INVITATION FOR MULTI-STEP BID (IFB) NO.: GPA-072-15
DESCRIPTION: Supervisory Control and Data Acquisition (SCADA) System

SPECIAL REMINDERS TO PROSPECTIVE BIDDERS
Bidders are reminded to read the Sealed Bid Solicitation and Instructions, and General Terms and Conditions attached to the IFB to ascertain that all of the following requirements checked below are submitted in the bid envelope, one (1) original, and six (6) bound copies of the Technical Proposal including one (1) original and six (6) copies of the Qualitative Scoring Worksheet, and one (1) electronic copy of the Qualitative Scoring Worksheet, at the date and time for closing.

(XX) BID GUARANTEE – One Hundred Fifty Thousand US Dollars ($150,000.00) May be in the form of;
NOTE: Cashier’s Check or Certified Check Refunds will be ONLY be made out to the name of the Bidder.)

Reference #11 on the General Terms and Conditions
a. Cashier’s Check or Certified Check
b. Letter of Credit or

c. 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.

(    ) STATEMENT OF QUALIFICATION;

(    ) SAMPLES;

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

(XX) AFFIDAVIT OF DISCLOSURE OF MAJOR SHAREHOLDERS – 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) NON-COLLUSION AFFIDAVIT;

(XX) NO GRATUITIES OR KICKBACKS AFFIDAVIT;

(XX) ETHICAL STANDARDS AFFIDAVIT;

(XX) WAGE DETERMINATION AFFIDAVIT;

(XX) RESTRICTIONS AGAINST SEX OFFENDERS AFFIDAVIT;

(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 ______________________ 2015, __________________, authorized representative of __________________________ acknowledge receipt of this special reminder to prospective bidders with the above referenced IFB.

Bidder Representative’s Signature
INVITATION FOR BID

ISSUING OFFICE:
Guam Power Authority
Procurement Management Materials Supply
GPA Central Office, 1st Floor
Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913

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

DATE ISSUED: 07/30/2015
MULTI-STEP BID INVITATION NO.: GPA-072-15

BID FOR: Supervisory Control and Data Acquisition (SCADA) System

SPECIFICATION: See Attached

DESTINATION: See Attached

REQUIRED DELIVERY DATE: 365 Calendar Days After Notice to Proceed (NTP)

INSTRUCTIONS TO BIDDERS:
INDICATE WHETHER: ______ INDIVIDUAL ______ PARTNERSHIP ______ CORPORATION

INCORPORATED IN:

This bid shall be submitted in duplicate and sealed to the issuing office above no later than (Time) 2:30 P.M., Date: 10/20/2015 and shall be publicly opened. Bid 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 within two hundred forty (240) calendar days from the date opening to supply any or all of the items which prices are quoted.

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

NO.: GPA-072-15

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

GUAM POWER AUTHORITY

GUAM WATERWORKS AUTHORITY

MARK G. MILLER
GWA GENERAL MANAGER (INTERIM)

JOHN M. BENAVENTE, P.E.
GPA GENERAL MANAGER

GUAM POWER AUTHORITY
P.O. BOX 2977
HAGATNA, GUAM 96932
INVITATION FOR MULTI-STEP BID

NO.: GPA-072-15

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

Volume I

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1 Introduction

The Guam Power Authority (GPA) and Guam Waterworks Authority (GWA) are inviting qualified firms to participate in a Multi-Step Bid for a Supervisory Control and Data Acquisition (SCADA) system both the Guam Power Authority and Guam Waterworks Authority (GPA). Collectively GPA and GWA will be denoted as GPWA.

This bid uses the clarifying U.S. Government’s General Accounting Office definitions under the generic term “Control Systems” describing two types: Distributed Control Systems (DCS) and SCADA. Typically, DCS operate within a single processing or generating plant or over a small geographic area. However, SCADA systems operate its telemetry and control over a large, geographically dispersed utility-wide area. For example, GPA may use a DCS to control power plant operations. Additionally, GWA may use a DCS for operating and monitoring process control functions within a water or wastewater facility or over a small number of such facilities. GPA will use the SCADA system procured under this bid to primarily monitor and control its electric transmission grid. GWA will use the SCADA system procured under this bid to monitor and control its water transmission and distribution system as well as its wastewater collection system.

This bid shall be a Two Step process. Step One will establish a Qualified Bidders List (QBL) based on acceptable submitted non price Bid information (or Technical Qualification Proposals). Step Two will evaluate the Priced Proposals from the vendors identified on the QBL and which, if any, Qualified Bidder will be awarded a contract. Step One is the period from IFB announcement through Notification of Qualified Bidders. Step Two is the period after completion of the Technical Proposal Evaluation and notification of the QBL to the contract award date.

GPWA will qualify the Bidders based on their Technical Qualification Proposals and the Qualitative Proposal Scoring Worksheet. GPWA will notify the Bidders selected for the QBL and will proceed with the second step of the bid process to open the sealed bid Priced Proposals of the qualified Bidders. GPWA will perform a comprehensive evaluation of each bid and select the Bidder with the best bid based on the submitted Priced Proposal Worksheet. If the selected Bidder cannot proceed with the contract, GPWA may elect to 1) go to the next best Bidder or 2) cancel the bid.

Table 1 indicates the anticipated milestones for the Bid process. GPWA reserves the right to change the Bid process schedule at its sole discretion.
### Table 1: Bid Schedule

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<td>1/27/2016 12:00 PM</td>
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### 1.1 Invitation for Bid (IFB) Document Organization

Invitation for Bid documents are organized into four separate volumes, as follows:

Volume I: Commercial Terms and Conditions  
Volume II: Technical Qualification Requirements  
Volume III: Cybersecurity  
Volume IV: Appendices

GPWA reminds Bidders to submit the Priced Proposal in a separate sealed envelope clearly marked “Priced Proposal” for Step Two of the bid process.
1.2 GPA Overview

GPA is a public utility corporation that provides electric power service throughout the entire island of Guam. GPA, in conjunction with private partners, operates and maintains 13 power plants, with a total rated capacity of 552.4 MW. The Authority also has installed and maintains an estimated combined total of 175 miles of 115 kV and 34.5 kV transmission lines and an estimated 585 miles of primary distribution lines, and 29 substations. In addition, GPA operates and maintains a total capacity of 18 MW for emergency generators to support 128 Guam Waterworks Authority water and sewage pump stations and sewage treatment facilities situated at various locations throughout Guam and 10 portable units.

1.2.1 Generation Overview

An overview of GPA’s generation resources and transmission systems is provided in GPA’s Integrated Resource Plan, which can be found at the following webpage:
http://guampowerauthority.com/gpa_authority/strategicplanning/2012IRP.php

1.2.2 Electrical System Overview

Guam Power Authority has approximately 175 miles of 115KV and 34.5KV transmission lines. There are 6 ea 115KV and 34 ea 34.5KV lines connecting 29 substations throughout the island. These Substations have 63 ea 13.8KV distribution feeders with approximately 585 miles of lines. The Guam Power Authority follows National Electrical Manufacturers Association (NEMA) ANSI C84 for delivery of power and imbalance.

The GPA Islandwide System Transmission Single Line Diagram can be found on the following webpage:

1.3 GWA Overview

Guam Waterworks Authority (GWA) is a water and wastewater utility serving the Island of Guam, U.S.A. GWA’s mission is to provide excellent water and wastewater services in a safe, reliable, responsible and cost effective manner. GWA is a Government of Guam Public Corporation and Enterprise Fund. The Consolidated Commission on Utilities (CCU), a five-member elected board of directors, heads GWA. Additionally, GWA is regulated by the Guam Public Utilities Commission (GPUC).

GWA is responsible for the production, treatment, distribution and sale of safe, reliable drinking water. GWA is also responsible for the collection, treatment and disposal of wastewater.

GWA water facilities include:

- 120 Deep Wells
- 1 Water Treatment Plant
- 5 Water Springs, 1 active and 4 inactive
- 39 Reservoirs
- 37 Water Booster Pump Stations
- 73 Pressure Regulating Valves
- 15 Master Meters (construction project on-going)
> 600 miles of water lines ranging in diameter from 2 inches to 24 inches
40,743 Water revenue meters

GWA wastewater facilities include:
- 7 Wastewater Treatment Plant
- 77 Wastewater Pump Stations
- > 230 miles of sewer lines

GWA Operations conduct daily site visits to its water and wastewater facilities to inspect, record operational status and take necessary control actions. Alarm notification is minimal, with abnormal conditions often go undetected until the site is inspected during the daily site visits.

1.4 IFB Document Media

The four-volume set of IFB documents and all Amendments to this IFB may be made available to Bidders in electronic format including:

- CD-ROM (inclusive of electronic spreadsheets);
- Downloadable files posted on the Internet (webpage); or
- Transmittal through email.
2 Instructions to Bidders

These instructions to Bidders are intended to provide guidance in the preparation of bids and do not constitute part of the bid or of the contract document.

This is a multi-step bid procurement consisting of two steps. Bidders must submit both parts of their bids: the Technical Qualification Proposal and the Priced Proposal by the Bid Submittal Closing Date indicated in Table 1: Bid Schedule. During Step One, only the submitted Technical Qualification Proposals will be evaluated. After Cut-Off Date for Receipts of Technical Proposals, Bidders may be requested to schedule a presentation and discussion session with GPA on Guam. Bidders must discuss, but are not limited to the following:

- Technical approach for project
- Preliminary site plan
- Project Financing
- Project Management Structure
- Operations and Maintenance (O&M) contract.

GPA is at liberty to issue a final Amendment after these presentations and discussions prior to receiving priced proposals.

In Step Two, the Priced Proposals based upon Technical Qualification Proposals will be considered for award. Only the Technical Qualification Proposals that are deemed acceptable, either initially or as a result of further discussions with prospective Bidders, will be considered for award during Step 2.

2.1 Correspondence

2.1.1 Language

English is the official language of Guam. As such, Bidders should submit all of their bid documents, and any accompanying documents, in English. Any bids not submitted in English will be designated as “Unacceptable” and will not qualify for the QBL.

2.1.2 Commercial and Technical Correspondence

Any prospective Bidder desiring an explanation or interpretation of the IFB, commercial terms, Technical Specifications, etc., 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-072-15.

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

PHONE: (671) 646-3054/55
FAX: (671) 648-3165
In addition, Bidders may also make this request by writing to the GPA PMC Procurement Officer at: GPWA-SCADA@gpagwa.com.

All inquiries must be received by GPA Procurement no later than the Cut-Off Date for Receipt of Proposals indicated in Table 1: Bid Schedule. 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 IFB to all parties recorded by the Procurement Officer as having received the IFB. This information may be provided as an amendment to the IFB if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.

2.2 Pre-Bid Site Visit

The Pre-Bid Conference and Site Visit date is indicated in Table 1: Bid Schedule. All prospective Bidders are required to attend the Pre-Bid Conference and Site Visit. Attendance shall be at the Bidder’s own expense. Bidders wishing to attend shall meet at the time specified at the following physical address:

GPWA Procurement Conference Room, First Floor
Gloria B. Nelson Public Service Building
688 Route 15 Fadian, Mangilao, Guam.

The GPA Procurement Materials Management office may be reached by telephone at the following: (671) 648-3054/5. GPA will provide Google Maps from the Airport to the Pre-Bid Conference Site

The project site visit includes:

- Power System Control Center (Fadian)
- Power System Control Center (Cabras)
- GWA Dispatch Office
- GPWA Information Technology Center (Fadian)
- Various potential GWA remote sites.

2.3 Examination of Technical and Functional Requirements and IFB Documents

Before submitting their bid, Bidders must familiarize themselves with the nature and extent of the work, duly noting any local conditions that may affect the work to be done and the labor, materials, and equipment required.

Bidders are also required to carefully examine all IFB documents inclusive of all technical and functional requirements and to inform themselves of all conditions and requirements for the execution of the proposed work in accordance with the laws and regulations of the Territory of Guam. Ignorance on the part of Bidders of any part of the IFB documents and Technical Requirements will in no way relieve them of the obligations and responsibilities assumed under the contract.

2.4 IFB Amendment

Any amendment, modification or addendum issued by the Guam Power Authority, prior to the opening of the bids, for the purpose of changing the intent of the Technical Requirements, clarifying the meaning or
changing any of the provisions of this IFB, shall be binding to the same extent as if written in the
originally-issued IFB 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 listed under Section 2.1.2:
Commercial and Technical Correspondence.

2.5 Familiarity with Laws

Bidders shall be familiar with all U.S. Federal and local laws, ordinances, rules and regulations of Guam
that in any manner affect the work. Ignorance of law on the part of the Bidders will not relieve the Bidder
from responsibility.

2.6 Cost of Bidding

Bidders shall bear all costs associated with the preparation and submission of their bids. GPA will not be
responsible or liable for those costs, regardless of the outcome of the IFB process.

2.7 Priced Proposals Furnished Separately without Technical Qualification Proposals

Bidders are required to submit their Priced Proposals as found in the Priced Proposal Worksheet
separately from their Technical Qualification Proposals and completed Qualitative Proposal Scoring
Worksheet by the Cut-Off Date for Receipt of Priced Proposals. Bidders must package Priced Proposals
in a separate sealed envelope marked “Priced Proposal” and indicating the date and time of bid package
submittal. Any equipment and material prices shall be provided on the basis of CIF to the Guam job site
unloaded.

2.8 Price/Cost Data

Bidders shall provide prices/costs in U.S. Dollars

2.9 Documents Executed Outside Guam

The Power of Attorney, performance bond guarantee, and documents defining the constitution of the joint
venture, consortium, company or firm, if executed outside Guam, whether required to be submitted with
the bids or after the award of the contract, must be authenticated by a Notary Public or other official
authorized to witness sworn statements. Original bid submittals must be sent to GPA and post-marked no
later than the Bid Submittal Closing Date.

2.10 Step One Procedures

The following outlines the requirements for technical (non-price) bid submittals.
2.10.1 Submission of Bids

2.10.1.1 Bid Contents

Each bid shall contain a complete and clear description of the proposed Energy Storage System, technology, construction timelines and permitting experience, site use, proposed interconnection with GPA system, operation and maintenance experience with proposed technology (as more fully discussed in Volume II: Technical Qualification Requirements). Each bid shall include the following:

- Cover and bid checklist forms defined in Appendix A;
- Responses and supporting information to the questions raised in the Qualitative Proposal Scoring Worksheet and Volume II: Technical Qualification Requirements;
- Supplementary information described below.

Each bid shall be submitted in the format and quantities discussed in Section 2.10.2: Bid Submittal.

2.10.1.2 Responses and Supporting Information to Qualitative Questions

As part of their bid package, Bidders shall provide written responses and supporting information to answer each of the questions raised in the Qualitative Proposal Scoring Worksheet. Volume II provides more detail on information required for the Technical Qualification Proposals and Priced Proposals. The Bidders shall provide chapters/sections for each scoring category identified in the Qualitative Proposal Scoring Worksheet.

2.10.1.3 Supplementary Information

Bidders shall submit all the supplementary information required by the IFB documents. The supplementary information must be provided in sufficient detail and clarity to permit a complete comparison of the bids with the Technical Specifications. The supplementary information shall be provided in the chapter/section for the Other Documents scoring category and shall include the following:

1. Insurance policy;

2. Audited financial information for the last five years on the main Bidder’s firm, its parent or subsidiary company that will be used in this contract. If they have one, Bidders must include their Dunn and Bradstreet Number or Other Major Credit Rating Agency rating, or comparable, independent verification of their credit standing;

Submittal of the following supplementary information is mandatory and must be provided by the Bid Submittal Closing Date. **GPA shall automatically disqualify any bid submitted without the supplementary information listed below:**

3. A copy of the Bidder’s Articles of Incorporation or other applicable forms concerning business organization (i.e. partnership, sole proprietorship, etc.) and By-Laws;

4. Affidavit of Disclosure of Major Shareholder (Appendix C);
5. Certificate of Good Standing to conduct business from the jurisdiction of their company’s residence;

6. Non-collusion Affidavit (Appendix D);

7. Information regarding outstanding claims against the Bidder, if any;

8. Bid Bond (Appendix B);

9. A current Guam Business License is not required in order to provide a Bid for this engagement, but is a pre-condition for entering into a contract with the Authority;

10. No Gratuities or Kickbacks Affidavit (Appendix J);

11. Ethical Standards Affidavit (Appendix K);

12. Declaration Re Compliance with U.S. DOL Wage Determination (Appendix L);

13. Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property (Appendix M).

2.10.2 Bid Submittal

2.10.2.1 Manual Bid Submittal

Bidders shall submit their bids manually.

2.10.2.2 Non-repudiation Issues

GPA has structured its Manual IFB submittal procedures to ensure non-repudiation of the submitted bids. In this IFB, “non-repudiation” means strong and substantial evidence of the identity of the sender and owner of the bid and of bid’s integrity in so far as it being unaltered from its original sent state, sufficient to prevent a party from successfully denying the origin, submission or delivery of the bid and the integrity of its contents. Non-repudiation applies to both parties to this IFB transaction. It binds the sender as well as precludes the recipient from denying the exchange of information and material upon the receipt of secure acknowledgement from the recipient.

GPA and the Bidder shall manage the Manual IFB Submittal Process to address non-repudiation, security and confidentiality inclusive but not limited to the following:

- Manually executed signatures and printed media documents;
- Chain of custody receipts;
- Manual time-stamps for receipt of IFB materials;
- Machine generated Fax confirmation reports;
- Secure notification e-mail;
- Electronic Postings on the guampowerauthority.com domain;
- Physical delivery of printed material bids;
- Physically secured area storage of IFB materials.
2.10.2.3 Signature of Bidder

A duly authorized person must sign the Bidder’s bids. All names shall be typed or printed below the signature. A bid submitted by a corporation must bear the seal of the corporation, be attested to by its Secretary, and be accompanied by necessary Power-of-Attorney documentation.

Associated companies or joint ventures shall jointly designate one Power-of-Attorney person authorized to obligate all the companies of the association or joint venture. A bid submitted by a joint venture must be accompanied by the document of formation of the joint venture, duly registered and authenticated by a Notary Public, in which is defined precisely the conditions under which it will function, its period of duration, the persons authorized to represent and obligate it, the participation of the several firms forming the joint venture, the principal member of the joint venture, and address for correspondence for the joint venture. Bidders are advised that the joint venture agreement must include a clause stating that the members of the joint venture are severally and jointly bound.

2.10.2.4 Manual Bid Submittal Package Format and Handling

This section describes the bid package format and content required by GPA that is specific to manual submittal of bids. The Manual IFB Bid Submittal Process is characterized by a preponderance of the submitted material in tangible printed media form that is hand-delivered by an authorized agent of the Bidder to the Procurement Officer of the Guam Power Authority. Both the Bidders’ agents and the GPA Procurement Officer are live human beings. In addition, both parties perform non-repudiation of the bid through the execution of manually executed signatures, seals and time stamps.

Bidders are required to submit one original and six (6) bound copies of their bid.

2.10.2.5 Marking and Packaging of Bids

As a general rule, the manually submitted Bids shall be packaged in separate sealed boxes with the following information clearly marked on the outside of the two largest sides:

1) “TECHNICAL QUALIFICATION PROPOSAL” OR “PRICED PROPOSAL”
2) “SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM PHASE I”;
3) BIDDER’S NAME;
4) INVITATION FOR BID NUMBER;
5) CLOSING DATE and TIME (Guam Standard Time).
6) Addressed As follows:

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

If the Bidder’s submittal cannot fit within one box or if the Bidder chooses to submit more than one box, each box must be labeled as described above and with the following additional information:
2.10.2.6 Receipt and Handling of Manually Submitted Bids

Upon receipt, each Bid submittal package will be time-stamped. The only acceptable evidence to establish the date and time of receipt at the GPA is the date/time stamp of the Guam Power Authority's procurement office on the wrapper or other documentary evidence of receipt maintained by GPA. Bids will be stored in a secure place until the date and time set for proposal opening.

GPA procurement personnel will stamp the outside of each package using the GPA Procurement time stamp and will officially log the date and time that each Bidder’s sealed bid package is received.

