transfer) and all improvements comprising the Facility (the "Facility Transfer"), provided that there is no default in payment obligations by GPA that has not been cured.

(b) Six (6) months prior to the Transfer Date, GPA and Project Company shall meet and agree on the inventories involved and the mechanics of the Facility Transfer but Project Company shall not be liable for any discrepencies between such inventories and the actual fixtures, fittings, plant and equipment transferred, provided that following agreement on inventories Project Company shall exercise the same care regarding the fixtures, fittings, plant and equipment and all improvements therein as it did prior to agreeing to the same and provided further that GPA shall be entitled to provide a security unit within the Site.

(c) [ ] shall be responsible for all costs and expenses (including legal fees and taxes or duties) incurred in connection with the Facility Transfer and shall at its own cost obtain or effect all Government Authorizations and other approvals, licenses, registrations and filings and take such other action as may be necessary for the Facility Transfer as contemplated in this Article 18, and reimburse [ ] on demand for all such costs and expenses incurred by [ ] in respect thereof.

18.2 Testing Prior to End of Term and Facility Transfer

(a) Unless this ECA is terminated early, during the last year of the Term, the Project Company shall perform the tests described in Schedule 4 ("End of Term Tests") and the final pre-Facility Transfer overhaul described in Schedule 1 (the "Final Major Overhaul"). In the event that the End of Term Test results demonstrate that the Facility requires repair and/or replacement of equipment or parts, the Project Company shall carry out such corrective action as is required by Schedule 1.

(b) If the Facility does not satisfy the requirements of Schedule 1, including the performance requirements set forth in Schedule 1, the Project Company shall immediately take such actions as will cause the Facility to comply with the requirements of Schedule 1. If the Project Company fails to cause the Facility to comply with the requirements of Schedule 1 within thirty (90) Days prior to the expiration of the Term, GPA (or its nominee) may take such measures as may be required for the Facility to comply with the requirements of Schedule 1 at the sole expense of the Project Company. In the event that Project Company does not make timely payments for such expenses, GPA shall have the right to draw such amounts from the Transfer Security and/or set off such amounts under Article 14.1(e)(iv).

18.3 Transfer Overhaul

Three (3) years prior to the expiration of the Term, the Project Company shall deliver to GPA a plan that is consistent with Prudent Utility Practices and reasonably acceptable to GPA setting out the anticipated costs and activities associated with the Final Major Overhaul and the Facility Transfer. The Final Major Overhaul shall occur no earlier than 18 months and no later than 6 months from the expiration of the Term. In the event that GPA, acting reasonably, does not agree with the costs and activities anticipated by the Project Company in such transfer plan and the Parties cannot agree on the costs and activities, the Dispute shall be resolved in accordance with ARTICLE 19, provided, however, that the Project Company's obligations under the transfer plan shall always be limited to the scope set out in Schedule 1. The plan shall also describe the reserves to be maintained by the Project Company to cover these anticipated costs and activities. The Project Company shall maintain adequate reserves to complete the Facility Transfer obligations required by Schedule 1.

18.4 Transfer Security

On or prior to the end of the twenty-first (21st) Contract Year, the Project Company shall deliver to GPA a security deposit in the amount of US$15,000,000 (the "Transfer Security"). The security deposit shall be issued in one of the forms set out in Article 6 as security for performance of the Project Company's obligations under this ARTICLE 18. The deposit shall remain valid for one (1) year subsequent to the date of Facility Transfer. In the event that Project Company has not delivered the security deposit in favor of GPA by the end of the twenty-first (21st) Contract Year, GPA shall have the right to withhold payments to Project Company (including payment amounts owed pursuant to Article 14) up to the Transfer Security amount.

ARTICLE 19
CHOICE OF LAW AND RESOLUTION OF DISPUTES

19.1 Governing Law

This Agreement and the rights and obligations hereunder shall be interpreted, construed and governed by the laws of Guam and all applicable laws of the United States of America.

19.2 Initiation of Dispute Resolution

(a) In the event that a Dispute arises, the Parties shall attempt in good faith to settle such Dispute by mutual discussions within thirty (30) Days after the date that the disputing Party gives Notice of the Dispute to the other Party which may include referring the Dispute to the Joint Coordinating Committee for a specified time period, subject to mutual agreement of the Parties.

(b) In the event that the Dispute is not resolved in accordance with Article 19.2(a), either Party may refer the Dispute to the chief executive officer or chief operating officer of Project Company and GPA for further consideration. In the event that such individuals are unable to reach agreement within fifteen (15) Days, or such longer period as they may agree, then either Party may commence arbitration of the Dispute in accordance with Article 19.3

19.3 Arbitration

(a) Any Dispute arising out of or in connection with this Agreement and not resolved following the procedures described in Article 19.2 shall be finally settled by arbitration under the ICC Rules by three (3) arbitrators appointed in accordance with the ICC Rules.

(b) Any arbitration shall be conducted in English, and unless otherwise agreed by the Parties, the number of arbitrators shall be three (3).

(c) The place of arbitration shall be Guam.