2.10.3 Submittal Closing Date

The Technical Qualification Proposal Submittal Closing Date is indicated in Table 1: Bid Schedule. Submitted proposals, excluding the Priced Proposals, will be opened at this time which will initiate the proposal evaluation process. No proposals shall be accepted after the Bid Submittal Closing Date.

2.10.4 Bid Changes During Bid Process

Changes may be made to the Technical Qualification Proposals(s) prior to the Bid Submittal Closing Date.

2.10.5 Evaluation of Technical Qualification Proposals

After the Bid Submittal Closing Date, GPA will evaluate the Technical Qualification Proposals and develop the QBL.

In determining the most qualified Bidder, GPA shall be guided by the following:

- The ability, capacity and skill of the Bidder to perform the work specified.
- Whether the Bidder can perform promptly or within the specified time.
- The Bidder’s approach or plan for the required work. A preliminary schedule must be provided with the plan.
- The quality of performance of the Bidder with regard to awards of similar scope previously made to him.
- The previous and existing compliance by the Bidder with laws and regulations relative to procurement.

The Qualitative Proposal Scoring Worksheet lists the evaluation criteria and preliminary scoring. GPA will convene an Evaluation Committee of no less than three (3) people whom will elect a committee chairperson. Each committee member will score each Bidder’s proposal using the Qualitative Proposal Scoring Worksheet. Proposals that score greater than or equal to 80 points are deemed acceptable. Proposals that score between 75 and 79 percent, inclusive, are deemed potentially acceptable. Proposals scoring below 75 percent are deemed unacceptable.
If the committee determines that a proposal is not acceptable, then that proposal cannot be evaluated in Step Two. If the committee determines that a proposal is potentially acceptable, then that proposal cannot be evaluated in step Two unless the committee finds less than two acceptable proposals. No unacceptable proposals will be scored beyond Step One.

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 Step Two if there are sufficient acceptable Technical Qualification Proposals to assure effective price competition in the second step without technical discussions. If the Procurement Officer finds that such is not the case, the Procurement Officer shall issue an amendment to this IFB or engage in technical discussions with Bidders as set forth below.

The Procurement Officer may conduct discussions with any Bidder who submits a technically acceptable or potentially acceptable technical Offer. During the course of such discussions, the Procurement officer shall not disclose any information derived from the Technical Qualification Proposals to any other Bidder. Once discussions are begun, any Bidder, who has not been notified that its Technical Qualification Proposal has been finally found acceptable, may submit supplemental information amending its Technical Qualification Proposal at any time. Such submission may be made at the request of the Procurement Officer or upon the Bidder’s own initiative.

2.10.5.1 Discussion of Bids

Qualified Bidders may be requested to schedule a presentation and discussion session as per Section 2. GPA may conduct discussions with any Bidder to determine such Bidder’s qualifications for further consideration and explore with the Bidder the scope and nature of the required services, method of performance and the relative utility of alternative methods of approach. During the course of such discussions, the Procurement Officer shall not disclose any information derived from the Technical and Qualification Proposals of any other Bidder.

Each Bidder is requested not to contact GPA on any matter relating to its bid, from the Bid Submittal Closing Date to the time the contract is awarded, except to respond to inquiries made by GPA.

2.10.5.2 Notice of Unacceptable Bid

A notice of unacceptability will be forwarded to the Bidder upon completion of the Technical Qualification Proposal evaluation and final determination of unacceptability. When the Procurement Officer determines a Bidder’s Technical Qualification Proposal to be unacceptable, such Bidder shall not be afforded an additional opportunity to supplement its offer.

2.11 Step Two Procedures

Upon completion of the Technical Qualification Proposal evaluation and discussions, qualified Bidders must submit their priced proposals. GPA will proceed with Step Two of the multi-step bid, which includes evaluation of the Priced Proposals and award of the contract.
2.11.1 Request for Priced Proposals

Each Bidder from the QBL will be notified and GPA will open their Priced Proposals, which were submitted on the Priced Proposal Worksheet. GPA will select a winning Bidder based on a comprehensive evaluation of the Priced Proposals.

2.11.2 Bid Changes During Bid Process

Changes may be made to the Priced Proposals only prior to the Bid Submittal Closing Date.

2.11.3 Bid Validity

All price/cost data submitted with the Bidders’ bids shall remain firm and open for acceptance for a period of not less than eight (8) months after the Bid Submittal Closing Date; thereafter, the Priced Proposal shall be subject to renewal by mutual agreement between the Bidder and GPA. The Bidder shall state the actual date of expiration in their Priced Proposal with their bid submittal.

2.11.4 Preliminary Examination of Priced Proposal

GPA will examine the Priced Proposal on the opening date to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Priced Proposals are generally in order.

Arithmetical errors will be rectified on the following basis. If there is discrepancy between the unit price and the total price, including any discounts, that is obtained by multiplying the unit priced and quantity, the unit price shall prevail and the total price shall be corrected. If the Bidder does not accept the correction of the error, its bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

2.11.5 Evaluation Criteria and Comparison of Priced Proposals

GPA will only evaluate and compare the Priced Proposals for Bidder’s whose Technical Qualification Proposals were determined to be responsive to the IFB document requirements during Step One. GPA’s evaluation of Priced Proposals shall compare the total basic bid prices.

2.12 General Bid Guidelines and Requirements

2.12.1 Amendments to the IFB Document

GPA may elect to change the IFB documents in whole or in part. GPA shall send all Amendments to the IFB document recipients via fax and/or e-mail. In addition, GPA will make all Amendments available on the Internet at the GPA Website at the URL:

2.12.2 Proprietary Data

For the purposes of this IFB and submitted bids, the laws, rules and regulations of Territory of Guam concerning confidentiality shall govern. Bidders may designate those portions of the Bid that contain trade secrets or other proprietary data that are to remain confidential.

The Procurement Officer shall examine the bids to determine the validity of any request for nondisclosure of trade secrets and other proprietary data identified in writing. If the Bidder and GPA do not agree as to the disclosure of data, the Procurement Officer shall inform the Bidder in writing and in e-mail within five working days of the closing date for Bid submittal what portions of the Bid will be disclosed and that, unless the Bidder protests under the Conditions of Contract Disputes clause the information will be so disclosed. The bid shall be opened to public inspection subject to any continuing prohibition of the disclosure of confidential data.

2.12.3 Acceptance of Bids

GPA reserves the right to reject any or all bids and to waive minor errors, informalities, and discrepancies made by the Bidders if it appears in GPA’s best interest to do so.

Any effort by a Bidder to influence GPA in the bid evaluation, bid comparison or contract award decisions may result in the rejection of the bid. Once GPA has arrived at a decision regarding the award of the contract, it will notify promptly the winning Bidder in writing.

2.12.4 IFB Cancellation or Delay

The Guam Power Authority reserves the right to delay award or to cancel the IFB, or to reject all bids or any individual bid in whole or in part, at any time prior to the final award. When the IFB is canceled or rejected prior to final award, notice of cancellation or rejection shall be sent to all Bidders and all bid materials will be promptly returned. The reasons for cancellation or rejection shall be made a part of the procurement file that is available for public inspection. After the Bid Submittal Closing Date, but prior to award, all bids may be rejected in whole or in part when the Procurement Officer determines that such action is in the Territory's best interest for reasons including but not limited to:

a) The supplies and services being provided are no longer required;

b) The IFB did not provide consideration of other factors of significance to the Territory;

c) All otherwise acceptable bids received have clearly unreasonable price/cost data;

d) There is reason to believe that the bids may not have been independently arrived at in open competition, may have been collusive and may have been submitted in bad faith;

Again, any individual bid may be rejected in whole or in part when in the best interest of the Territory.

2.12.5 Disqualification of Bidder

When, for any reason, collusion or other anticompetitive practices are suspected among Bidders or offerors, a notice of the relevant facts shall be transmitted to the Guam Attorney General. Bidders
suspected of collusion or other anticompetitive practices may be suspended or debarred from participating in future procurement opportunities for a specified period.

2.12.6 False Statements in Bid

Bidders must provide full, accurate, and complete information as required by this IFB and its attachments. The penalty for making false statements in any bid or bid is prescribed in 18 U.S.C. 1001 and Title 9, Guam Code Annotated. Note, by use of a digital signature to sign the bid, the Bidder agrees that this act legally binds the Bidder to his bid.

2.13 Award of Contract

The contract will be awarded to the Bidder evaluated as being qualified and with the lowest total basic bid price.

The successful Bidder will be notified in writing (letter or e-mail or fax) of the intent to award the contract, and will be required to send to GPA’s offices, within ten (10) days of the date of receipt of such notice, a representative or representatives with proper Power-of-Attorney for the purpose of executing a contract with such alterations or additions thereto as may be required to adopt such contract to the circumstances of the bid.

The successful Bidder shall provide the required Performance Bond within fourteen (14) days of receipt of the GPA Notice of Intent to Award.

Failure on the part of the successful Bidder to provide a Performance Bond and/or to enter into a contract with GPA shall be sufficient grounds for the annulment of the award. The negotiations may then be resumed with the next most qualified Bidder.

2.14 Bid and Performance Bond Requirements

2.14.1 Bid Bond Form and Amount

A bid bond for an amount of $150,000 (USD) is required and may be in the following form:

a. Cash, Bank Draft or Certified Check made payable to the Guam Power Authority;
b. By wire transfer to Guam Power Authority, Account No. 601-007247, Routing No. 121405115, Bank of Guam, P. O. Box BW, Hagatna, Guam 96932
c. Letter of Credit;
d. Surety Bond – valid if accompanied by:

   (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.

Bid Bonds, submitted as Bid Guarantee, without signatures and supporting documents are invalid and associated bids will be rejected.
If a Bidder desires to submit a bid bond with an acceptable bonding company, the Bidder must submit original copies of Appendix B.

For those Bidders not selected for award of contract, bid bonds will be refunded. For those Bidders selected for award of contract, bid bonds will be refunded once GPA has received their performance bond (see next Section 2.14.2). Any Bidder who is selected for award of contract but who is unable to fulfill the obligations of its respective bid(s) will permanently forfeit its bid bond(s) to GPA.

2.14.2 Performance Bond Form, Amount, and Duration

A performance bond shall be required from winning Bidders in the form as prescribed in Appendix F. At the beginning of the contract term and at the beginning of each GPA Fiscal Year during which the contract is in effect, the Bidder shall provide and maintain a performance bond in the amount equal to:

1. Cost for Minimum Annual Energy as described in the Draft Energy Storage Power Purchase Agreement for that full or partial fiscal year within the term of the contract.

If the Bidder is declared by GPA to be in default under the CONTRACT, GPA may exercise any or all rights and remedies it possesses under the provisions of the performance bond.

The GPA Fiscal Year begins on October 1 and ends on September 30 of the following calendar year.

2.14.3 Requirement for Performance Bond Execution by a Guam Licensed Surety Company

The Bidder shall provide a Performance Bond executed by a surety company licensed to do business on Guam.
3 Required Bid Forms

This Section describes the forms required for submission of the Bid.

The following forms in Appendices A, B, C, D, E, J, K, L, M, N, O, P, Q, R, S, T, and U must be completed:

- APPENDIX A – Bid Checklists
- APPENDIX B – Bid Bond Form and Instructions
- APPENDIX C – Major Shareholders Disclosure Affidavit
- APPENDIX D – Non-Collusion Affidavit
- APPENDIX E – Local Procurement Preference Application
- APPENDIX F – Performance Bond
- APPENDIX G – Bid Compliance Worksheets
- APPENDIX H – GWA SCADA Master Plan
- APPENDIX I – GPA RTU Configuration Database
- APPENDIX J – No Gratuities or Kickbacks Affidavit
- APPENDIX K – Ethical Standards Affidavit
- APPENDIX L – Declaration Re Compliance with U.S. DOL Wage Determination
- APPENDIX M – Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property
- APPENDIX N – Deferred Payment Agreement (Sample)
- APPENDIX O – Qualitative Proposal Scoring Worksheet
- APPENDIX P – SCADA/EMS System Sizing
- APPENDIX Q – Performance Response Requirements
- APPENDIX R – Fuel Switching Application Specifications (Additive Bid)
- APPENDIX S – Computer Hardware Specifications (Notional)
- APPENDIX T – Factory Acceptance Test Attendees
3.1 Technical Bid Forms

The following referenced forms are contained in the Appendices and shall be completed and submitted with the Bid.

3.1.1 Document Receipt Checklist

The Bidder shall complete Form A-1 by initialing the Invitation For Bid Documents received from Guam Power Authority, including the latest IFB Amendment received. This Form is an acknowledgement of receipt, review and understanding of the IFB documents.

3.1.2 Bid Submittal Checklist

The Bidder shall complete Form A-2. This Form provides an inventory of documents submitted by the Bidder in response to the Bid requirements.

3.1.3 Major Shareholders Disclosure Affidavit

Bidders shall fill out the Major Shareholders Disclosure Affidavit form in Appendix C and submit it with their bids.

3.1.4 Non-collusion Affidavit

Bidders shall fill out the Non-collusion Affidavit form in Appendix D and submit it with their bids.

3.1.5 Local Procurement Preference Application

Bidders shall fill out and sign the Local Procurement Preference Application in Appendix E and submit it with their bids.

3.1.6 No Gratuities or Kickbacks Affidavit

Bidders shall fill out and sign the No Gratuities or Kickbacks Affidavit in Appendix J and submit it with their bids.

3.1.7 Ethical Standards Affidavit

Bidders shall fill out and sign the Ethical Standards Affidavit in Appendix K and submit it with their bids.
3.1.8 **Declaration Re Compliance with U.S. DOL Wage Determination**

Bidders shall fill out and sign the Declaration Re Compliance with U.S. DOL Wage Determination in Appendix L and submit it with their bids.

3.1.9 **Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property**

Bidders shall fill out and sign the Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property Affidavit (Appendix M) and submit it with their bids.

3.2 **Price Bid Form**

3.2.1 **Fee & Evaluation Data**

Bidders shall complete the Priced Proposal Worksheet and submit it in a sealed envelope which will only be opened when the Bidder has been deemed qualified through Step One of the multi-step bid process.
4 Conditions of Contract

4.1 Definitions

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof.

4.1.1 $ The term “$” refers to currency in U.S. dollars.

4.1.2 Approved The word "Approved," when applied by ENGINEER to CONTRACTOR's drawings or documents, shall mean that the drawings or documents are satisfactory from the standpoint of interfacing with GPA-furnished components, and/or that ENGINEER has not observed any statement or feature that appears to deviate from the Specification requirements.

4.1.3 Approved As Revised The words "Approved As Revised," when applied by ENGINEER to CONTRACTOR's drawings or documents shall mean that the drawings or documents are approved as defined above, except that the corrections shown are required for the proper interfacing with GPA-furnished components or are necessary to be in conformance with the Specification's requirements.

4.1.4 Change Order A written instrument to CONTRACTOR signed by GPA authorizing an addition, deletion, or revision in the goods or special services, or an adjustment in the purchase order price or the delivery time, issued after the effective date of the Contract Agreement (Agreement).

4.1.5 Contract The term "Contract" means the Energy Storage System Phase I Contract executed as a result of this Multi-Step Bid.

4.1.6 Contract Agreement (Agreement) The written agreement between GPA and CONTRACTOR covering the furnishing of the Goods, Special Services, and other services in connection therewith evidencing what is contemplated and agreed to between the parties including any other Contract Documents either attached to the Agreement or made a part thereof by reference therein.

4.1.7 Contract Documents The Contract Agreement, Bonds (where required), Bid Documents and Amendments, Bidder’s Proposals, any Supplementary Conditions, the Specifications, the Drawings and any other documents specifically
identified in the Contract Agreement, together with all Modifications issued after execution of the Contract Agreement.

4.1.8 CONTRACTOR

The Bidder with whom GPA has entered into the Contract Agreement.

4.1.9 Day

A calendar day of twenty-four (24) hours measured from midnight to the next midnight

4.1.10 Delivery Time

The total number of days or the dates stated in the Agreement for furnishing the Goods and/or Special Services

4.1.11 Defective

An adjective which when modifying the words Goods or Special Services refers to Goods or Special Services which are unsatisfactory, faulty, deficient, do not conform to the Contract Documents, or do not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents.

4.1.12 Drawings

Drawings are all official drawings approved by the ENGINEER and showing the character and scope of the Goods to be furnished.

4.1.13 Effective Date of the Contract Agreement

The date indicated in the Purchase Agreement on which it becomes effective, or if no such date is indicated, the date by which the Purchase Contract is signed by both parties.

4.1.14 ENGINEER

Wherever the words "ENGINEER" or "ENGINEERS" appear in the CONTRACT Documents, it shall mean GPA's engineer duly appointed as “ENGINEER”. GPA shall assign several ENGINEERS as required to cover specialized areas of expertise.

4.1.15 ENGINEER’s Instructions

Written instructions issued by ENGINEER which clarify or interpret the CONTRACT Documents or order minor changes or alterations in the Goods or Special Services to be furnished but which do not involve a change in the Purchase Price or the Delivery Time.
4.1.16 General Manager

The General Manager is the Chief Executive Officer of the Guam Power Authority. The office and title of General Manager shall apply to any person acting in a regular or in an acting capacity as the Chief Executive Officer of the Guam Power Authority.

4.1.17 Goods

All property required to be furnished by CONTRACTOR under the procurement documents.

4.1.18 Modification

A written amendment of the Contract Agreement signed by both parties, or Change Order, or ENGINEER's Instructions.

4.1.19 Notice

The term "Notice" as used herein shall mean and include all written notice demands, instructions, claims, approvals and disapprovals required to obtain compliance with contract requirements. Any written notice by either party to the contract shall be sufficiently given if delivered to or at the last known business address of the person, firm, or corporation constituting the other party to the contract, or to his, their, or its duly authorized agent, representative, or officers, or when enclosed in a postage prepaid envelope addressed to such last known business address and deposited in a United States mail box. CONTRACTOR must provide and maintain a post office address within Guam and file the same with the Contracting Officer.

4.1.20 OWNER


4.1.21 Point of Delivery

The place at which property in the goods shall pass to GPA. Goods shall be CIF landed at job-site, Guam, unloaded.

4.1.22 Project

The facilities, or works, the Goods and Services are to be used for or incorporated into.

4.1.23 Procurement Officer

The General Manager of the Guam Power Authority or the General Manager’s designee.

4.1.24 PURCHASER

The Guam Power Authority with whom CONTRACTOR has entered into the Contract Agreement.
4.1.25 Seller

The CONTRACTOR.

4.1.26 SITE or Site

The SITE is the area where the Project is to be constructed or executed.

4.1.27 Special Services

Services to be furnished by CONTRACTOR at the Site as required by the Contract Agreement.

4.1.28 Territory

The Territory of Guam.

4.2 Agreement

Prior to entering into a formal agreement, GPA and CONTRACTOR shall resolve and document any differences between the CONTRACTOR’s bid and the IFB documents. The Agreement between GPA and CONTRACTOR shall consist of the IFB documents, as resolved by the CONTRACTOR’s final negotiated Bid and by GPA amendments, and the CONTRACTOR’s bid, as adjusted by a prioritized list of documents generated during the evaluation and negotiation processes and agreed to and acknowledged in writing by both parties. These documents may consist of, but are not limited to, written answers to questions, letters, and written clarifications to the bid.

Any formal contract document shall reference GPA IFB documents and the CONTRACTOR’s bid. No oral understanding or statement shall modify the Agreement. Changes to the above documents can only be made in accordance with the procedure for modifications as defined in Section 4.14 Changes.

The resolved IFB documents shall take priority over and shall govern in all cases of conflict with the adjusted bid. The CONTRACTOR’s contractual obligation shall be to fulfill all requirements of the IFB documents, as resolved, and to provide all features of the CONTRACTOR’s bid, as adjusted.

The IFB documents are intended to be complementary, what is called for by one shall be as binding as if called for by all. If not otherwise specified in the IFB documents, these General Conditions shall apply. If, during performance of the Agreement CONTRACTOR detects a discrepancy in the IFB documents, CONTRACTOR shall so report to ENGINEER in writing at once and shall obtain a written interpretation or clarification from ENGINEER before proceeding further; however, CONTRACTOR shall not be liable to GPA for failure to report any conflict, error, or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

All materials, equipment, and services that may reasonably be inferred from the IFB documents, as being required to produce the intended result will be supplied whether or not specifically called for. When words that have a well-known technical or trade meaning are used to describe materials, equipment, or services, such words will be interpreted in accordance with such meaning. Reference to standard specifications, manuals, or codes of any technical society, organization or association, or to the code of any Governmental authority, whether such reference be specific or by implication, shall mean the latest
standard specification, manual, or code in effect on the effective date of the Agreement except as may be otherwise specifically stated in the Specification or Agreement. ENGINEER shall issue clarifications and interpretations of the IFB documents.

4.3 Indemnity

CONTRACTOR shall indemnify and hold GPA and ENGINEER harmless from any claim, liability or product liability, loss, damage, demand, cause of action or suit, expense, or fee of legal counsel arising out of or in connection with the Goods or Special Services provided by the CONTRACTOR.

4.4 Shipment, Delivery, and Acceptance of Goods

Shipment and delivery of the Goods shall be in accordance with this Paragraph except as otherwise provided or specified in the CONTRACT Documents.

All goods will be delivered at the point of delivery set forth in the Purchase Contract. CONTRACTOR shall select the means and methods of transportation. All charges necessary to effect shipment to the point of delivery, including but not limited to export packing, switching, trucking, lighter age, and special handling will be paid by CONTRACTOR.

GPA and/or ENGINEER reserve the right to inspect the Goods upon delivery for the purpose of identifying the Goods and general verification of quantities.

4.5 Accounting

For accounting purposes and for use in establishing property records, GPA may require CONTRACTOR to provide a reasonable price breakdown of the total price into separate prices applying to the individual items supplied under the Agreement.

Where the Agreement covers the reimbursement of the traveling or living expenses of the CONTRACTOR’s employees or agents, the CONTRACTOR agrees to furnish complete itemization and breakdowns of such expenses when requested by GPA.

In the event of any changes to or termination of the Agreement, or the furnishing of goods or services on a labor hour or a cost reimbursable basis, CONTRACTOR shall supply information in such detail as may be reasonably required by GPA to support all applicable charges. GPA, or an independent auditor designated by GPA, shall have the right to audit, during normal working hours, CONTRACTOR’s accounts and records relating to such charges. The expense of such audit will be borne by GPA.

4.6 Waiver of Claims

The making and acceptance of final payment will constitute:

A waiver of all claims by GPA against CONTRACTOR, except claims arising from unsettled liens, claims relative to defective Goods appearing after final payment, or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; nor will final payment constitute a waiver by GPA of any rights in respect of CONTRACTOR’s continuing obligations ‘under the Procurement Documents; and
A waiver of all claims by CONTRACTOR against GPA other than those previously made in writing and still unsettled.

4.7 **Supervision and Coordination by CONTRACTOR**

CONTRACTOR shall competently and efficiently manage, supervise, and direct production of the Goods and furnishing of Special Services and coordinate all operations required to deliver the Goods and furnish any required Special Services.

CONTRACTOR shall designate, in writing to GPA, a person with authority to act on behalf of CONTRACTOR with respect to CONTRACTOR’s obligations under the CONTRACT Documents, and all communications given to or received from that person will be binding on CONTRACTOR.

CONTRACTOR shall perform all such activities as an independent contractor and not as an agent of GPA. When others furnish materials and equipment for assembly by the CONTRACTOR, CONTRACTOR shall receive, unload, store, and handle it and become responsible therefore as though CONTRACTOR was furnishing such materials and/or equipment under the Agreement.

4.8 **Substitutions**

If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof certifying that the proposed substitute will perform adequately the function as called for by the general design, be similar and of equal substance to that specified, and be suited to the same use and capable of performing the same function as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR’s warranty or timely delivery of the Goods, whether or not acceptance of the substitute will require a change in any of the Contract Documents to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the production of the Goods is subject to payment of any license fee or royalty.

All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair, and replacement service will be indicated. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR’s expense such additional data about the proposed substitute as is required by ENGINEER. GPA may require CONTRACTOR to furnish at CONTRACTOR’s expense a special performance guarantee or other surety with respect to any substitute.

4.9 **Documentation and Drawings**

The Agreement will not be deemed satisfactorily completed until all requirements have been complied with including, but not limited to, proper material documentation, final drawings and reproductions, and other requirements stated in the Contract Documents. GPA may withhold final payment hereunder, pending completion of all such requirements by the CONTRACTOR.

At the time of each submission, CONTRACTOR shall in writing call ENGINEER’s attention to any deviations that the drawings or documents may have from the requirements of the Specification or Contract Documents. CONTRACTOR shall also direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals. CONTRACTOR’s submission of any
drawing or document bearing CONTRACTOR’s approval shall constitute a representation to GPA and ENGINEER that CONTRACTOR assumes full responsibility for having determined and verified the design criteria, quantities, dimensions, installation requirements, materials, catalog numbers, and similar data and that CONTRACTOR has reviewed or coordinated each drawing or document with the requirements of the Contract Documents.

ENGINEER’s review and approval of CONTRACTOR’s drawings or documents will be only for conformance with the design concept of the Goods and for compliance with the information given in the Contract Documents. Such review and approval will not extend to design data reflected in drawings or documents that is peculiarly within the special expertise of CONTRACTOR or any party dealing directly with CONTRACTOR. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER when drawings or documents are marked “Approved As Revised” and shall return the required number of corrected copies.

GPA and/or ENGINEER shall have the right to reproduce any and all drawing, prints, or other data or documents received from CONTRACTOR that are considered necessary for engineering, construction, or other purposes, despite any notice to the contrary appearing on the item. When a drawing or document approval is required by the Specifications, CONTRACTOR shall not commence production of any part of the Goods affected thereby until such drawing or document has been reviewed and approved by ENGINEER.

ENGINEER’s review and approval of CONTRACTOR’s drawings or documents will not relieve CONTRACTOR from responsibility for any deviations from the Contract Documents unless CONTRACTOR has in writing called ENGINEER’s attention to such deviation at the time of submission and ENGINEER has given written concurrence and approval to the specific deviation, nor will any concurrence or approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the drawings or documents submitted.

The Contractor shall submit for the approval of the Contracting Officer, shop and setting drawings and schedules required by the specifications or that may be requested by the Contracting Officer and no work shall be fabricated by the Contractor, save at his own risk, until such approval has been given. The drawings submitted shall be marked with the name of the project, numbered consecutively and bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for re-submission. If the shop drawings show variations from the requirements of the contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in his letter of transmittal so that if any variations are acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the contract even though such shop drawings have been approved. If a drawing as submitted indicates a departure from the contract requirements which the Contracting Officer finds to be in the interest of the Owner and to be so minor as not to involve a change in the contract price or time for performance, he may approve the drawing.

4.10 Continuing Performance

CONTRACTOR shall continue its performance under the Agreement during all claims, disputes, or disagreements with GPA. Production of Goods will not be delayed or the timely delivery of Goods or
furnishing of Special Services be prejudiced, delayed, or postponed pending resolution of any claims, disputes, or disagreements, except as CONTRACTOR and GPA may otherwise agree in writing.

4.11 Expediting

CONTRACTOR shall expedite delivery of the Goods and any related work of subcontractors. When requested or required by the Contract Documents, CONTRACTOR shall also provide GPA with an itemized schedule for engineering, outsourcing, fabrication, and shipping, which shall be followed by expediting reports including status of deliveries of materials and/or equipment purchased from subcontractors, if any, each month during its performance under the Agreement. If CONTRACTOR encounters delay in obtaining materials, or foresees any delay in its own manufacturing works, CONTRACTOR shall immediately inform GPA of such situation.

GPA and/or its designee shall be allowed reasonable access to CONTRACTOR’s and its subcontractor’s works for the purpose of expediting project progress. Any expediting done by GPA shall not relieve CONTRACTOR from its obligations as to the Delivery Time specified in the Agreement.

4.12 Compliance with Law

CONTRACTOR shall comply, and secure compliance by its subcontractors, with all applicable laws or regulations in connection with the Goods and services furnished hereunder. This includes the securing of any business or other licensing, certifications, or permits required.

If CONTRACTOR discovers any variance between the provisions of applicable laws and regulations and the drawings, Specifications, and other technical data furnished by the GPA, CONTRACTOR shall promptly notify GPA in writing thereof and obtain necessary changes from GPA before proceeding with the work affected thereby.

4.13 Price Adjustment

4.13.1 Price Adjustment Methods

Any adjustment in contract price within the parameters of this contract shall be made in one or more of the following ways:

a) By agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;

b) By unit prices specified in the contract or subsequently agreed upon;

c) By the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as specified in the contract or subsequently agreed upon;

d) In such other manner as the parties may mutually agree; or

e) In the absence of agreement between the parties, by a unilateral determination by the Procurement Officer of the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as computed by the Procurement Officer.
4.13.2 Submission of Cost or Pricing Data

The CONTRACTOR shall provide cost or pricing data for any price adjustments subject to the provisions of Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations.

4.14 Changes

4.14.1 Change Order

By a written order, at any time, and without notice to surety, the Procurement Officer may, subject to all appropriate adjustments, make changes within the general scope of this contract in any one or more of the following:

a) Drawings, designs, or Specifications, if the supplies to be furnished are to be specially manufactured for the Territory in accordance therewith;
b) Method of shipment or packing; or
c) Place of delivery.

4.14.2 Time Period for Claim

Within 30 days after receipt of a written change order under Paragraph 4.14.1 Change Order, unless the Procurement Officer extends such period in writing or e-mail, the CONTRACTOR shall file notice of intent to assert a claim for an adjustment. Later notification shall not bar the CONTRACTOR's claim unless the Territory is prejudiced by the delay in notification.

4.14.3 Claims Barred After Final Payment

No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this contract.

4.14.4 Other Claims Not Barred

In the absence of such a change order, nothing in this clause shall be deemed to restrict the CONTRACTOR's right to pursue a claim arising under the contract if pursued in accordance with the clause entitled, "Claims Based on the General Officer's Actions or Omissions, - Notice of Claim", or for breach of contract.

4.15 Contract Price

The Contract Price constitutes the total consideration to be paid by GPA to the CONTRACTOR for the complete delivery of the Goods, Special Services, and for performing other services in connection therewith in accordance with the Contract Documents as amended by the parties pursuant to the Agreement. Unless expressly provided otherwise in the Contract Documents, the Contract Price is not subject to escalation in respect of materials and/or labor cost or any other factor or variation in rates of exchange, and all duties, responsibilities, and obligations assigned to or undertaken by the
CONTRACTOR shall be at its expense without change in the Contract Price. Charges, fees, CONTRACTOR's profit, and all other expense shall be deemed to be included in the Contract Price.

Only a formal Change Order, accepted by GPA, may change the Contract Price. The CONTRACTOR shall make any claim for an increase in the Contract Price in advance of performance of any such changes. However, GPA reserves the right to challenge or refute such claims.

4.16 Payment Milestones and Schedule

Payment milestones have been selected to clearly identify the actual status of the portion of the Work completed rather than anticipated project progress schedules. Payments will be based on actual completion of each milestone event, where applicable, and not on the scheduled completion date. When a change in the Agreement is approved, the total contract price will be altered to the new total, and the remaining milestone payments will be adjusted.

Milestones shall not be scheduled more frequently than once every month. GPA will not approve a milestone payment until all preceding milestones have been approved. GPA will make payments within thirty days from receipt and approval of the invoice for the completed milestone.

The CONTRACTOR shall submit for review by GPA monthly invoices accompanied by a progress report describing the work performed during the compensation period. All payments to CONTRACTOR shall be free of any deductions, including but not limited to withholding taxes.

Should GPA enter into a Deferred Payment Agreement with the CONTRACTOR, GPA shall pay the CONTRACTOR for cost and services rendered upon complete delivery and acceptance of all goods and services as herein specified and performed under the Contract Agreement. A Deferred Payment Agreement as shown on Appendix N shall be executed between the CONTRACTOR and GUAM POWER AUTHORITY. The first application for payment maybe submitted by the CONTRACTOR after the Deferred Payment Agreement has been executed. GPA will make payments within thirty (30) days from receipt and approval of the invoice.

4.17 Force Majeure

Force Majeure referred to herein shall mean an occurrence beyond the control and without the fault or negligence of the party affected including, but not limited to, acts of God or the public enemy, expropriation or confiscation; changes in law procedures, war, rebellion, or riots; floods, unusually severe weather that could not reasonably have been anticipated; fires, explosions, epidemics, catastrophes, or other similar occurrences which are not within the control of the party affected. However, the following shall not be considered as Force Majeure:

a) Delay caused by lack or inability to obtain raw materials, congestion at CONTRACTOR's or its subcontractor's facilities, or elsewhere; market shortages, or similar occurrences, or

b) Delay, either on the part of the CONTRACTOR or its subcontractors, caused by shortages of supervisors or labor, inefficiency, or similar occurrences, or

c) Sabotage, strikes, or any other concerted acts of workmen, which occur only in the facilities of the CONTRACTOR or its subcontractors.
Should the circumstances of Force Majeure continue over a period of ninety (90) days, GPA has the right, if no other understanding is reached, to terminate the whole Agreement or any part thereof in accordance with Paragraph 4.21. Any delay or failure in performing the obligations under the Contract Documents of the parties hereto shall not constitute default under the Purchase Contract or give rise to any claim for damages or loss or anticipated profits if, and to the extent, such delay or failure is caused by Force Majeure, and if a claim is made therefore.

4.17.1 Invocation of Force Majeure

The party invoking Force Majeure shall perform the following:

a) Notify the other party as soon as reasonably possible by facsimile, e-mail, telex, cable or Messenger/courier of the nature of Force Majeure, anticipated exposure time under Force Majeure, and the extent to which the Force Majeure suspends the affected party’s obligations under the CONTRACT;

b) Consult with the other party and take all reasonable, prudent steps to minimize the losses of either party resulting from the Force Majeure;

c) Resume the performance of its obligations as soon as possible after the Force Majeure condition ceases.

4.17.2 Delivery Time and Force Majeure

Only a Change Order may change contractual Delivery Times. The CONTRACTOR as provided in Paragraph 4.14 Changes and its sub-paragraphs shall file all claims for an extension in the Delivery Time.

The Delivery Time will be extended in an amount equal to time lost due to delays caused by Force Majeure if a claim is made therefore as provided in this Paragraph. No amendment to the Contract Price, however, shall be allowable because of Force Majeure occurrences.

Notwithstanding the foregoing, all time limits stated in the Purchase Order documents are of the essence in the agreement. The provisions of this Paragraph shall not exclude recovery for damages (including compensation for additional professional services) for delays not caused by Force Majeure.

4.18 Warranty

The CONTRACTOR’S obligation to furnish the Goods and Special Services and to perform other services in connection therewith in accordance with the Agreement is absolute, and the CONTRACTOR warrants and guarantees to GPA that all Goods will be in accordance with the Contract Documents and will be new, fit for the purpose for which they are intended, and free from any defects, including faulty design, materials, or workmanship.

The CONTRACTOR shall provide GPA with all warranties and guarantees in writing. GPA and the Bidder shall negotiate the manner in which claims against these warranties are addressed including any
remedies for non-responsiveness. This may include retention of contract amounts, performance bonds, etc.

The CONTRACTOR shall be responsible for remedi ing all defects, without limitation, in design, materials, workmanship, operating characteristics, or performance of the Goods developing within twelve (12) months from the date on which GPA has placed the Goods in continuous service, or within twenty-four (24) months from the date of final payment, whichever date shall first occur, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or by any specific provisions of the Contract Documents.

Any part(s) supplied in replacement of the defective part(s) of the Goods or any Goods repaired pursuant to the provisions of this Paragraph shall be supplied or repaired on the same terms and conditions as provided for herein for the supply of the Goods and in particular a new warranty period shall apply. Such new warranty period shall expire on the date twelve (12) months from the date of such replacement or repair or on the expiration date of the warranty for the original Goods that were replaced or repaired, whichever is later.

If within any warranty period, repairs or changes are required in connection with guaranteed work which, in the opinion of GPA, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract, the CONTRACTOR shall promptly upon receipt of notice from GPA and without expense to GPA:

a) Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein; and

b) Make good all damages to the building or site or equipment or contents thereof which, in the opinion of GPA, are the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract.

In any case wherein fulfilling the requirements of the contract or of any guarantee embraced in or required thereby the CONTRACTOR disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to GPA and guarantee such restored work to the same extent as it was guaranteed under such other contract.

If the CONTRACTOR, after notice, fails to proceed promptly to comply with the terms of the guarantee, GPA may have the defects corrected and the CONTRACTOR and his surety shall be liable for all expense incurred.

All special guarantees applicable to definite parts of the work shall be stipulated in the specifications or other papers forming a part of the contract and shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

In the event the CONTRACTOR furnishes special services for installation and startup, such services shall be rendered in a competent and diligent manner and in accordance with the Contract Documents, accepted industry practice and any applicable professional standards.
4.19 Tests and Inspections

GPA or its designee shall have the right to inspect or observe the production, inspection, or testing of the Goods at any time and place including the CONTRACTOR's facilities and those of its subcontractors where the Goods are being produced.

Authorized GPA representatives shall have access at all times to the work for inspection whatever it is in preparation or progress and the CONTRACTOR shall provide proper facilities for such access and inspection.

Inspectors may be placed by GPA to supervise each and every subdivision of the work or any parts or process thereof. The authorized inspectors shall have free access to all parts of the work at all times and shall be given every facility, information and means of thoroughly inspecting the work done and the materials used or to be used. The inspectors shall at all times be free to perform their duties and any intimidation of any inspector by the CONTRACTOR or the employees thereof shall be sufficient reason, if GPA shall so decide, to annul the contract.

The CONTRACTOR shall conduct, at its responsibility and expense, all tests and inspections called for by the Contract Documents. In the event that witness inspection by GPA is required under the Contract Documents, the costs and expense arising therefrom shall be borne by the CONTRACTOR, including inspector's fees, transportation, hotel, and general flying expenses. In the event that CONTRACTOR's inspection is required at the site, CONTRACTOR's transportation, hotel, and general living expenses shall be borne by The CONTRACTOR.

Any inspection made by the inspector of GPA and/or its designee will be final. Such inspections or the witnessing of CONTRACTOR's test and inspection by GPA and/or its designee shall not relieve The CONTRACTOR of any of its responsibilities or liabilities under the Contract Documents, nor be interpreted in any way as implying acceptance of the Goods.

In the event of a dispute, an independent inspector shall be appointed, mutually acceptable to both parties, whose decision as to the quality and/or necessity of the work shall be final and binding on both parties. The independent inspector(s)' fees and charges shall be shared equally by both parties. Payments of any and all invoices of any major repairs or replacements shall be made based on mutually acceptable terms pre-approved by the CONTRACTOR and GPA.

The CONTRACTOR shall repair and replace, without cost or delay, anything found defective by tests and inspections, and also to bear all costs of re-inspection.

If the CONTRACTOR fails to proceed at once with the replacement of rejected materials and/or the correction of defective workmanship, the OWNER may, by contract or otherwise, replace such materials and/or correct such workmanship and charge the cost to the CONTRACTOR, or may terminate the right of the CONTRACTOR to proceed. The CONTRACTOR and surety shall be liable for any damage to the same extent for termination thereunder.

The CONTRACTOR must carry out at its authority and expense any inspection required by statutory Authority, governmental regulation, or other similar Authority on the codes or standards.
The CONTRACTOR shall furnish promptly, without additional charge, all reasonable facilities, labor and materials necessary for the safe and convenient inspection and tests that may be required by the Contracting Officer. All inspections and tests shall be performed in such manner as not to unnecessarily delay the work. Special, full-size and performance tests shall be as described in the specifications. The CONTRACTOR shall be charged with any cost of inspection when material and workmanship are not ready at the time inspection is requested by the CONTRACTOR.