(d) Unless otherwise provided in this Agreement, during the conduct of Dispute resolution the Parties shall continue to perform their respective obligations under this Agreement.

(e) The arbitration tribunal may consolidate an arbitration arising out of or relating to this Agreement with any arbitration arising out of or relating to the Lease Agreement if the subject matter of the Disputes arises out of or relates to essentially the same facts or transactions. Such consolidated arbitration shall be determined by the arbitration tribunal appointed for the arbitration proceeding that was commenced first in time.

19.4 Consent to Jurisdiction

Each Party hereby consents to the jurisdiction of the courts of Guam for any action filed by the other Party to enforce a judgment entered for the purpose of recognising any award or decision of any arbitrator(s) or expert(s) who were duly appointed under this

Agreement to resolve any Dispute between the Parties. With respect to any such proceedings for the enforcement of any such award against the assets of a Party:

(a) GPA appoints [ ] the [ ] of GPA, whose address is presently Gloria B. Nelson Public Service Building 688 Route 15 Fadian, Mangilao, Guam, to receive for and on its behalf service of process in such jurisdiction in any such enforcement proceeding; and

(b) The Project Company appoints its [ ], whose address is presently at [ ], to receive for and on its behalf service of process in such jurisdiction in any such enforcement proceeding.

ARTICLE 20
NO LIABILITY FOR REVIEW

No review, non-objection or approval by GPA of any agreement, document, instrument, drawing, specifications or design proposed by Project Company shall relieve Project Company from any liability that it would otherwise have had for its negligence or wilful misconduct (i) in the preparation of such agreement, document, instrument, drawing, specification or design or (ii) the failure to comply with the applicable Laws of Guam with respect thereto.

ARTICLE 21
SHARE TRANSFER AND DISPOSAL OF ASSETS

21.1 Shares Certificate Legend Requirement

With respect to the transfer of the registered ownership of any Shares, Project Company (i) shall include appropriate legends on all share certificates evidencing Shares of Project Company to put prospective purchasers of such Shares on notice of the restrictions in the following provisions and, (ii) to the extent permitted by the Laws, shall not register or give effect to any purported transfer of Shares that is not in compliance with such restrictions or do not bear such legend.

21.2 Transfer Restriction

Prior to the second anniversary of the Phase 2 Commercial Operation Date, none of the Initial Shareholders shall (i) transfer any Shares owned by them or (ii) merge into or consolidate with any other individual, corporation, company, voluntary association, partnership, joint venture, trust, or (iii) dispose of assets of Project Company at any time, except for:

(a) a transfer required by any Laws or by the operation of the Laws or by order of a court, tribunal, or Governmental Authority with appropriate jurisdiction; or

(b) a transfer resulting from the enforcement of a pledge or security interest in or over any Shares in accordance with the Security Package; or

(c) a transfer of Shares in accordance with the Lenders' Direct Agreement; or

(d) a transfer to which GPA has given its prior written approval.

ARTICLE 22
NOTICES

Except as otherwise expressly provided in this Agreement, all notices, communications, or other documents (together "**Notices**") to be given or made by one Party to the other Party pursuant to this Agreement shall be in English and in writing, shall be addressed for the attention of the person indicated below, and shall be delivered by hand or sent by reputable international express courier by facsimile, or registered mail. Any Notice given by facsimile shall be confirmed by sending a copy of the same by personal delivery or by registered mail, but the failure to so confirm shall not void or invalidate the original Notice if it is in fact received by the Party to which it is addressed. The addresses for service of the Parties and their respective facsimile numbers are:

[……]

or such other addresses and facsimile numbers as either Party may have notified to the other Party in accordance with this Article 22.

All Notices shall be deemed delivered (a) when presented personally, (b) when transmitted by facsimile to the receiving Party's facsimile number specified above, (c) one (1) Day after being delivered to a courier for express delivery, addressed to the receiving Party, at the address indicated above (or such other address as such Party may have specified by written Notice), or (d) five (5) Days after being sent by registered mail addressed to the receiving Party, at the address indicated above (or such other address as the receiving Party may have specified by written Notice). Any Notice given by facsimile shall be confirmed in writing delivered personally or sent by registered mail, but the failure to so confirm shall not void or invalidate the original Notice if it is in fact received by the Party to which it is addressed.

ARTICLE 23
MISCELLANEOUS PROVISIONS

23.1 Amendment

This Agreement cannot be amended except by prior written agreement between the Parties.

23.2 Headings

The headings contained in this Agreement are used solely for convenience and do not constitute a part of this Agreement nor shall such headings be used in any manner to aid in the construction of this Agreement.

23.3 Third Parties

This Agreement is intended solely for the benefit of the Parties hereto. Nothing in this Agreement shall be construed to create any duty or any liability to or any right of suit or action whatsoever, to any person not a Party to this Agreement.

23.4 No Implied Waiver

The failure or delay of either Party to enforce at any time any of the provisions of this Agreement, or to require at any time performance by the other Party of any provision hereof, shall neither be construed to be a waiver of such provisions nor affect the validity

of this Agreement or any part hereof or the right of such Party thereafter to enforce each and every such provision.