Should it be considered necessary or advisable by the Contracting Officer at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out same, the CONTRACTOR shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any material respect due to the fault of the CONTRACTOR or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements involved in the examination and replacement, the cost of conducting the test plus fifteen percent (15%) shall be allowed the CONTRACTOR and he shall in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

4.20 Final Inspection

When the work is substantially completed the CONTRACTOR shall notify the OWNER, in writing, that the work will be ready for final inspection and test on a definite date which shall be stated in such notice. The notice shall be given at least ten (10) calendar days in advance of said date and shall be forwarded through the Contracting Officer who will attach his endorsement as to whether or not he concurs in the CONTRACTOR's statement that the work will be ready for final inspection or tests on the date given but such endorsement shall not relieve the CONTRACTOR of this responsibility in the matter.

4.21 Remediying Defects

4.21.1 Remediying Defective Parts

If at any time GPA determines that the replacement parts are defective, the CONTRACTOR shall, upon written notice from GPA, do all things necessary, at its expense, to make good the defects as soon as possible after being notified to do so by GPA. The CONTRACTOR warrants that the CONTRACTOR, unless otherwise agreed, shall remedy any defects. It is understood, that if so instructed by GPA, the CONTRACTOR shall make shipment by the fastest available method.

In the event that the CONTRACTOR does not take prompt action to fulfill its obligations hereunder as required by GPA and to the satisfaction of GPA, GPA may, after ten (10) days written notice to the CONTRACTOR, and without prejudice to any of its rights under the Contract Agreement, accept the defective Goods and carry out the remedial work itself instead of requiring correction or removal and replacement, and charge the CONTRACTOR for the costs of the work. In an emergency where delay would cause serious risk of loss or damage, GPA may take such action without prior notice to or waiting for action by the CONTRACTOR.
4.21.2 Remedying Defective Special Services

If at any time GPA notifies the CONTRACTOR in writing that any of the Special Services are defective, the CONTRACTOR shall promptly provide acceptable services. If the CONTRACTOR fails to do so, GPA may obtain the Special Services elsewhere.

4.21.3 Cost of Remedying Defects

All direct, indirect, and other costs of correcting, removing, and replacing defective Parts or of obtaining Special Services elsewhere and of exercising GPA’s rights and remedies under Paragraph 4.32, and other sections as they apply, will be charged against the CONTRACTOR and, if incurred prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Purchase Price, or if incurred after final payment, an appropriate amount will be paid by the CONTRACTOR to GPA. Such direct, indirect, and other costs will include, in particular but without limitation, compensation for additional professional services required and all costs of repair and replacement of property of GPA or others destroyed or damaged by correction, removal, or replacement of defective Goods. The CONTRACTOR shall not be allowed an extension of the Delivery Time because of any delay in performance attributable to the exercise by GPA of GPA’s rights and remedies under this Paragraph.

4.22 Stop Work Order

4.22.1 Order to Stop Work

The Procurement Officer may, by written order to the CONTRACTOR, at any time, and without notice to any surety, require the CONTRACTOR to stop all or any part of the work called for by this contract. This order shall be for a specified period not exceeding ninety-days (90-days) after the order is delivered to the CONTRACTOR, unless the parties agree to any further period. Any such order shall be identified specifically as a stop work order issued pursuant to this clause. Upon receipt of such an order, the CONTRACTOR shall forthwith comply with its terms and take all reasonable steps to minimize the occurrence of costs allocable to the work covered by the order during the period of work stoppage. Before the stop work order expires, or within any further period to which the parties shall have agreed, the Procurement Officer shall either:

a) Cancel the stop work order; or

b) Terminate the work covered by such order, as provided in the 'Termination for Default Clause' or the 'Termination for Convenience Clause of this contract.

4.22.2 Cancellation or Expiration of the Order

If a stop work order issued under this clause is canceled at any time during the period specified in the order, or if the period of the order or any extension thereof expires, the CONTRACTOR shall have the right to resume work. An appropriate adjustment shall be made in the delivery schedule or contract price shall be modified in writing accordingly, if:

a) The stop work order results in an increase in the time required for, or in the CONTRACTOR's cost properly allocable to, the performance of any part of this contract; and
b) The CONTRACTOR asserts a claim for such an adjustment within thirty (30) days after the end of the period of work stoppage; provided that, if the Procurement Officer decides that the facts justify such action, any such claim asserted may be received and acted upon at any time prior to final payment under this contract.

4.22.3 Termination of Stopped Work

If a stop work order is not canceled and the work covered by such order is terminated for default or Convenience, the reasonable costs resulting from the stop work order shall be allowed by adjustment or otherwise.

4.23 Termination for Convenience

4.23.1 Termination

The Procurement Officer may, when the interest of GPA or the Territory so require, terminate this contract in whole or in part, for the Convenience of the Territory. The Procurement Officer shall give written notice of the termination to the CONTRACTOR specifying the part of the contract terminated and when termination becomes effective. [GSA Procurement Regulations 6-101.10.]

4.23.2 CONTRACTOR's Obligations

The CONTRACTOR shall incur no further obligations in connection with the terminated work and on the date set in the notice of termination the CONTRACTOR will stop work to the extent specified. The CONTRACTOR shall also terminate outstanding orders and subcontracts as they relate to the terminated work. The CONTRACTOR shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated work. The Procurement Officer may direct the CONTRACTOR to assign the CONTRACTOR's right, title, and interest under terminated orders or subcontracts to the GPA. The CONTRACTOR must still complete the work not terminated by the notice of termination and may incur obligations as are necessary to do so.

4.23.3 Right to Supplies

The Procurement Officer may require the CONTRACTOR to transfer title and deliver to GPA in the manner and to the extent directed by the Procurement Officer:

a) Training material;

b) Any completed supplies; and,

c) Such partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information and contract rights (hereinafter called "manufacturing material") as the CONTRACTOR has specifically produced or specially acquired for the performance of the terminated part of this contract.
The CONTRACTOR shall, upon direction of the Procurement Officer, protect and preserve property in the possession of the CONTRACTOR in which the Territory has an interest. If the Procurement Officer does not exercise this right, the CONTRACTOR shall use best efforts to sell such supplies and manufacturing materials in accordance with the standards of Uniform Commercial Code of Guam (UCCG), Section 2706. Utilization of this Section in no way implies that the Territory has breached the contract by exercise of the Termination for Convenience Clause.

4.23.4 Compensation Under Termination for Convenience

The CONTRACTOR shall perform the following for compensation under termination for convenience.

a) The CONTRACTOR shall submit a termination claim specifying the amounts due because of the termination for Convenience together with cost or pricing data to the extent required by Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations bearing on such claim. If the CONTRACTOR fails to file a termination claim within one year from the effective date of termination, the Procurement Officer may pay the CONTRACTOR, if at all, an amount set in accordance with subparagraph (c) of this Paragraph.

b) The Procurement Officer and the CONTRACTOR may agree to a settlement provided the CONTRACTOR has filed a termination claim supported by cost or pricing data to the extent required by Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations and that the settlement does not exceed the total contract price plus settlement costs reduced by payments previously made by GPA, the proceeds of any sales of supplies and manufacturing materials, and the contract price of the work not terminated.

c) Absent complete agreement under Subparagraph (b) of this Paragraph, the Procurement Officer shall pay the CONTRACTOR the following amounts, provided payments agreed to under Subparagraph (b) shall not duplicate payments under this subparagraph:

i. Contract prices for supplies or services accepted under the contract;

ii. Costs incurred in preparing to perform and performing the terminated portion of the work plus a fair and reasonable profit on such portion of the work (such profit shall not include anticipatory profit or consequential damages) less amounts paid or to be paid for accepted supplies or services; provided, however, that if it appears that the CONTRACTOR would have sustained a loss if the entire contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;

iii. Costs of settling and paying claims arising out of the termination of subcontracts or orders. These costs must not include costs paid in accordance with other subparagraphs of this Paragraph;

iv. The reasonable settlement costs of the CONTRACTOR including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract for the termination and settlement of subcontracts there under, together with reasonable storage,
transportation, and other costs incurred in connection with the protection or disposition of property allocable to the terminated portion of this contract. The total sum to be paid to the CONTRACTOR under this Subparagraph shall not exceed the total contract price plus the reasonable settlement costs of the CONTRACTOR reduced by the amount of payments otherwise made, the proceeds of any sales of supplies and manufacturing materials under subparagraph (b) of this Paragraph, and the contract price of work not terminated.

d) Cost claimed, agreed to, or established under subparagraph (b) and (c) of this Paragraph shall be in accordance with Chapter 7 (Cost Principles) of the Guam Procurement Regulations. 13 GCA 2796 (UCCG) states:

2706. SELLER's Resale Including contract for Resale

(1) Under the conditions stated in Section 2703 on CONTRACTOR's remedies, the CONTRACTOR may resell the goods concerned or the undelivered balance thereof. Where the resale is made in good faith and in a commercially reasonable manner the CONTRACTOR may recover the difference between the resale price and the contract price together with an incidental damages allowed under the provisions of this division (Section 2710), but less expenses saved in consequence of the buyer's breach.

(2) Except as otherwise provided in Subsection (3) or unless otherwise agreed resale may be at public or private sale including sale by way of one or more contracts to sell or of identification to an existing contract of the CONTRACTOR. Sale may be as a unit or in parcels and at any time and place and on any terms, but every aspect of the sale including the method, manner, time, place and terms must be commercially reasonable. The resale must be reasonably identified as referring to the broken contract, but it is not necessary that the goods be in existence or that any or all of them have been identified to the contract before the breach.

(3) Where the resale is at private sale the CONTRACTOR must give the buyer [i.e., GPA] reasonable notification of his intention to resell.

(4) Where the resale is at public sale:

(01) Only identified goods can be sold except where there is a recognized market for a public sale of futures in goods of the kind; and

(02) It must be made at a usual place or market for public sale if one is reasonably available and except in the case of goods which are perishable or threaten to decline in value speedily the CONTRACTOR must give the buyer [i.e., GPA] reasonable notice of the time and place of the resale; and,

(03) If the goods are not to be within the view of those attending the sale, the notification of sale must state the place where the goods are located and provide for their reasonable inspection by prospective Bidders; and

(04) The CONTRACTOR may buy.
(5) A purchaser who buys in good faith at a resale takes the goods free of any rights of the original buyer [i.e., GPA] even though the CONTRACTOR fails to comply with one or more of this section's requirements.

(6) The CONTRACTOR is not accountable to the buyer [i.e., GPA] for any profit made on any resale. A person in the position of a CONTRACTOR (Section 2707) or a buyer who has rightfully rejected or justifiably revoked acceptance must account for any excess over the amount of his security interest, as hereinafter defined (Subsection 3) of Section 2711."

4.24 Termination for Defaults

4.24.1 Default

If the CONTRACTOR refuses or fails to perform any of the provisions of this contract with such diligence as will ensure its completion within the time specified in this contract, or any extension thereof, otherwise fails to timely satisfy the contract provisions, or commits any other substantial breach of this contract, the Procurement Officer may notify the CONTRACTOR in writing of the delay or non-performance and if not corrected in ten days or any longer time specified in writing by the Procurement Officer, such officer may terminate the CONTRACTOR's right to proceed with the contract or such part of the contract as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part the Procurement Officer may procure similar supplies or services in a manner and upon terms deemed appropriate by the Procurement Officer. The CONTRACTOR shall continue performance of the contract to the extent it is not terminated and shall be liable for excess cost incurred on procuring similar goods or services.

4.24.2 CONTRACTOR's Duties

Notwithstanding termination of the contract and subject to any directions from the Procurement Officer, the CONTRACTOR shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the CONTRACTOR in which GPA has an interest.

4.24.3 Compensation

Payment for completed supplies delivered and accepted by the GPA shall be at the contract price. Payment for the protection and preservation of property shall be in an amount agreed upon by the CONTRACTOR and the Procurement Officer; if the parties fail to agree, the Procurement Officer shall set an amount subject to the CONTRACTOR's rights under Chapter 9 (Legal and Contractual Remedies) of the Guam Procurement Regulations. The GPA may withhold from amounts due the CONTRACTOR such sums as the Procurement Officer deems to be necessary to protect the GPA against loss because of outstanding liens or claims of former lien holders and to reimburse the PURCHASER for the excess costs incurred in procuring similar goods and services.

4.24.4 Excuse for Nonperformance or Delayed Performance

Except with respect to defaults of subcontractors, the CONTRACTOR shall not be in default by reason of any failure in performance of this contract in accordance with its terms (including any failure by the
CONTRACTOR to make progress in the prosecution of the work hereunder which endangers such performance) if the CONTRACTOR has notified the Procurement Officer within fifteen (15) days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of the public enemy; act of the Territory and any other governmental entity in its sovereign restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the CONTRACTOR shall not be deemed to be in default, unless the supplies or services to be furnished by the subcontractor were reasonably obtainable from other sources in sufficient time to permit the CONTRACTOR to meet the contract requirements. Upon request of the CONTRACTOR, the Procurement Officer shall ascertain the facts and extent of such failure, and, if such officer determines that any failure to perform was occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the CONTRACTOR's progress and performance would have met the terms of the contract, the delivery schedule shall be revised accordingly, subject to the rights of the GPA under the clause entitled "Termination For Convenience", Paragraph 4.231. (As used in the Paragraph of this clause the term "subcontractor" means subcontractor at any tier.)

4.24.5 Erroneous Termination for Default

If, after notice of termination of the CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions of this clause, or that the delay was excusable under the provisions of Paragraph 4.24.4 (Excuse for Nonperformance or Delayed Performance) of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for Convenience of GPA, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this contract does not contain a clause providing for termination for Convenience of GPA, the contract shall be adjusted to compensate for such termination and the contract modified accordingly subject to the CONTRACTOR's rights under Chapter 9 (Legal and Contractual Remedies) of the Guam Procurement Regulations.

4.24.6 Additional Rights and Remedies

The rights and remedies provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

4.25 Disputes

All controversies between GPA and the CONTRACTOR, which arise under, or are by virtue of, this contract and which are not resolved by mutual agreement, shall be resolved under Guam Procurement Law and the Government Claims Act.

4.26 Consequential Damages

Unless expressly provided for otherwise in this Agreement, neither party, including their agents and employees, shall be liable to the other party for consequential damages, including, but not limited to, loss of use, loss of profit and interest due to breach of contract, breach of warranty, negligence, or any other cause whatsoever, provided nothing herein shall relieve CONTRACTOR from its liability for injury to persons or property, including property of GPA, whether such liability arises in contract, including breach of warranty, or tort, including negligence.
4.27 Time of Completion and Liquidated Damages

The CONTRACTOR must agree to fully complete the basic work under the Contract Agreement within three hundred sixty-five (365) calendar days from the issuance of Notice to Proceed (NTP). The CONTRACTOR must also agree to pay to GPA the amount of two thousand dollars ($2,000.00) per calendar day, not as a penalty, but as reasonable liquidated damages for failing, neglecting or refusing the work within the time specified.

Should GPA choose to award the additive bid, the CONTRACTOR must agree to fully complete the work under the Contract Agreement within ninety (90) calendar days from the issuance of the Notice to Proceed (NTP). The CONTRACTOR must also agree to pay to GPA the amount of two thousand dollars ($2,000.00) per calendar day, not as a penalty, but as reasonable liquidated damages for failing, neglecting or refusing the work within the time specified.

4.27.1 Prosecution of the Work

The CONTRACTOR agrees that said work shall be prosecuted regularly, diligently and without interruption at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed by and between the CONTRACTOR and the OWNER that the time for completion of the same takes into consideration the average climatic range and usual industrial conditions prevailing in the locality.

4.27.2 Suspension of Work

The OWNER will furnish all land and rights-of-way necessary for the carrying out of this contract and the completion of the work herein contemplated. Should the OWNER be prevented or enjoined from proceeding with the work or from authorizing its prosecution, either before or after the commencement by reason of any litigation, the CONTRACTOR shall not be entitled to make or assert any claim for damage by reason of said delay, or to withdraw from the contract except by consent of the OWNER, but time for completion of the work will be extended to such time as the OWNER determines will compensate for the time lost by such delay determination to be set forth in writing.

4.28 Notices

Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

4.29 Computation of Time

When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the time computation.
4.30 Language and Trade Terms

All communications, documents, and execution of services hereunder, unless otherwise designated, shall be in the English language. INCOTERMS (International Rules for the Interpretation of Trade Terms) published by the International Chamber of Commerce in 1980 and any subsequent revisions thereto shall govern interpretation of trade terms in the Contract Documents.

4.31 Governing Law

The laws of Guam shall govern the validity and interpretation of these conditions, the Agreement and legal relations of the parties.

CONTRACTOR shall not transfer or assign to any third parties any obligations or rights under the Agreement, nor any claims against GPA arising directly or indirectly out of the Agreement.

CONTRACTOR shall not sublet the Agreement in whole or in part without the prior written consent of GPA. Written consent of GPA for subletting shall not relieve CONTRACTOR of any of his obligations under the Agreement.

4.32 Non-waiver

GPA shall not consider any provisions of this Agreement waived unless GPA gives notice of such waiver in writing. Even if such notice has been given, such waiver shall not be construed as being a waiver of any other past or future right of GPA under the provisions of this Agreement, unless otherwise expressly stipulated therein. Failure of GPA to insist upon strict performance of any of the terms and conditions hereof, or failure or delay of GPA to insist upon strict performance of any of the terms and conditions hereof, or failure or delay of GPA to exercise any acts, rights, or remedies provided herein or by law shall not relieve CONTRACTOR of liability under any guarantees or of obligations under the Agreement and shall not be deemed a waiver of any right of GPA to insist upon strict fulfillment of the Agreement or of any of GPA’s rights or remedies as to the Goods or Special Services furnished.

4.33 Severability

If any work, phrase, clause, article, or other provision of this Agreement is or is deemed or adjudicated or otherwise found to be against public policy, void, or otherwise unenforceable, then said work, phrase, clause, article, or other provision shall be deleted or modified, in keeping with the express intent of the parties hereto as necessary to render all the remainder of this Agreement valid and enforceable. All such deletions or modifications shall be the minimum necessary to effect the foregoing.

4.34 Rights and Remedies

The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, will be in addition to, and shall not be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by law or contract, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.
representations, warranties, and guarantees made in the Contract Documents will survive final payment and termination or completion of this Agreement.

4.35 New Material

Unless the Contract Agreement specifies otherwise, the CONTRACTOR represents that the Goods and components are new. If the CONTRACTOR believes that furnishing used or reconditioned Goods or components will be in GPA’s interest, the CONTRACTOR shall so notify GPA in writing. The CONTRACTOR's notice shall include the reasons for the request along with a proposal for any consideration to GPA if GPA authorizes the use of used or reconditioned Goods or components.

All materials shall conform to federal and local codes and standards applicable to this type of work i.e. NEMA, ANSI, IEEE, ASTM etc. All necessary items and accessories not specified herein, but which are required to fully carryout the specified intent of the work, shall be furnished by the CONTRACTOR at no cost to the owner.

4.36 Claims based on the General Manager's Action or Omissions

If any action or omission on the part of the General Manager, or his/her designee, requiring performance changes within the scope of the contract constitutes the basis for a claim by the CONTRACTOR for additional compensation, damages, or an extension of time for completion, the CONTRACTOR shall continue with performance of the contract in compliance with the directions or orders of such officials, but by so doing, the CONTRACTOR shall not be deemed to have prejudiced any claim for additional compensation, damages, or an extension of time for completion; provided:

(1) The CONTRACTOR shall have given written notice to the General Manager, or his/her designee:

   i. Prior to the commencement of the work involved, if at that time the CONTRACTOR knows of the occurrence of such action or omission;

   ii. Within thirty (30) days after the CONTRACTOR knows of the occurrence of such action or omission, if the CONTRACTOR did not have such knowledge prior to the commencement of the work; or

   iii. Within such further time as may be allowed by the Procurement Officer in writing. This notice shall state that the CONTRACTOR regards the act or omission as a reason that may entitle the CONTRACTOR to additional compensation, damages, or an extension of time. The Procurement Officer or designee of such officer, upon receipt of such notice, may rescind such action, remedy such omission, or take such other steps as may be deemed advisable in the discretion of the Procurement Officer or designee of such officer.

(2) The notice required by subparagraph (1) of this Paragraph describes as clearly as practicable at the time the reasons why the CONTRACTOR believes that additional compensation, damages, or an extension of time may be remedies to which the CONTRACTOR is entitled; and
The CONTRACTOR maintains and, upon request, makes available to the Procurement Officer within a reasonable time, detailed records to the extent practicable, of the claimed additional costs or basis for an extension of time in connection with such changes.

4.36.1 Limitations of Clause

Nothing herein contained shall excuse the CONTRACTOR from compliance with any rules of law precluding GPA and its officers and any CONTRACTORS from acting in collusion or bad faith in issuing or performing change orders that are clearly not within the scope of the contract.

4.36.2 Standards of Design and Workmanship

The finished Work shall be complete in all respects. The intent of the Specifications is to acquire or purchase management services, training, operations and maintenance materials and services, and supply and inventory management and control. All hardware shall be manufactured, fabricated, assembled, finished, and documented with quality workmanship throughout, and all of its components shall be new and suitable for the purposes specified. All firmware/software shall be designed, implemented, tested, and documented in accordance with the best and recognized correct practices and shall be suitable for the purpose specified. All work shall conform to industry best practices.

4.37 Standard Work Schedule

Work scheduled and performed by the CONTRACTOR on GPA’s premises shall conform to published GPA working hours and shall account for GPA’s observed holidays.

4.38 Interference with Operation

Interference with normal operation of GPA’s facilities or equipment, or that of any CONTRACTORs or subcontractors on GPA’s premises, shall be avoided. The GPA’s representative will determine in advance whether such interference is unavoidable and will establish the necessary procedures under which the interferences will be allowed.

4.39 Release of Information

The CONTRACTOR shall not release any information, including the contract price concerning this project or any part thereof in any form, including advertising, news releases, or professional articles, without written permission of GPA.

4.40 Liens

In the event that a lien of any nature shall at any time be filed against the hardware, firmware, or software or the CONTRACTOR's facility by any person, firm, or corporation which has supplied material or services at the request of the CONTRACTOR, and for the cost of which the CONTRACTOR is liable under the terms of the Agreement, the CONTRACTOR agrees, promptly on demand of GPA and at the CONTRACTOR's expense, to take any and all action necessary to cause any such lien to be released or
discharged therefrom. The CONTRACTOR agrees to hold GPA harmless from all liens, claims, or demands in connection with the Work.

4.41 Title

Title to any of the hardware, firmware, and software, management practices, training and other documents and/or processes required by GPA to continue the improved management, operations and maintenance of the project will pass to GPA upon placement of the equipment within GPA’s premises prior to commencement of its installation, subject to GPA’s inspection thereof. The CONTRACTOR shall retain title and be responsible for movement of the equipment from the delivery carrier onto the premises and the subsequent unpacking of the equipment. If, for any reason, the Work is terminated prior to its completion, the title to all the Work performed to that time including all hardware, firmware, software, management practices, training and other documents and/or processes required by GPA to continue the improved management, operations and maintenance of the project, whether in the CONTRACTOR's facility, in transit, or on GPA’s premises, shall immediately pass to GPA.

4.42 Insurance

CONTRACTOR shall not commence work under this contract until he has obtained all insurance required under this section and GPA has approved such insurance, nor shall the CONTRACTOR allow any Subcontractor to commence work on this subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. He shall maintain all insurance required during the course of the work.

4.42.1 Contractors and Subcontractors Insurance

Prior to commencing the work, contractor shall obtain and thereafter maintain during the course of the work Insurance with companies acceptable to GPA. The contractor shall not allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. The limits of insurance shall be as follows unless a higher limit is required by statute:

1. General Liability including products, completed operations and contractual coverage for this Agreement in the amount of $1,000,000 combined limit. Coverage for "on an occurrence basis" commercial general liability which includes owner's and contractor's protective and contractual liabilities, and have a general aggregate limit of $1,000,000, a products and completed operations aggregate limit of $1,000,000, and a single occurrence limit of $1,000,000, and $1,000,000 for any of the above. GPA shall be an additional insured. Waiver of subrogation shall be granted in favor of GPA.

2. Auto Liability covering owned, hired, and non-owned vehicles, which includes endorsement for loss, property damage or destruction, and personal bodily injury in single aggregate minimum amount of $1,000,000 for each occurrence. GPA shall be an additional insured. Waiver of subrogation shall be granted in favor of GPA.

3. Professional Liability or Architects and Engineers Liability in the amount of $1,000,000.
4. Excess Liability with limits of $5,000,000 or higher. GPA shall be an additional insured. Waiver of Subrogation shall be granted in favor of GPA.

5. Worker’s Compensation and Employer’s Liability covering all employees and all statutory limits and requirements for workers’ compensation for Guam, and including but not limited to employers’ (CONTRACTOR) liability for employee bodily injury. Statutory limits and $1,000,000/ $1,000,000/ $1,000,000 respectively. Waiver of Subrogation endorsement shall be granted in favor of GPA.

6. Builder’s Risk or Installation Floater, when applicable, is to be furnished by CONTRACTOR, which shall include GPA as named insured.

7. Pollution Liability, when applicable, with limits of $5,000,000. GPA shall be an additional insured. Waiver of Subrogation shall be granted in favor of GPA.

8. Property insurance with replacement cost limits for the premises, property, improvements, structures, and machinery and equipment on the Premises.

9. Business Income and Extra Expense with a $3,000,000 limit or whatever is deemed appropriate by GPA upon award.

CONTRACTOR must furnish to the OWNER “Certificates of Insurance” evidencing all such coverage of the above items including the statement to the effect that cancellation or termination of said policy shall not be effective until thirty (30) working days after receipt of written notice by OWNER, prior to the commencement of this Contract. OWNER shall have the rights, which shall be exercised in OWNER’s sole discretion, to terminate this contract if CONTRACTOR fails to maintain or have the insurance policy described above.

All insurance policies herein required of CONTRACTOR shall be written by a company duly authorized and licensed to do business in Guam where work under this contract is being performed and be executed by some agent thereof duly licensed as an agent in Guam.

4.42.2 Indemnification

The CONTRACTOR shall indemnify, defend and hold harmless GPA against all loss, damage, or expense (including reasonable attorney’s fees incurred by GPA) arising out of the performance of the work, including injury or death to any person or persons resulting from the acts, omissions or negligence of the CONTRACTOR or the CONTRACTOR’s employees, servants, agents or subcontractors and from mechanics and materialism liens and to include the cost of enforcement of this indemnity. CONTRACTOR agrees that the insurance herein shall be issued by an established and reputable company with Best's Key Rating of B+ or better.

4.42.3 Certificate of Insurance

CONTRACTOR shall furnish certificates of insurance and waiver of subrogation endorsement to GPA prior to commencement of work showing evidence of such coverage, including the statement to the effect that cancellation or termination of the insurance shall not be effective until at least (30) days after receipt
of written notice to GPA. At all times CONTRACTOR’s insurance shall be primary to any other insurance that may be carried by GPA. The statement of limits of insurance coverage shall be construed as in any way limiting the CONTRACTOR’s liability under this agreement. GPA shall be an additional insured on all liability coverage and certificates of insurance shall clearly indicate such.

4.42.4 Insurance Company and Agent

All insurance policies herein required of the CONTRACTOR shall be written by a company duly authorized and licensed to do business in the State or Territory where work under this contract is being performed and be executed by some agent thereof duly licensed as an agent in Guam.

4.42.5 GPA Insurance

GPA agrees that it will keep the property and machinery and equipment insured, at a minimum, against loss or damage by fire with extended coverage endorsement for full replacement value as determined by GPA from time to time. Such insurance shall be issued by financially responsible insurers duly authorized to do business in Guam where the property is located and shall contain the standard form of waiver of subrogation. The insurance company shall be required to give GPA not less than thirty days (30) notice in the event of cancellation or material alteration of such coverage. Nothing contained herein shall be construed as creating any liability or responsibility on the part of the CONTRACTOR for the adequacy of insurance coverage on the property. As to any insurable risks of loss or damage to the property and machinery and equipment not required to be insured hereunder, GPA shall bear the cost of the same. GPA shall be deemed to be self-insured as to the deductible or co-insurance amount applicable to such insurance coverage and shall pay any deductible or co-insurance amount applicable in the event of such loss or damage.

4.42.6 Waiver of Subrogation

The CONTRACTOR hereby releases GPA and their respective officers, employees, and agents from all loss or damage to the Premises and to the fixtures, personal property, equipment and improvements of the CONTRACTOR in or on the Premises, notwithstanding that any such loss or damage may be due to or result from the negligence of GPA or their respective officers, employees or agents. This waiver does not apply to maintenance and repair assumed under the Contract Agreement by the CONTRACTOR.

4.43 CONTRACTOR Use of Site and Removal of Debris

The CONTRACTOR expressly agrees to undertake the following at his own expense:

a) To confine all operations to within the vicinity of the site limits and arrange work so that all materials and equipment are placed in such manner and location that there may be a minimum of interference or inconvenience inflicted upon other contractors, employees, equipment of GPA and the public

b) To take every precaution against injuries to persons or damages to property

c) To comply with the regulations governing the operation of premises which are occupied and to perform his contract in such a manner as not to interrupt or interfere with the operation of other facilities

d) To perform any work necessary to be performed after regular working hours or on Saturdays, Sundays or legal holidays without additional expense to GPA
e) To store his apparatus, materials, supplies, and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other contractors
f) To place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work
g) To frequently clean up all refuse, rubbish, scrap materials, and debris caused by his operation so that at all times the site of the work shall present a neat, orderly and workmanlike appearance
h) To affect all cutting, fitting, or patching of his work required to make the same conform to the plans and specifications, and except with the consent of GPA, not to cut or otherwise alter the work of any contractor
i) Before final payment to remove all surplus materials, false work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, to put the site in a neat, orderly condition and to thoroughly clean and leave reasonably dust free all finished surfaces

4.44 Restoration of Property

Any property damages to private and public properties, buildings, equipment, or utilities during the course of the work shall be restored to its original condition at no expense to GPA.

4.45 Barricades

The CONTRACTOR shall erect, install and maintain all temporary public walks, warning signs, barricades or other protective means in and around the site as deemed necessary or as may be ordered by the Contracting Officer for the effective protection of the public from injury and shall be held strictly liable for their safety.

4.46 Working Hours

Working hours shall be between 7:00 a.m. and 4:00 p.m. Monday through Friday.

4.47 Time Restrictions for Performing Work

No work shall be carried out on site outside of the specified working hours or on Saturdays, Sundays, or legal holidays without the Engineer’s written consent unless the work is unavoidable, absolutely necessary to save life or property, or necessary for the safety of the work, in which case the CONTRACTOR shall immediately advise the Engineer. Engineer shall not unreasonably withhold any such consent save in exceptional circumstances, nor do so if work outside of the specified working hours or on Saturdays, Sundays, or legal holidays in considered by CONTRACTOR to be necessary to meet the Contract Time. The services of the Inspector and Engineer will be charged to the CONTRACTOR.

4.48 Safety and Health Requirements

4.48.1 Compliance with Federal and Local Safety Regulations

The CONTRACTOR shall comply with Safety and Health Regulations for Construction, promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act, as set forth in Title 29, C.F.R. Copies of these regulations may be obtained from Labor Building, 14th and
4.49 Accident Prevention

Precaution shall be exercised at all times for the protection of persons (including employees) and property. The safety provisions of applicable laws, building and construction codes shall be observed. Machinery, equipment and all hazards shall be guarded or eliminated in accordance with the safety provisions of the latest edition of the Manual of Accident Prevention in Construction published by the Associated General Contractors of America to the extent that such provisions are not in contravention of applicable laws.

Should typhoon warnings be issued, the CONTRACTOR shall take every practicable precaution to minimize damage and/or danger to persons, to the work, and to adjacent property. These precautions shall include closing all openings, removing all loose materials, tools and/or equipment from exposed locations, and removing or securing scaffolding and all other temporary work. The CONTRACTOR shall undertake these precautions at his own expense.

4.49.1 Responsibility of CONTRACTOR to Act in Emergency

In case of an emergency which threatens loss or injury of property and/or safety or life, the CONTRACTOR shall act, without previous instructions from the OWNER, as the situation may warrant.

4.50 Electrical Energy

The CONTRACTOR shall make all necessary applications, pay all fees and charges, obtain necessary permits and provide and maintain his own electrical power and light as required and necessary in the progress of any branch of the work. He shall provide all temporary wiring necessary.

4.51 Water

The CONTRACTOR shall make all necessary applications, pay all fees and charges, obtain necessary permits for construction of temporary water required for use on this project. The nearest available source of water tap shall be verified by the CONTRACTOR. The CONTRACTOR shall be responsible for all expenses required for conveying water to the site from the available nearest source.

4.52 Signs

The CONTRACTOR shall erect a sign at the project site at his own expense. The location of sign shall be as directed by the Contracting Officer. Size of signs, lettering, and other pertinent data that should appear on the sign will be furnished by the Contracting Officer to the CONTRACTOR.

4.53 Standards

a) Any material specified by reference to the number, symbol or title of a specific standard, such as a commercial standard, a Federal specification, a trade association standard or other similar
standard, shall comply with the requirements in the latest revision thereto in effect on the date of Invitation for Bids, except as limited to type, class or grade or modified in such reference.
b) The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in the specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements. The Contracting Officer will furnish, upon request, information as to how copies of such standards may be obtained.
c) Reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the CONTRACTOR, in such cases, may at his option use any article, device, product, material, fixture, form of type of construction which in the judgment of the Contracting Officer expressed in writing is equal to that specified.

4.54 Samples

a) The CONTRACTOR shall furnish for the approval of the Contracting Officer any samples required by the specifications or that may be required by the Contracting Officer of any and all materials or equipment he proposes to use and shall prepay all shipping charges on the samples.
b) No samples are to be submitted with bids.
c) No materials or equipment of which samples are required to be submitted for approval shall be used on the work until such approval has been given by the Contracting Officer, save only at the CONTRACTOR's risk and expense.
d) Each sample shall have a label indicating the material represented, its place of origin and the names of the producer, the CONTRACTOR and the building or work for which the material is intended. Samples of finished materials shall be so marked as to indicate where the materials represented are required by the drawings or specifications.
e) A letter in duplicate submitting each shipment of samples shall be mailed under separate cover by the Contractor and contain a list of the samples, the name of the building or work for which the materials are intended, and the brands of the materials and names of the manufacturers.
f) The approval of any sample shall be only for characteristics or for the named in such approval and no other. No approval of a sample shall be taken in itself to change or modify any contract requirement. When a material has been approved, no additional sample of that material will be considered and no change in brand or make will be permitted. Approval of samples of hardware in good condition may be suitably marked for identification and used in the work.
g) Failure of any material to pass the specified tests will be sufficient cause for refusal to consider under this contract any further samples of the same brand or make of that material.
h) Test samples as the Contracting Officer may deem necessary will be procured from the various materials or equipment delivered by the CONTRACTOR for use in the work. If any of these test samples fail to meet the specifications requirement, any previous approvals will be withdrawn and such materials or equipment shall be subject to removal and replacement by the CONTRACTOR with materials or equipment meeting the specification requirements, or at the discretion of the OWNER, the defective materials and equipment may be permitted to remain in place subject to a proper adjustment of the contract price. The cost of the tests will be borne by the OWNER except where laboratory tests as hereinafter specified are required by the specifications.
4.55 Laboratory Tests

Any specified laboratory tests of materials and finished articles to be incorporated in the work shall be made by bureaus, laboratories or agencies approved by the Contracting Officer, and the reports of such tests shall be submitted to the Contracting Officer. The cost of the testing shall be paid for by the CONTRACTOR.

4.56 Methods

The CONTRACTOR shall use proper and efficient methods and appliances for the performance of all the operations connected with work embraced under these specifications, drawings and contract to secure a rate of progress which will secure completion of the work within the time specified. If, at any time before commencement of work, or during the progress thereof, such methods, equipment or appliances are inefficient or inappropriate for securing said quality of work or said rate of progress, the Contracting Officer may order the CONTRACTOR to increase their efficiency or to improve their character, and the CONTRACTOR must conform to such order. The failure of the Contracting Officer to demand such increases of efficiency or improvement shall not relieve the CONTRACTOR or his sureties from the obligations to secure such quality of work and said rate of progress and the completion of the work as required herein.

4.57 Labor and Materials

The CONTRACTOR shall furnish all labor, materials and equipment for the execution of the work according to the drawings, specifications and contract, and where no specifications are contained therein for whatever may be necessary, shall do all that may be termed ordinary, customary or essential to a job to be well and reliably completed. This includes concealment of all pipes and other rough items of installation if not clearly so shown on the drawings in a manner acceptable to the Contracting Officer. Structural safety shall not be impaired by such concealment. Work not particularly detailed, marked or specified shall be of equal quality as similar parts that are detailed, marked or specified. All material finished for and used in the job shall be of kind and grade specified and where not specifically called for at least of customary standard grade. All work shall be executed in accordance with their trades. Full structural safety is essential and the CONTRACTOR guarantees to accomplish same for the entire work.

4.58 As-Built Drawings

A contract set of drawings shall be maintained at the site with all changes or deviations from the original drawings neatly marked thereon in brightly contrasting color. This shall be a separate set of drawings not used for construction purposes which shall be kept up to date as the job progresses and shall be made available for inspection by the Contracting Officer at all times. Upon completion of the contract this set of drawings and a copy in AutoCAD format shall be delivered to the Contracting Officer.

4.59 Final Report

Two (2) hard copies and one (1) electronic copy of final reports shall be submitted to GPA after testing and commissioning are completed. The report shall include but not limited to:

a) Summary of Work Performed
b) Inspection and Test Criteria
c) All test results
d) List of materials used
e) As-built drawings
f) Commissioning Reports
g) Recommendations
INVITATION FOR MULTI-STEP BID

NO.: GPA-072-15

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

Phase I

Volume II

Technical Qualification Requirements
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1 OVERVIEW

This Specification describes the general requirements for a new Supervisory Control and Data Acquisition/Energy Management System (SCADA/EMS), associated software, systems, and equipment, and other associated deliverables. The new SCADA/EMS system is to be jointly purchased and operated by Guam Power Authority (GPA) and Guam Waterworks Authority (GWA) under a single user license.

This new SCADA/EMS system will be replacing GPA’s Siemens Power TG EMSYS Energy Management System, which has been in operation since 2006. GWA on the other hand does not have an existing system so the new SCADA/EMS system will be a new installation for GWA.

The new SCADA/EMS master station equipment will be installed at the Gloria B. Nelson Public Service Administration Facility (GBN PSAF) at Fadian, Mangilao, Guam. Table 1-1 shows the SCADA equipment locations.

The CONTRACTOR Scope of work includes but may not be limited to engineering, system design, system configuration, system integration, system testing, training, documentation, O&M support services, the giving and execution of warranties, project management, and other activities, third-party products, and equipment necessary to provide GPA and GWA with a fully-functioning, cyber secure SCADA/EMS completely integrated with external applications discussed in this specification and existing GPA and GWA network, communications, RTU, and IED systems and equipment. Additionally, the CONTRACTOR is required to supply, configure, test, document, and provide adequate training for additional third-party systems, software, and equipment required by this Bid.

Table 1-1: SCADA Equipment Installation Locations

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<th>Non-GBN PSAF</th>
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<td>GPA Power System Control Center</td>
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<td>GPA SCADA Tech Workstations</td>
<td>GPA Power System Control Center</td>
<td>Third</td>
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<tr>
<td>GWA Dispatcher Workstations</td>
<td>GWA Systems Control Center</td>
<td>Third</td>
<td></td>
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<tr>
<td>Multiscreen Video Wall System and</td>
<td>GWA Systems Control Center</td>
<td>Third</td>
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<td>GPWA Administrator Workstations</td>
<td>GPWA Information Technology Center</td>
<td>Second</td>
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<td>GWA wastewater operator terminal</td>
<td>GWA Wastewater Maintenance Building</td>
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<td>Hagatna Wastewater Treatment Plant</td>
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GPA’s existing Siemens Power TG SCADA/EMSYS is located at the GPA Power System Control Center in Cabras Island, Piti. The new SCADA/EMS system shall be installed, commissioned, and operating in...
parallel with GPA’s existing system. The existing system shall be operated as a backup system until a fully functioning Disaster Recovery (DR) system is completed and commissioned. The installation and commissioning of the new SCADA/EMS system shall be carefully coordinated with GPA and GWA, hereafter jointly referred to as “GPWA”.