23.5 Relationship of the Parties

This Agreement shall not be interpreted or construed to create an association, joint venture, partnership or agency between the Parties or to impose any partnership obligation or liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party. Nothing in this Agreement shall be construed as creating any relationship between the Parties other than that of independent sale and purchase of capacity and electricity generated at the Facility. Except as otherwise set forth herein, the Parties do not intend to create any rights, or grant any remedies to, any third party beneficiary of this Agreement. Therefore, Project Company shall be solely responsible for the payment of salaries, wages and mandatory and fringe benefits of its employees, which will not have any labour relationship with GPA.

23.6 Rights of Inspection

Project Company shall promptly furnish to GPA such information as GPA may from time to time reasonably request. Subject to Article 7.5, Project Company shall permit representatives of GPA on reasonable notice and during reasonable hours to visit the Facility, such visit to be at the cost of GPA.

23.7 Periodic Reports

(a) Each Party shall, as soon as available but in any event within one hundred twenty (120) Days after the end of each fiscal year, furnish to the other Party: (a) two (2) copies of its complete financial statements for such fiscal year (which are in agreement with its books of accounts and are prepared in accordance with accounting principles which are generally accepted in Guam and consistently applied), together with an audited report thereon; (b) a copy of any management letter or other communication sent by the auditors to the Party or to its management in relation to the Party's financial, accounting and other systems, management and accounts; and (c) a report by the auditors certifying that, based on its financial statements, the Party was in compliance with its financial obligations as of the end of the relevant fiscal year or, as the case may be, detailing any non-compliance. In addition, each Party shall authorise its auditors (whose fees and expenses shall be for the account of the Party) to communicate directly with the other Party at any time regarding the Party's accounts and operations and shall furnish to the other Party a copy of such Authorization.

(b) Each Party shall, as soon as available but in any event within sixty (60) Days after the end of each six (6) Month period of each fiscal year, furnish to the other Party: (i) two (2) copies of balance sheets of such Party, as of the close of that period, and statements of sources and uses of income and retained earnings and changes in the Party's capital accounts and financial position, for the period and for the portion of the fiscal year ending with that period, in each case setting forth in comparative form the figures for the corresponding period for the preceding fiscal year, all in reasonable detail and in accordance with the generally accepted accounting principles in Guam consistently applied

and certified as complete and correct, subject to changes resulting from year-end adjustments, by the chief accounting officer of the Party; and (ii) a report on any factors materially and adversely affecting or that might materially and adversely affect the Project or the Party's business and operations or its financial condition.

23.8 Survival

Articles [1, 2, 6.3, 6.4, 16, 19, 23, and 23] shall survive the cancellation, expiration or termination of this Agreement.

23.9 Language

The language of this Agreement shall be English. All documents, Notices, waivers and all other communication written or otherwise between the Parties in connection with this Agreement shall be in English.

23.10 Entirety

This Agreement and Schedules attached hereto [and the LLA] and any scedules or annexes thereto, taken together, are intended by the Parties as the final expression of their agreement and are intended also as a complete and exclusive statement of the terms of their agreement with respect to the subject matter of this Agreement and the LLA. All prior written or oral understandings, offers or other communications of every kind pertaining to the sale or purchase of capacity and energy hereunder to GPA by Project Company or to Project Company by GPA or pertaining to the connection of the Facility to the Grid System are hereby abrogated and withdrawn.

23.11 Assignment

This Agreement may not be assigned by either Party other than by mutual agreement between the Parties in writing. Notwithstanding the foregoing, for the purpose of financing or refinancing the Facility, GPA agrees that Project Company may assign to the Lenders its rights and interest or create security over its rights and interest under or pursuant to (i) this Agreement, (ii) the Facility, (iii) the movable property and intellectual property of Project Company and (iv) the revenues or any of the rights or assets of Project Company. The Parties acknowledge and agree that provisions, which shall be agreed with the Lenders, will be included in the Lenders' Direct Agreement which will provide, inter alia, for the Lenders' security interest and cure and step-in rights in and under this Agreement.

23.12 Successors and Assigns

This Agreement shall be binding upon, and inure to the benefit of, the Parties hereto and their respective legal successors and assigns permitted in accordance with Article 23.11.

23.13 Confidentiality

Each of the Parties shall hold in confidence the agreements relating to the Project and all documents and other information, whether technical or commercial, which is of a confidential nature supplied to it by or on behalf of the other Party relating to the design, construction, insurance, operation, maintenance, management and financing of the Project and shall not publish, disclose or use the same for its own purposes other than as

may be required to perform its obligations under this Agreement or as may be required by law.

23.14 Counterparts

This Agreement may be executed in more than one counterpart, each of which shall be deemed to be an original and all of which when taken together shall be deemed to constitute one and the same instrument.

23.15 Severability

If one or more provisions contained in this Agreement are held or found to be invalid, illegal, or unenforceable in any respect, the provision(s) shall be given effect to the extent permitted by law and the invalidity, illegality, or unenforceability of any provisions shall not affect the validity of the remaining provisions of this Agreement.