1.1 GPA Overview

Guam Power Authority (GPA) is a public utility serving the island of Guam. GPA is a Government of Guam Public Corporation and Enterprise Fund. The Consolidated Commission on Utilities (CCU), a five-member elected board of directors, heads GPA. Additionally, GPA is regulated by the Guam Public Utilities Commission (GPUC).

GPA operates and maintains an electrically islanded generation, transmission, and distribution electric utility serving the Island of Guam, U.S.A. The GPA system has a dynamic system, with noticeable changes to the system Beta during a typical operating period. The system experiences large frequency deviations during normal operations and severe frequency deviations during transient events. Operating the GPA power grid will provide myriad challenges as GPA completes its 120+ MW utility scale renewable energy acquisition program and as capacity from third-party net metering systems continues.

GPA, in conjunction with private partners, operates and maintains nine (9) power plants, with a total gross nameplate capacity of 423.8 MW. In addition, GPA operates and maintains a total capacity of 18 MW of emergency generators supporting 128 Guam Waterworks Authority water and sewage pump stations and sewage treatment facilities situated at various locations throughout Guam and 10 portable units. Table 1-2 lists generation plants available for synchronized operation.

An overview of GPA’s generation resources and transmission systems is provided in GPA’s Integrated Resource Plan, which can be found at the following webpage:

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

GPA also has maintains an estimated combined total of 175 miles of 115 kV and 34.5 kV transmission lines and an estimated 585 miles of primary distribution lines, and 29 substations. The majority of these critical power system components are currently being monitored and controlled by the existing Siemens Spectrum Power TG Energy Management System (EMSYS). The GPA Islandwide System Transmission Single Line Diagram can be found on the following webpage:

http://guampowerauthority.com/gpa_authority/engineering/gpa_engineering_system_diagrams.php

GPA maintains a Meteorological Tower (MET) associated with the US EPA Cabras/Piti Area Intermittent Control Strategy (CPAICS) as required by the 69.11 (a)(3)(i) of 40 CFR Part 69 Subpart A, as amended, and any modification to the CPAICS approved by USEPA as defined in 69.11(a)(3)(ii). As part of CPAICS, GPA’s current SCADA/EMS has a customized Fuel Switching (FSW) application to control the type of fuel used by Cabras-Piti Power Plants.
Table 1-2: Island-Wide Power System Generation Resources

<table>
<thead>
<tr>
<th>Power Plant</th>
<th>Nameplate Gross Capacity (MW)</th>
<th>Technology</th>
<th>Owner</th>
<th>Operated By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabras 1&amp;2</td>
<td>132.0</td>
<td>Steam Turbine</td>
<td>GPA</td>
<td>TEMES</td>
</tr>
<tr>
<td>Cabras 3&amp;4</td>
<td>78.6</td>
<td>Slow Speed Diesel</td>
<td>GPA</td>
<td>EWP</td>
</tr>
<tr>
<td>MEC 8&amp;9</td>
<td>88.0</td>
<td>Slow Speed Diesel</td>
<td>Osaka Gas</td>
<td>Osaka Gas</td>
</tr>
<tr>
<td>Piti 7</td>
<td>40.0</td>
<td>Combustion Turbine</td>
<td>TEMES</td>
<td>TEMES</td>
</tr>
<tr>
<td>Macheche CT</td>
<td>20.0</td>
<td>Combustion Turbine</td>
<td>GPA</td>
<td>GPA</td>
</tr>
<tr>
<td>Yigo CT</td>
<td>20.0</td>
<td>Combustion Turbine</td>
<td>GPA</td>
<td>GPA</td>
</tr>
<tr>
<td>Talofofo</td>
<td>8.8</td>
<td>Medium Speed Diesel</td>
<td>GPA</td>
<td>GPA</td>
</tr>
<tr>
<td>Tenjo Vista</td>
<td>26.4</td>
<td>Medium Speed Diesel</td>
<td>GPA</td>
<td>GPA</td>
</tr>
<tr>
<td>MDI</td>
<td>10.0</td>
<td>Medium Speed Diesel</td>
<td>GPA</td>
<td>GPA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>423.8</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guam Power Authority</td>
<td>GPA</td>
</tr>
<tr>
<td>Taiwan Electrical and Mechanical Engineering Services</td>
<td>TEMES</td>
</tr>
<tr>
<td>Korea East-West Power Co.</td>
<td>EWP</td>
</tr>
</tbody>
</table>

1.1.1 Existing GPA SCADA Served Facilities

Since, 1980, GPA has operated its power system using a supervisory control and data acquisition systems. The current GPA SCADA/EMS provides remote telemetry and control to 32 substations and power plants. Table 1-3 lists these sites and their locations. The Contractor must integrate these sites with the new SCADA/EMS system. The communication links will be provided by GPWA.

By next the end of 2016, GPA anticipates placing additional facilities on SCADA that may coincide with this SCADA project including but not limited to:

- Ten or more new renewable energy facilities
- A 40 MW Energy Storage System at the Agana Substation.

1.1.2 GPA Power Systems Control Center

The GPA Systems Control Center will move from its current location at Cabras to the third floor of the Gloria B. Nelson Public Service Administration Facility (GBN PSAF). Twenty-five (25) employees work at PSCC performing various dispatching, technical and support. This project will require training of all of these employees as well as employees in SPORD, Information Technology, Customer Services,
Generation, Engineering, and Transmission & Distribution. Additionally, this bid requires the transitioning of data circuits from their current location and configuration at Cabras to the GBN PSAF.

Table 1-3: Existing GPA SCADA Served Facilities

<table>
<thead>
<tr>
<th>SCADA Enabled Site Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aniqua Substation</td>
<td>Agana</td>
</tr>
<tr>
<td>2. Anderson Substation</td>
<td>Anderson Air Force Base, Yigo</td>
</tr>
<tr>
<td>3. GAA Substation</td>
<td>Antonio B. Won Pat International Airport, Tamuning</td>
</tr>
<tr>
<td>4. GIAT Substation</td>
<td>Antonio B. Won Pat International Airport, Tamuning</td>
</tr>
<tr>
<td>5. Apra Heights Substation</td>
<td>Apra</td>
</tr>
<tr>
<td>6. Barrigada Substation</td>
<td>Barrigada</td>
</tr>
<tr>
<td>7. Radio Barrigada Substation</td>
<td>Barrigada</td>
</tr>
<tr>
<td>8. Cabras 1&amp;2 Power Plant</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>9. Cabras 3&amp;4 Power Plant</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>10. MEC 8&amp;9 Power Plant</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>11. TEMES 7 Power Plant</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>12. Piti 34.5 kV Substation</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>13. Piti 115 kV Substation</td>
<td>Cabras-Piti Complex, Piti</td>
</tr>
<tr>
<td>14. Macheche CT Power Plant</td>
<td>Dededo</td>
</tr>
<tr>
<td>15. Dededo Substation</td>
<td>Dededo</td>
</tr>
<tr>
<td>16. Harmon Substation</td>
<td>Dededo</td>
</tr>
<tr>
<td>17. Meteorological Monitoring Station 1</td>
<td>Fuel Farm, Piti</td>
</tr>
<tr>
<td>18. Dundan Renewable Power Plant</td>
<td>Inarajan</td>
</tr>
<tr>
<td>19. MDI Power Plant</td>
<td>Leopalace Resort &amp; Country Club, Yona</td>
</tr>
<tr>
<td>20. MDI Substation</td>
<td>Leopalace Resort &amp; Country Club, Yona</td>
</tr>
<tr>
<td>21. Pagat Substation</td>
<td>Mangilao</td>
</tr>
<tr>
<td>22. Marbo Substation</td>
<td>Marbo</td>
</tr>
<tr>
<td>23. Agana Substation</td>
<td>Mongmong</td>
</tr>
<tr>
<td>24. Orote Substation</td>
<td>Naval Base, Guam, Santa Rita</td>
</tr>
<tr>
<td>25. Talofofo Power Plant</td>
<td>Talofofo</td>
</tr>
<tr>
<td>26. Tamuning 34.5 kV Substation</td>
<td>Tamuning</td>
</tr>
<tr>
<td>27. Tamuning 115 kV Substation</td>
<td>Tamuning</td>
</tr>
<tr>
<td>28. Tenjo Vista Power Plant</td>
<td>Tenjo Vista, Piti</td>
</tr>
<tr>
<td>29. San Vitores Substation</td>
<td>Tumon</td>
</tr>
<tr>
<td>30. Tumon Substation</td>
<td>Tumon</td>
</tr>
<tr>
<td>31. Umatac Substation</td>
<td>Umatac</td>
</tr>
<tr>
<td>32. Yigo CT Power Plant</td>
<td>Yigo</td>
</tr>
</tbody>
</table>

1.1.3 GPA/GWA Cybersecurity Plan and Policies

As part of the Smart Grid ARRA Grant Program, GPA and GWA developed a Cybersecurity Plan and Policy set. All Smart Grid and SCADA related equipment, implementations, network, voice, and data communications, data transfers, software applications, work processes, planning, remote operating control, and physical security must adhere to the GPA/GWA Cybersecurity Plan. The entire conduct of the execution of the SCADA/EMS Bid and Project falls under the aforementioned requirement.

The Bidder must describe in detail how it will design for the electronic and physical security for the SCADA/EMS, associated software, systems, and equipment.
1.1.4 GPA General Responsibilities

GPA shall supply the following items and services for the SCADA/EMS Project:

A. Space and server cabinets in the GBN PSAF Server Rooms for CONTRACTOR supplied equipment. GPA will provide the dimensions of the server cabinets and the floor plans for the new facility at the Mandatory Pre-Bid Conference.

B. Power sources at the New GPA Control Center and Server Room.

C. Air-Conditioned environment at the GPWA Control Centers and Server Room.

D. Communication circuits and GPA’s connection to Bidder-supplied termination points.

E. Remote Terminal Units (existing and new)

G. Timely technical review and approval of CONTRACTOR’s designs, plans, documentation, training manuals, and other deliverables subject to GPA review.

H. Participation in CONTRACT supplied training programs.

I. Participation in formalized Factory Acceptance, Site Acceptance, and 1000-Hour Availability Tests.

J. Participation in Point-to-Point and other field testing and integration.

K. GPA Multi-Screen Video Wall system.

The CONTRACTOR’s responsibility includes analysis of the resources supplied above to determine if adequate resources exist to support the project. The CONTRACTOR must provide any additional resources, equipment, and modifications to GBN PSAF infrastructure to bridge all resource and infrastructure gaps.

1.2 GWA Overview

Guam Waterworks Authority (GWA) is a water and wastewater utility serving the Island of Guam, U.S.A. GWA’s mission is to provide excellent water and wastewater services in a safe, reliable, responsible and cost effective manner. GWA is a Government of Guam Public Corporation and Enterprise Fund. The Consolidated Commission on Utilities (CCU), a five-member elected board of directors, heads GWA. Additionally, GWA is regulated by the Guam Public Utilities Commission (GPUC).

GWA is responsible for the production, treatment, distribution and sale of safe, reliable drinking water. GWA is also responsible for the collection, treatment and disposal of wastewater.

GWA water facilities include:

- 120 Deep Wells
- 1 Water Treatment Plant
- 5 Water Springs, 1 active and 4 inactive
- 39 Reservoirs
- 37 Water Booster Pump Stations
- 73 Pressure Regulating Valves
- 15 Master Meters (construction project on-going)
• > 600 miles of water lines ranging in diameter from 2 inches to 24 inches
• 40,743 Water revenue meters

GWA wastewater facilities include:
• 7 Wastewater Treatment Plant
• 77 Wastewater Pump Stations
• > 230 miles of sewer lines

GWA Operations conduct daily site visits to its water and wastewater facilities to inspect, record operational status and take necessary control actions. Alarm notification is minimal, with abnormal conditions often go undetected until the site is inspected during the daily site visits.

1.2.1 GWA SCADA Master Plan

GWA completed its SCADA Master Plan in 2014 that lays out a coordinated and prioritized sequence of SCADA improvements to enhance operations, provide reliable and efficient systems, maintain desired service levels, contribute to protection of health and safety, and achieve regulatory compliance. The GWA SCADA Master Plan proposed to accomplish the SCADA implementation in three (3) main phases. SCADA Phase A consists of the central SCADA infrastructure and high priority facilities as identified by GWA Operations and Management at the time the SCADA Master Plan development, which includes 210 GWA water and wastewater facilities. SCADA Phase B consists of adding second tier high priority facilities as identified by GWA Operations and Management at the time of SCADA Master Plan development, and integrating these locations into the SCADA system. SCADA Phase C consists of adding additional instruments and equipment to the facilities already implemented with SCADA under Phase A and B. However, due to funding limitations, GWA has broken down Phase A into multiple implementations. The initial SCADA Phase A-1 will consist of a new central SCADA/EMS system connected and integrated with existing and new SCADA upgraded water and wastewater facilities.

The GWA SCADA Master Plan provides requirements inclusive for this Bid.

1.2.2 Existing GWA SCADA Upgraded Facilities

GWA has a few facilities upgraded with supervisory control and data acquisition systems and are presently operating as standalone systems. These existing systems need to be connected and integrated with the new SCADA/EMS system. The communication links will be provided by GPWA.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wastewater Treatment Plant</td>
</tr>
<tr>
<td>1</td>
<td>Water Treatment Plant</td>
</tr>
<tr>
<td>11</td>
<td>Deep Wells</td>
</tr>
<tr>
<td>2</td>
<td>Reservoirs</td>
</tr>
<tr>
<td>15</td>
<td>Total</td>
</tr>
</tbody>
</table>

Table 1-4: Number of GWA/SCADA Upgraded Facilities
A general description is provided below.

- **Ugum Water Treatment Plant (WTP)** - a system was installed to monitor and control equipment and processes at this water treatment plant. The plant’s system is not connected or interacting with other systems.
- **Hagatna Sewer Treatment Plant (STP)** - a system was installed to monitor new equipment and unattended operations of selected treatment processes. The function of the system is to monitor, archive data, and notify personnel when an alarm event occurs. The system consists of a master control workstation connected to a local area network (LAN) of programmable logic controllers (PLCs). The master control workstation is installed at the treatment plant which gathers information from the plant’s PLCs and sends information through the LAN. The plant’s system currently does not interact with other systems.
- **Dedicated Sinajana/Agana Heights/Ordot Water Transmission Line** – a system was installed at eleven (11) water wells along Route 4 and two (2) reservoirs to automate the sequence of operation of the water wells based on levels of the Agana Heights and Chaot Reservoirs. The system consisted of a PLC and communication equipment at each site and one master SCADA server. This system does not interact with other systems.

### 1.2.3 Planned/New SCADA Upgraded Facilities

GWA has several upcoming capital improvement projects that will be upgrading 120 additional water and wastewater facilities with programmable logic controllers (or remote terminal units), communications, and field instrumentation. These new SCADA upgraded facilities need to be connected and integrated with the new SCADA/EMS system. The communication links will be provided by GPWA.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>Wastewater Pump Stations</td>
</tr>
<tr>
<td>33</td>
<td>Deep Wells</td>
</tr>
<tr>
<td>5</td>
<td>Reservoirs</td>
</tr>
<tr>
<td>3</td>
<td>Water Booster Pump Stations</td>
</tr>
<tr>
<td>1</td>
<td>Master Meter</td>
</tr>
<tr>
<td>1</td>
<td>Pressure Regulating Valve</td>
</tr>
<tr>
<td>120</td>
<td>Total</td>
</tr>
</tbody>
</table>

### 1.2.4 GWA Systems Control Center

The GWA Systems Control Center is located on the third floor of the Gloria B. Nelson GPA/GWA Multi-Purpose Facility. It has a staff of sixteen (16) employees performing various dispatching, technical and support duties in the operation and maintenance of water and wastewater systems. But unlike GPA, GWA has little experience of SCADA systems. This project will develop and administer a user training program for all employees at the GWA Systems Control Center as well as other SCADA users and support staff from other GWA Divisions such as the IT, Engineering, Water Maintenance/Operations and Wastewater Maintenance/Operations Divisions.
1.2.5 GWA IT Division

The GWA IT Division may take on the role as GWA’s SCADA Administrator. The GWA IT Division has little SCADA experience so the scope of this project will include a skills assessment, and the development and delivery of a SCADA Administrator training program suited for GWA IT employees and support staff.

1.2.6 GWA General Responsibilities

GWA shall supply the following items and services for the SCADA/EMS Project:

A. Communication circuits and GWA’s connection to Bidder-supplied termination points.
B. Provide access to Remote Terminal Units and Programmable Logic Controllers (existing and new)
C. Coordination of Bidder’s activities with GWA operating requirements.
E. Timely technical review and approval of CONTRACTOR’s designs, plans, documentation, training manuals, and other deliverables subject to GPA review
F. Participation in CONTRACT supplied training programs
G. Participation in formalized Factory Acceptance, Site Acceptance, and 1000-Hour Availability Tests
H. Participation in RTU/PLC point-to-point testing and other field testing and integration
I. Coordination of CONTRACTOR’s activities with GPA/GWA operating requirements.

1.3 SCADA Communications

GPWA SCADA communications will use the Consolidated Communication Network (CCN). Tier1, Tier2, and Tier 3 networks comprise the CCN. GPWA fiber assets and equipment comprise the Tier1. The Tier1 network carries VOIP, computer network, and other data services. A Tropos/ABB wireless mesh network comprises the Tier2 network. Landis+Gyr’s Gridstream system comprises the Tier3 network. These networks have high data capacities, physically robust components, and a fault tolerant architecture. GWA and GPA will be using and expanding the service coverage of GPA’s existing mesh network to support GWA SCADA and other GPA communication needs.

GPA has existing RTUs being polled via GTA circuits with the exception of the Cabras-Piti Complex where RTUs are polled via GPA copper or fiber circuits. The CONTRACTOR will transition GPA RTUs onto the CCN insofar as coverage of the CCN exists.

1.4 Interfacing with External Applications

The SCADA/EMS must interface with external applications. These applications include but are not limited to:

- GWA
  - Water and Wastewater Hydraulic Analysis (W/WW HA)
- GPA
  - Automatic Generation Control (AGC)
• GPWA
  o Geographic Information System (GIS)
  o Computerized Maintenance Management System (CMMS)/Enterprise Asset Management (EAM)
  o Outage Management System (OMS)
  o Meter Data Management System (MDMS)
  o iDashboards
  o Ventyx GENOPS
  o Ventyx Nostradamus
  o Data Warehouse/Business Intelligence Systems.

1.4.1 Water and Wastewater Hydraulic Analysis

GWA uses Innovyze InfoWater application software to perform water hydraulic analysis. GWA plans to purchase the Innovyze InfoSWMM application software in the future to perform wastewater hydraulic analysis. The new SCADA/EMS system shall be capable of interfacing and providing data to the Innovyze InfoWater and InfoSWMM application software to calibrate the network models to improve the accuracy of the hydraulic analysis results.

1.4.2 Geographic Information System

The Geographic Information System (GIS) is an integral tool used by GWA for planning, cost estimating, and analyzing systems in a spatial way. The Environmental Systems and Research Institute (ESRI) ArcMap is the GIS software purchased and used by GWA and GPA. Under the One Map – One Customer Initiative, GWA and GPA plan to integrate their GIS data onto the same ESRI platform.

In ArcMap, the map consists of a series of layers containing both the Water and Waste Water facilities and pipeline networks that are geographically referenced on an aerial photography/satellite imagery layer as the background. GPA will also have its series of layers on the same background. The map layers are user selectable. Users can select all or some of the map layers to display the facilities and pipeline they want to view on the map, and can turn the aerial photography/satellite imagery layer on or off. The map layers and the aerial photography/satellite imagery layer can be exported in Shape files and MrSId imagery respectively.

Data in the new SCADA/EMS system shall be geographically referenced. Contractor shall bring in the map from the ArcMap GIS into the new SCADA/EMS system to maintain one single consistent map. This should reduce data maintenance and errors. Consistency is also essential for users to transition between the ArcView GIS and the new SCADA/EMS system, efficiently and without confusion.
Importing the shape files (GIS format) and MrSid imagery into the new SCADA/EMS system to create and update the map shall be a simple and seamless process to accomplish. Furthermore the new SCADA/EMS system shall enable users to select the layers they want to view on the map. A selectable list of layers shall be provided on the SCADA map display to turn layers on or off.

1.4.3 Computerized Maintenance Management System

GWA will be issuing a Request for Proposal (RFP) to replace its existing Computerized Maintenance Management System (CMMS). The new SCADA/EMS system shall be capable of exporting available runtime hours, mean time between failures, and other pertinent information that will be captured in the new CMMS. GPA and GWA will move to the same Enterprise Asset Management platform. The SCADA/EMS must support common interfaces to these systems. (Future Requirement).

1.4.4 Outage Management System (OMS)

GPA uses Milsoft’s Outage Management System. The CONTRACTOR shall provide interfaces for the bilateral transfer of information between the SCADA/EMS and OMS.

1.4.5 Meter Data Management System (MDMS)

GPA uses Harris Utilities Meter Data Management System (MDMS). The CONTRACTOR shall provide interfaces for the bilateral transfer of information between the SCADA/EMS and MDMS.

1.4.6 iDashboard

GPA uses iDashboard as its enterprise Business Intelligence tool. The CONTRACTOR shall provide interfaces for bilateral transfer of information from the SCADA/EMS to iDashboards.

1.4.7 GENOPS

GPA will extensively use the Ventyx GENOPS application. The CONTRACTOR shall provide interfaces for the bilateral transfer of information between the SCADA/EMS and GENOPS. GPA is currently in the implementation phase of its GENOPS Project.

The SCADA/EMS must provide GENOPS but is not limited to providing the following on a real-time, time-coincident basis:

- 15-minute power system demand (MW)
- 15-minute gross, net, and auxiliary power output (MW) for each generator
- 15-minute gross, net, and auxiliary energy production (MWH) for each generator
- 15-minute fuel consumption (gallons, barrels) for each plant
- 15-minute indication of fuel type used at each power plant that uses more than one fuel type
- 15-minute weather data.
The SCADA/EMS must accept GENOPS recommendations for Economic Dispatch. The SCADA/EMS must make this information available for display or tabular. The SCADA/EMS must use this information to automatically dispatch generation units.

1.4.8 Nostradamus

GPA uses the Ventyx Nostradamus application. The CONTRACTOR shall provide interfaces for the bilateral transfer of information between the SCADA/EMS and Nostradamus. Nostrodamus will provide Short-Term Load Demand Forecasts including:

- One-Hour Look Ahead Demand Forecast
- Day Peak Demand Forecast
- Next Day 24-hour Demand and Peak Demand Forecast
- Week Ahead Hourly Demand Forecast.

The SCADA/EMS must accept Nostrodamus Forecasts and make them available for display or tabular.

1.4.9 SCADA/EMS Data Warehouse and Business Intelligence Applications

GPA/GWA envisions implementing an Enterprise Data warehouse catering to the reporting requirement of various departments and to the needs of business, planning, operations, and reporting functions. The Data warehouse will serve as the final data store for all enterprise data and would be used to run various reporting and dashboard applications.

Due to limitations of data volume, it is envisioned that data from SCADA and associated auxiliary applications would be stored in a temporary data store (staging area, Historian Mirror), where it can be aggregated based on business logic. This aggregated data will serve as the data source for drawing useful information from data using reporting and analytics tools.

SCADA and its associated applications will need to have the ability to directly move large quantities of data to the staging area, where it can be aggregated and processed as per requirement. The aggregated, “transformed” data will then be replicated to the Enterprise data warehouse for executive reporting and review requirements. The application has to be scalable to support further data sources and destinations AND must also have the ability to port/migrate data on a routine basis. If any ETL (Extract Transform Load) application is to be leveraged for this purpose, the supplier is expected to list the details along with requirement number of licenses and license costs etc.
GPA requires the CONTRACTOR to propose, design, implement, and deliver a Data Warehouse to serve as a repository for all SCADA/EMS data as part of the GPWA cybersecurity requirements. The CONTRACTOR must provide any Application and/or Database Interfaces and/or Connectors necessary to support bilateral data exchange between GPA and GWA external applications.

Additionally, GPWA is considering acquiring and implementing Business Intelligence Applications for the additional uses including but not be limited to the following:

- Alarm Management
- Automated Reports
- Balanced Scorecards
- Condition Based Maintenance (CBM)
- Continuous Emissions Monitor (CEM)
- Environmental Compliance Monitoring
- General Operations Documentation and Equipment Specs.

All licenses, warranties, and support agreements associated with the SCADA/EMS Data Warehouse and/or provided Business Intelligence Applications, its related/support software products, and the service of its products shall be fully transferred to GPA as part of the list of deliverables. Please Refer to Tables 1-6 and 1-7.

1.5 Shared Responsibilities for Operations and Maintenance of SCADA/EMS

The following organizations will share operations and maintenance responsibilities for the SCADA/EMS:

- Power System Control Center (Power System Operations User)
- SCADA/EMS RTU programming
- SCADA i/o database configuration (GPA data only)
- SCADA display and tabular configuration (GPA displays only)
- O&M for RTUs/IEDs on third-party communications
- GPA RTU O&M
- GPA RTU Point-to-Point Testing
- GWA Dispatchers (Water/Wastewater Operations User)
- GPA and GWA IT
- IT System O&M and performance monitoring
- CNN System O&M and performance monitoring
- System Database Management
- System Administration
- Software Application patch management, O&M, and performance monitoring
System Administration
○ Cybersecurity
○ Access control list, access privilege, and authentication management
○ System Administration
○ External Application Interface Management (EAIM)
○ System Administration
○ CNN Communications
○ Configuration
○ Troubleshooting with PSCC
○ Mirroring Systems (O&M, Configuration)
○ GPWA Customer Services (Command Center)
○ GWA Engineering
○ Data User
○ GWA advanced applications configuration
○ GWA RTU Point-to-Point Testing
○ GPA Engineering (Physical Security)
○ SPORD (Performance Management, Contract Management, Data Analytics, In-House Consulting Resource)

The Bidder should consider the above distribution of responsibilities and functions in describing the training program it will provide as part of the list of deliverables.
### Table1-6: SCADA/EMS Data Warehouse List of Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan/Design</strong></td>
<td></td>
</tr>
<tr>
<td>Data Warehouse Design</td>
<td>Identify required DB software applications</td>
</tr>
<tr>
<td></td>
<td>Define data structures and method of approach</td>
</tr>
<tr>
<td></td>
<td>Describe and justify proposed Data Warehouse model</td>
</tr>
<tr>
<td></td>
<td>Provide design diagrams and documents</td>
</tr>
<tr>
<td>Operational Applications/Systems</td>
<td></td>
</tr>
<tr>
<td>Integration Solution and Design</td>
<td>Identify required application development tools if necessary</td>
</tr>
<tr>
<td></td>
<td>Define required data flow processes</td>
</tr>
<tr>
<td></td>
<td>Provide design diagrams and documents</td>
</tr>
<tr>
<td>IT Infrastructure Requirements</td>
<td></td>
</tr>
<tr>
<td>Schedule/Checklist</td>
<td>Identify Data Warehouse hardware requirements</td>
</tr>
<tr>
<td></td>
<td>Identify Network Access Control requirements (for Firewall)</td>
</tr>
<tr>
<td><strong>Implement/Test</strong></td>
<td></td>
</tr>
<tr>
<td>Setup, Installation, Configuration of</td>
<td>Install DB software and DB supporting software</td>
</tr>
<tr>
<td>Data Warehouse</td>
<td>Configure DB for Data Warehouse model</td>
</tr>
<tr>
<td></td>
<td>Setup required data structures</td>
</tr>
<tr>
<td>Setup of required Integration Layers</td>
<td>Setup DB connectors and/or application interfaces</td>
</tr>
<tr>
<td></td>
<td>Setup and configure ETL (extract, transform, load) and data sanitation processes</td>
</tr>
<tr>
<td>Test Data Warehouse required</td>
<td>Test loading and querying of the Data Warehouse</td>
</tr>
<tr>
<td>functionalities</td>
<td></td>
</tr>
<tr>
<td>Benchmark Data Warehouse performance</td>
<td>Test read and write throughput speeds</td>
</tr>
</tbody>
</table>

### Table1-7: Business Intelligence Applications List of Deliverables

<table>
<thead>
<tr>
<th>BI Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mobile</strong></td>
<td>Perform ad hoc analysis on SCADA/EMS data remotely using your mobile device</td>
</tr>
<tr>
<td><strong>Report Designer</strong></td>
<td>Create reports and perform detailed calculations with SCADA/EMS data and be able to export with your document format of choice such as Microsoft Excel, Adobe PDF, etc</td>
</tr>
<tr>
<td><strong>Data Analytics</strong></td>
<td>Allows GPWA to run sophisticated analytics and forecast models</td>
</tr>
<tr>
<td><strong>Asset Management</strong></td>
<td>Allows GPWA to efficiently monitor and maintain their infrastructure through accurate data capture and providing decision support</td>
</tr>
<tr>
<td><strong>Event Log Manager</strong></td>
<td>Store and log important processes and events that will be used for audit, analysis, and forensic investigations whenever required</td>
</tr>
<tr>
<td><strong>Alarm and Notification Manager</strong></td>
<td>Allows GPWA to be alerted/ notified when user-defined thresholds are triggered by events</td>
</tr>
</tbody>
</table>
2 PROPOSAL REQUIREMENTS

2.1 Technical / Qualitative Proposal

The Bidder shall demonstrate sufficient qualifications for this solicitation by providing the following sections as part of the Technical or Qualitative Proposal. The Bidder shall provide sufficient information for how and what it will provide GPWA in order to fulfill all the requirements of the Bid.

2.1.1 Business Structure

The Bidder shall provide all of the following:

A. Company information such as name, local address, corporate headquarters (if any) and affiliate company in support for the performance of the required services.
B. Business structure and nature of services provided.
C. Copy of the Articles of Incorporation and By-Laws or other applicable forms concerning the business organization.
D. Certificate of Good Standing to conduct business in jurisdiction of residence.
E. Other supporting information, brochures, company profile publications that may assist in the evaluation and selection process
F. Insurance policy
G. Financial Information and Credit Worthiness
H. Disclosure of any pending or current litigation against the Company that may affect the firm’s performance on this project
I. Project team organizational chart and curriculum vitae related to the scope of this project.

2.1.2 General Qualification Criteria

GPWA will use the following criteria to reject or accept the Bidder qualifications as a valid supplier.

A. Bidder shall have at least ten years of experience in providing SCADA/EMS software and systems to electric and water utilities.
B. Bidder shall provide three years of financial data sufficient for GPA to ascertain the ability of the Bidder to initially finance the project while in production. Financial data acceptable to GPA include but are not limited to SEC 10K form, annual reports with detailed balance sheet and income statements, Dun & Bradstreet credit ratings, and Moody’s Corp., Standard & Poor’s and Fitch Inc. credit ratings.

GPWA seeks an experienced CONTRACTOR possessing the following general characteristics:

A. High degree of technical capability
B. Has a great product that meets GPA and GWA’s requirements
C. Has a product the will have a highly useful life of 25 years without a decline in performance or support.
D. Has the creditworthiness to be in the business to support the SCADA/EMS for the expected life (25 years).
2.1.3 Project Approach

The Bidder shall provide all of the following:

A. Detailed descriptions of the work plan to perform, meet, and achieve the objectives of this solicitation.
B. Detailed description of the planned scope of work for each Basic Bid and Additive Bid Item. The details for the permits, warranties and operations and maintenance (O&M) services shall be provided here.
C. A detailed Project Execution Plan (PEP)
D. Detailed project plans
E. Detailed work breakdown structure (WBS)
F. Resource schedules
G. Quality procedures
H. Reporting procedures including project dashboards
I. Product purchasing and development plans
J. Risk management planning including risk analysis and mitigation matrix (RAMM), and
K. Project budgets
L. Quality Management Plan (QMP) for project and for system service life to:
   a. Ensure quality is planned
   b. Define how quality will be managed
   c. Define quality assurance activities
   d. Define quality control activities
   e. Define acceptable quality standards
M. Brief description of information or coordination to be requested from GPA for the duration of the project.
N. Brief description of Project Management methodology such as Critical Path Management (CPM).
O. A plan discussing how it will use virtual teams and services throughout the project to minimize travel expenses, disruption of GPA and GWA operations, and total project costs.

In the Project Approach of the Technical Proposal, the Bidder shall provide a description of the O&M plan for the project that demonstrates the long term operational viability of the proposed project. The plan should include a discussion of the staffing levels proposed for the project, the expected role of the CONTRACTOR, scheduling of major maintenance activity and the plan for regular testing and for performance monitoring and trending.

The Bidder shall provide examples of the Bidder’s experience with O&M services for other similar projects. The Bidder shall also provide a detailed list of all services that will be included in the O&M contract.

Contract performance shall be evaluated annually, within 60 days of the contract anniversary. Performance Testing shall be conducted annually for performance verification.

In the Priced Proposal Worksheet, the Bidder shall specify the Fixed O&M Fee for each contract year if separate or specify that it falls within the annual licensing fees.
2.1.3.1 Project Coordination

This section describes requirements for project coordination, project meetings, project progress reporting, approvals, as well as project documentation.

2.1.3.2 Project Team

As part of the proposal, the Bidder shall describe the general project organization related to project support and control, and the project organization intended to support the GPWA project.

The Bidder shall provide a proposed GPWA project team comprising of a GPA Project Manager, GPA Lead Engineer, GWA Lead Engineer, GPA Project Engineer, GWA Project Engineer and other relevant team members. GPWA reserves the right to disapprove any of the project team members prior to or during the project if deemed unsuitable or uncooperative.

The GPA project manager will coordinate all GPWA activities on the project. All communications between GPWA and the Bidder shall be made through the Bidder’s Project Manager and the GPA Project Manager.

2.1.3.3 Schedule

The Bidder shall submit in the bid an overall schedule for major project activities from the time of contract award to the completion of the availability test for the system. GPWA requires the CONTRACTOR to substantially complete the Project 365 days after receiving a Notice to Proceed from GPWA. Substantial completion is defined as having initiated the Site Acceptance Test.

Within two (2) weeks after contract award and thereafter as part of each progress report, the CONTRACTOR shall submit to GPWA a detailed project schedule in MS Project format.

To support effective monitoring of the project’s progress, meaningful, measurable performance milestones shall be scheduled frequently. In general, a milestone shall be indicated every four (4) weeks for each major area of project activity. The schedule shall clearly indicate the critical dates for GPWA activities, including training and database and display activities.

The Bidder shall explain any deviations from the planned delivery schedule and the proposed plan for recovery of the planned schedule shall be defined. A sample schedule shall be included with the Bidder’s bid.

2.1.3.4 Progress Reviews and Project Team Meetings

2.1.3.4.1 Progress Review Meetings

The Bidder shall describe how it will conduct weekly progress review meetings with the GPWA Program Management Office (PMO). The Bidder shall describe and provide examples of dashboards it will use to facilitate these meetings and provide day-to-day progress.
The CONTRACTOR shall provide a meeting schedule to discuss project progress. GPWA will review and approve the meeting schedule and venue. The CONTRACTOR is responsible for taking meeting minutes and distributing the minutes to the GPWA.

2.1.3.5 Project Status Meeting

The Bidder shall provide a schedule for monthly project status meetings. The Bidder must describe how it will organize and conduct these meetings. Project status meetings shall be used to review the project status report, action items, and technical issue review. It is conducted with GPWA Senior Staff and Management.

2.1.3.6 Monthly Status Reports

The Bidder shall describe the content it will provide in its monthly status reports. The Bidder will provide its ideas for an Executive Dashboard for the project.

A progress report shall be prepared by the CONTRACTOR prior to scheduled project meetings and be available at least one (1) week prior to each progress review meeting. The progress report shall contain at least the following:

1. An updated detailed project schedule, with explanations for any changes.
2. A detailed list of all activities completed since the previous report.
3. A detailed of activities not accomplished for the months and the reasons and contingency plans to recover.
4. The status of unresolved contract changes and issues.
5. A list of current or anticipated problems areas and proposed solutions.
6. Updated lists of Bidder and GPWA actions items along with required resolution dates.

2.1.4 Engineering and Technology

The Bidder shall provide information about the specific technology or equipment including the track record of the technology and equipment. The following information is required:

A reasonable but preliminary engineering plan which includes the following information:

A. An assessment of the adequacy of GBN PSAF communication, electrical, and mechanical infrastructure and a plan to bridge all resource and infrastructure gaps. As an example, CONTRACTOR must verify adequacy of GBN PSAF air conditioning and fire suppression systems to meet the cooling for the proposed addition of new electronic loads and other heat generating equipment.
B. SCADA/EMS system characteristics and system components
C. System design and integration plan
D. Preliminary workflow and process diagram
E. Preliminary map of the facility and equipment layouts including interconnection to the GPA network
F. Major equipment considered or expected to be used
G. Equipment vendors selected/considered
H. History of equipment operations
I. Equipment procurement strategy
J. Identification of expected key equipment suppliers and information that illustrates and discusses the proposed equipment and technology, lead times for delivery to GPA, and suppliers prior experience with equipment operation in tropical island environments (for outside plant equipment).
K. Identification of similar equipment and systems by the same manufacturer that are presently in commercial operations including the number installed, installed capacity and estimated generation.
L. Evidence that the technology to be employed is ready for commercial operation and what stage it is on the technology life cycle: research and development, ascent, maturity, and decline. GPWA is concerned about product obsolescence and lack of support short of the 20 to 25 years GPWA expects to use the system.
M. Discuss in detail how the Bidder will guarantee the continued highly useful life of the SCADA/EMS.
N. Provide the technology road map for the SCADA/EMS indicating upgrades and major system releases
O. Provide the expected product service life for the SCADA/EMS and associated equipment and third-party software.
P. Identify the long-lead equipment options and describe the timing for securing equipment.
Q. Bidders are encouraged to provide any additional information that will further describe the proposed projects technical feasibility and applicability to development on Guam.
R. Specification documents from the manufacturers of components, subsystems, and third-party software providers associated with the SCADA/EMS.
S. A table specifying the performance guarantees and warranties for the SCADA/EMS and associated components, subsystems, and third-party software providers.
T. A Conformance Table specifying compliance, noncompliance, or alternative proposal for compliance for each section of Volumes I and II of this Bid.

A Bidder’s proposal shall be deemed unacceptable if the requirements specified in Volume II, Section 4 and subsections are not adequately met.

2.1.5 Cybersecurity and Physical Security Approach

The Bidder shall provide a detailed discussion of its approach to implementing cybersecurity and physical security during the project phase and in the design and implementation of the SCADA/EMS. The Bidder shall fully describe its implementation of Secure DNP 3 (DNP3-SA) including version, testing, and success. The Bidder must describe in detail how it will design for the electronic and physical security for the SCADA/EMS, associated software, systems, and equipment.

GPWA will be performing vulnerability assessment and penetration testing on the SCADA/EMS, Smart Grid Systems, and all corporate IT and Business Technology Systems. The Bidder shall provide a detailed description of its role in supporting this process during the project implementation and operational phases of the SCADA/EMS.

The Bidder shall include in its price items for implementing the recommendations from the vulnerability assessment and penetration testing report.
2.1.6 Architectural Scalability and Flexibility

The Bidder shall provide a discussion of the proposed SCADA/EMS architecture, scalability, and flexibility. The discussion shall include the practical capabilities, limitations, and any relevant issues regarding the aforementioned topic including but not limited to:

A. Maximum number of supported RTUs
B. Maximum number of I/O points by type (AI, AO, DI, MCD, SOE, PA)
C. Maximum number of supported simultaneous poll communications
D. IP-based
E. 4-Wire Leased Line
F. Data storage and retrieval capabilities versus SCADA/EMS performance (e.g., system response issues).

2.1.7 Advanced Applications

The Bidder shall provide a discussion of all of its advanced applications supported by the proposed SCADA/EMS in the Technical/Qualitative Proposal. The discussion shall include the capabilities, limitations, and any relevant issues regarding the implementation of these capabilities.

Of special interest are advanced applications for electric utility and water wastewater utilities. GPA and GWA are interested in advanced applications includes but are not limited to:

A. Generation Dispatch and Control (GPA)
B. Transmission Security Management (GPA).

GPA may consider the above applications and other advanced applications presented by the Bidders in an Additive Bid Amendment. Bidders shall provide a budget for the acquisition, licensing, and implementation for these and other presented applications.

2.1.7.1 Generation Dispatch and Control (GDC)

The Bidder shall provide a detailed overview of its capabilities to deliver the suite of Generation Dispatch and Control (GDC) applications including but not limited to power system dispatch and closed loop digital control of multiple generators in an economic fashion while adhering to grid operating guides at the same time considering variable generation schedules, time error correction, reserve requirements, and security constraints of the transmission network.

2.1.7.2 Transmission Security Management (TSM)

The Bidder shall provide a detailed overview of its capabilities to deliver the suite of Transmission Security Management applications for analyzing and optimizing the use of the transmission network in a reliable and secure manner. TSM must have the capability to optimize given high penetration of variable generation on the system.
2.1.8 Open Systems

The Bidder shall provide a detailed discussion of the openness of its proposed SCADA/EMS. The Bidder shall describe its approach and execution of an Open-Standard System Architecture (OSSA) that utilizes open standards to reduce the cost/risk of ownership, delay system obsolescence, and allow quick, less costly integration of third-party products. An open systems approach reduces SCADA/EMS cost through facilitating the use of widely accepted standard products from multiple suppliers.

The Bidder shall discuss its proposal on the basis of six (6) basic elements of an open architecture:

1. Open Standards: Parts, modules, objects, products, and systems are based on vendor independent, non-proprietary, publicly available, and widely accepted standards. Standards allow for a transparent environment where users can intermix hardware, software, and networks of different vintages from different vendors to meet differing needs.
2. Interoperable: The ability of systems to provide and receive services from other systems to enable them to operate effectively together such as systems installed under GPA’s Smart Grid Initiative Grant.
3. Interchangeable: The ability of two or more parts, modules, objects, or products to be transparent replacements for one another without other changes in hardware or software. This property provides opportunities for upgrades and technology insertion.
4. Portable: The ability of two or more systems or components to exchange and use information or the ease in which a system or component can be transferred from one hardware or software environment to another.
5. Modular: Physical or logical modularity to meet functional requirements
6. Scalable: The ability to grow (and interlink hardware and software) to accommodate increased loads.

2.1.9 Proven Technology

The Bidder must provide information related to performance of its proposed resource technology and key components in continuous operation for a minimum of five (5) years in a commercial utility application similar or larger in size and function to GPA. The Bidder must provide information related to performance of its proposed resource technology and key components in continuous operation for a minimum of five (5) years in a commercial utility application similar or larger in size and function to GWA.

2.1.10 Quality Assurance and Control (QA/QC) Plan

The Bidder shall describe its quality assurance/quality control plan for this project to demonstrate how insofar as possible that the SCADA/EMS, software, systems, and equipment delivered to GPWA is fully functional, operates in a smooth and consistent manner, and is free of defects or errors.

All materials, hardware, and software to be furnished and all work to be performed under this Specification shall be subject to Quality Assurance and Testing. No hardware or software shall be shipped until all required inspections and tests have been made, demonstrating that the system conforms to the Specification and the hardware and software have been approved for shipment by GPWA.
Approval of the inspection and test results, the acceptance of hardware and software, or the waiving of inspection or tests thereof, shall in no way relieve the Bidder of the responsibility for furnishing a complete system that meets the requirements of the Specification. Nor shall such actions invalidate any claim that GPWA may make because of defective or unsatisfactory hardware and software. GPWA reserves the right to request additional tests at no extra charge on any work GPWA determines not to be in accordance with this Specification.

2.1.10.1 Test Plans and Procedures

Bidder shall describe and provide a schedule for formal QA/QC testing and reviews. Test plans and procedures for both factory and field tests shall be developed and sufficiently documented by the Bidder in order to ensure that each test is comprehensive based on the functions to be exercised and that any part of the test can be repeated, if GPWA so desires. Separate test plans and test procedures shall be submitted to GPWA for approval prior to the start of the functional performance tests.

The CONTRACTOR shall submit for approval a test plan and test procedures for the factory tests and all field tests at least eight (8) weeks prior to the start of the testing.

The test procedures shall be comprehensive and include, but not limited to the following:

a) Purpose of each test
b) Function(s) to be tested
c) Test set-up and test conditions for each part of the test
d) Expected results/the acceptance criteria

A schedule shall be provided with the test procedures, detailing the individual tests to be performed each day. A minimum of five (5) days shall be set aside for testing of the hardware and software by GPWA representatives.

The CONTRACTOR shall maintain a complete record of the results of all factory and field tests. GPWA shall be provided with a copy of the complete test results. This copy/record shall be corresponding to the steps enumerated in the test procedures.

The system must undergo and pass a number of functional and performance tests prior to final acceptance by GPWA.

2.1.10.2 Factory Acceptance Tests (FAT)

The Bidder shall describe its Factory Acceptance Plan for the project.

Acceptance for the purpose of shipment on the system shall depend upon achieving satisfactory results for tests conducted at the CONTRACTOR’s factory. The test data shall include GPWA database and display formats constructed for the project. These tests shall be conducted on the entire master station and a limited set of physical RTUs. Additional simulated RTUs shall be used to perform performance testing of the system.

Prior to the FAT, the CONTRACTOR shall perform a complete and organized pre-FAT test to verify that the system has been properly integrated and that in fact it is ready for the start of the FAT. GPWA shall
have the option of witnessing the pre-FAT in parts or in whole. GPWA shall witness the FAT and shall approve and sign off on the FAT prior to the CONTRACTOR shipping the system to GPWA. Appendix T lists the numbers and types of GPWA staff to attend the FAT.

2.1.10.3 Site Acceptance Testing

The Bidder shall describe its Site Acceptance Plan for the project.

The Site Acceptance Testing shall consist of the important subset of the Factory Acceptance Test demonstrating the operation of the system hardware and the full system functions under normal operation.

The SAT test shall concentrate on those areas of system operations that are simulated or only partially tested in the factory. For example, system timing and loading while communicating with a full complement of RTUs and the system reaction to actual field conditions shall be tested. GPWA shall witness the SAT. The following or their designate must approve and sign off on the successful completion of SAT:

- PSCC Manager
- GPA Chief Information Technology Officer (CITO)
- GWA System/Programmer Administrator
- SPORD Manager
- Manager of Engineering
- Utility Services Administrator
- GPA Project Manager
- GWA Project Manager.

2.1.10.4 1000-Hour Availability Testing

The Bidder shall describe its plan for the project availability testing.

Following the Site Acceptance Test, the CONTRACTOR shall conduct a 1000-hour test to verify the ability of the system to meet its availability requirements. The CONTRACTOR shall submit a formal availability test procedure for review and approval by GPWA. All variances against the system must be resolved prior to the start of the test. The test shall consist of normal system operations without special test equipment or procedures. GPWA personnel shall maintain all reports and records defined in the availability test procedure. GPWA will operate the system according to the procedures described in the approved Bidder documentation. The CONTRACTOR shall perform all preventive and remedial maintenance assisted by GPWA personnel.

The system shall be deemed available if it is functional for normal operations. Minor problems or nuisances shall be reported as variances, however, the system shall not be deemed unavailable due to these problems. Examples of the system being unavailable shall be the failure of both the prime and backup software applications, or hardware, thus rendering the system not fit for operational use. Examples of problems that shall not constitute the system as “unavailable” are database and configuration issues where the systems is functioning properly, however has been programmed with improper data. In
the event of failure of non-redundant devices such as consoles or printers, the system shall be deemed unavailable if more than 1 device is not functioning.

2.1.10.5 Variances

The Bidder shall describe its plan for the identifying, reporting, documenting, and resolving variances including final variance resolution sign-off and approval by GPWA.

A variance report shall be prepared each time a deviation from Specification requirements is detected or a problem in the functionality of the system is encountered during any of the System tests.

The report shall include a complete description of the variance, including the reference to this Specification and the test procedure and a description of the test conditions at the time the variance was detected.

The CONTRACTOR shall document the corrective actions taken to eliminate each variance by providing sufficient detail for the GPWA representative to determine the necessity for and extent of the re-testing of the offending function. This shall include any evaluation of any interaction with previously tested functions, and of any documentation that may require updating as a result of the corrective action.

The variance report shall be completed when the CONTRACTOR and GPWA representatives acknowledge correction of the variance with signatures. The variance reports shall be available to GPWA at all times and shall be submitted by the Bidder to GPWA at the conclusion of each test. The sign-off on variance resolution confirmation must involve the GPWA personnel who have witnessed both the variance and its resolution.

2.1.11 Training Plan

The Bidder must provide a detailed training plan for all delivered software and systems. The Bidder must provide the prerequisites for all training so that the appropriate people are provided the training. The Bidder shall provide a training program for GPWA personnel for maintenance and operation of the new SCADA/EMS, third-party systems and applications, and all related items in the list of deliverables.

The Bidder must provide a NERC-approved Power System Operator Training program for following NERC Power System Operator certifications:

1. Reliability Coordinator
2. Balancing, Interchange, and Transmission Operator
3. Transmission Operator
4. Balancing and Interchange Operator

The Bidder shall design the training scope, vehicle, and schedule to accommodate GPA/GWA work schedules. Not all of the trainees can attend at the same time.

The Bidder must include in its proposal all costs for prerequisites/eligibility screening, test application and testing coordination, registration and exam fees, and PSI Testing Center online examination expenses for GPA personnel to take the examination for the Transmission Operator certification.
The Bidder shall include in its training plan testing materials and testing methodology for testing GPA/GWA trainees to ensure the imparting of the necessary skills to operate and maintain the SCADA/EMS. The results of testing will be discussed with the General Manager, the Assistant General Manager of Operations, The PSCC Manager, the HR Personnel Services Administrator, and the SPORD Manager. Otherwise, all test results will be held confidential. The Bidder shall include costs for subsequent one-time retraining, retesting, and a remedial work plan to bridge knowledge and skill gaps.

The Bidder will give GPA full use rights to the training and testing materials and documentation. Table 2-1 provides an indication of the minimum general training categories and the number of trainees expected. The Bidder must provide a more detailed description and additional other training that will be required for GPWA to successfully configure, operate and maintain, and expand the SCADA/EMS and other software, systems, and equipment provided under this Bid.

2.1.12 Preferred Staffing Plan

Irrespective of current staffing at GWA and GPA, the Bidder must provide a detailed staffing plan indicating the number, minimum and preferred qualifications including education and experience, required and preferred certifications, and a detailed description of job duties personnel necessary to successfully operate and maintain the SCADA/EMS and associated software, systems, and equipment.

<table>
<thead>
<tr>
<th>Table 2-1: General Training Topics and Number of Trainees</th>
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</thead>
<tbody>
<tr>
<td><strong>Training Program</strong></td>
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<td>-----------------------------------------------------------------</td>
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<tr>
<td>NERC-approved Power System Operator Training</td>
</tr>
<tr>
<td>SCADA/EMS</td>
</tr>
<tr>
<td>System Overview (Managers, Supervisors, Engineers)</td>
</tr>
<tr>
<td>USER Training (System Operators/Dispatchers)</td>
</tr>
<tr>
<td>SCADA Configuration</td>
</tr>
<tr>
<td>Hardware</td>
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<tr>
<td>Communications</td>
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<tr>
<td>Historian</td>
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<tr>
<td>Applications</td>
</tr>
<tr>
<td>System Troubleshooting</td>
</tr>
<tr>
<td>OSIsoft Inc. PI™ Application Suites</td>
</tr>
<tr>
<td>Modbus Protocol</td>
</tr>
<tr>
<td>DNP3 Protocol</td>
</tr>
</tbody>
</table>

2.1.13 Experience of the Proposed Project Team

The Bidder shall provide all of the following:

A. Supporting information describing the past and current successful experience of the Project Team members with similar projects within the past five years. Describe the Project Team members’ roles in past projects. Provide the bid price and final contract price for the last five projects the Project Team members have completed that exceed $1,000,000.

B. Supporting information demonstrating knowledge and experience in complying with U.S. federal and local standards pertaining to the requested scope of work.
A Bidder’s proposal shall be deemed unacceptable if the following are not met:

A. The proposed Project Design Team must include people each with minimum of three (3) years of experience in the design of Electric Power Utility and Water/Wastewater SCADA/EMS and the associated system integration into customer facilities. This experience must include progressively increasing responsibilities.

B. The proposed Project Team Manager must have a minimum of three (5) years of experience in managing medium and large scale SCADA/EMS Projects or three years such experience and a current PMP certification.

C. Project Team members in charge of electrical wiring and installations shall be a licensed Master Electrician and/or Registered Electrical Engineer in Guam.

D. Network and communication work must be performed by a currently licensed RCDD or person with alternate network and system certifications

2.1.14 Time of Delivery

The Bidder shall demonstrate adequate time of delivery of the project within the specified completion time. Bidder shall provide a draft project schedule illustrating all major tasks identified in Section 3, Contractor Scope of Work, with their respective durations. The Bidder shall provide a complete critical path schedule for the project from the contract award to project commissioning. For each project element, list the start and end date.

The Bidder shall identify the elements on the critical path. The schedule shall include, as a minimum, facility contracts, construction, siting, environmental permitting (anticipated submittal and approval), engineering, procurement, local permits and any other requirements that could influence the project schedule. The Bidder shall identify any status of permits, licenses and studies required. The project schedule shall include dates for all construction and applicable reporting milestone events.

Project Schedules shall be delivered on the latest stable release of Microsoft Project. CONTRACTOR must supply and implement the following for GPWA as part of this project:

- Microsoft Project Server or Project Online
- Microsoft Project Professional (20 licenses)
- Microsoft Project Lite (30 licenses).
Microsoft Project licenses will be shared between GPA and GWA.

The Project Schedule may include several phases with the expectation that the SCADA/EMS with full SCADA/EMS functionality be delivered, installed, site-tested and commissioned within 365 calendar days (ARO) after receipt of a Purchase Order and issuance of a Notice-To-Proceed. The Project Schedule may consider a later phase for the installation and commissioning of advanced applications.

2.1.15 References

The Bidder shall provide at least three (3) letters of reference or recommendation from clients that received similar services from the proposed Project Team within the past five (5) years and three additional letters from clients using its SCADA/EMS greater than ten (10) years indicating:

A. Quality of work
B. Compliance with performance schedules
C. Cost-control ability
D. Level of integrity and business ethics
E. Software and system support services
F. Spare parts availability
G. SCADA/EMS performance.

The Bidder must provide a contact name, phone numbers, and an email address for each reference.

2.1.16 Exceptions to the Bid Documents

The Bidder shall indicate any exceptions to the bid requirements in this section. A Bidder’s proposal shall be disqualified if the GPA Evaluation Committee finds any exceptions to the bid requirements unacceptable.

2.2 Priced Proposal

The Priced Proposal is itemized into specific activities as indicated in the Priced Proposal Worksheet in Appendix P. The Bidder must indicate a bid price for each Basic Bid and Additive Bid item and there shall be no double-charging.

The Bidder’s Priced Proposal Worksheet shall contain bid prices for each of the specific activities and total bid package. GPA will evaluate the Priced Proposal and will decide to award either the basic bid, both the basic bid and additive bid, or none of the bid options to the Bidder.

2.3 Additive Bid Items

The Bidder shall include, in the Project Approach of the Technical Proposal, more detailed scope of work descriptions for each Additive Bid Item for evaluation.

GPA and GWA shall have the option of instructing the CONTRACTOR to proceed with any Additive Bid Item throughout the duration of the contract negotiations or thereafter.
3 CONTRACTOR SCOPE OF WORK

3.1 General Scope Requirements

The CONTRACTOR shall be responsible for all aspects of project implementation including but not limited to:

A. Necessary permits, if required
B. Adherence to all applicable codes and standards
C. System engineering and design
D. Installation design: addressing all electrical, mechanical and civil systems
E. SCADA/EMS and other necessary equipment procurement and delivery
   a. Delivery of all Operating System software and application software
   b. Delivery of all processors, consoles, printers, local input/output facility, signal and power cabling and related hardware
   c. Delivery of all required communication hardware
   d. Delivery of a Multi-Screen Video Wall system for the GWA Systems Control Center
   e. Delivery of recommended spare parts
F. All on-site construction, equipment installation and interconnection
   a. Network and communications interconnection coordination with GPWA
   b. Equipment and software installation coordination with GPWA
   c. Interconnection of all Bidder-supplied equipment in the new GPWA Control Centers and Server Room
   d. Complete and seamless integration of all Bidder-supplied hardware, software and applications
   e. Complete and seamless integration with GPWA existing RTUs/PLCs and other GPWA-supplied hardware
   f. Complete and seamless integration with GPA’s existing Multi-Screen Video Wall
   g. Complete and seamless integration and installation of CONTRACTOR-supplied Multi-Screen Video Wall system at GWA Systems Control Center
   h. Complete and seamless integration and installation of CONTRACTOR-supplied SCADA/EMS and supplied systems, software, and equipment with the external software applications and systems discussed in the specifications
   i. Complete and seamless integration with GPA’s existing AGC field hardware and software including controllers and communication devices.
G. Commissioning and quality assurance and performance testing with coordination with GPWA or its ENGINEER
   a. Provide engineering, programming, display building, report designing, and database conversion and integration assistance
      1. It is the responsibility of the CONTRACTOR to ensure that the above work is performed at the highest quality and to schedule
   b. Plan, document, and execute Factory Acceptance Testing (FAT), Site Acceptance Testing (SAT), 1000-hour Availability Testing, and all other required tests
      1. CONTRACTOR shall bear the expense for all travel, lodging, meals, and incidentals for GPA and GWA personnel attending the FAT. (Appendix T: Factory Acceptance Test Attendees)
c. Delivery of all documentation for the SCADA/EMS, supplied systems and equipment, warranties including but not limited to testing manuals and results, user guides, installation/operation/maintenance manuals, drawings, schematics, etc.

H. Training on all delivered software applications, systems, equipment, etc.
   a. Deliver initial on-site training of GPWA personnel for operation and maintenance of delivered SCADA/EMS, and other associated systems, software, and equipment
   b. Deliver on-site refresher training of GPWA personnel for operation and maintenance of delivered SCADA/EMS, and other associated systems, software, and equipment on the one-year anniversary of initial training
   c. Provide access to refresher and other training online on demand training for GPWA personnel for operation and maintenance of delivered SCADA/EMS, and other associated systems, software, and equipment on the one-year anniversary of initial training
   d. NERC-approved Power System Operator Training
      1. Reliability Coordinator
      2. Balancing, Interchange, and Transmission Operator
      3. Transmission Operator
      4. Balancing and Interchange Operator

I. Delivery of all warranties including those from third-party suppliers
   a. All warranties for delivered software, systems, and equipment must be made to GPA and GWA (GPWA)
   b. Warranty or assurance that spare or replacement hardware parts will be available for a minimum of ten (10) years from the date of successful completion of the 1000-hour Availability Test

J. Delivery and execution of a support and operations and maintenance service contracts
   a) Support and maintain the delivered system including but not limited to SCADA/EMS, software, systems, and equipment provided for one (1) year after successful completion of Site Acceptance Test
   b) Integration and commissioning support for up to 3 years after successful completion of Site Acceptance Test to assist GWA integrate more facilities into the SCADA/EMS

K. Provide a requirements gathering report for a GPWA Emergency Backup Control Center (Disaster Recovery) at the GWA Upper Tumon Office. Not a detailed design. This report provides the requirements for a future RFP for design of the GPWA Emergency Backup Control Center.

The CONTRACTOR shall include in its price proposal all of the above activities and any other activities necessary to provide GPA and GWA with a fully-functioning, cyber secure SCADA/EMS completely integrated with external applications discussed in this specification and existing GPA and GWA network, communications, RTU, and IED systems and equipment.

The CONTRACTOR shall include the submission of a Master Project Schedule outlining anticipated start and end dates for each of the functional activities listed above.

The CONTRACTOR shall provide all labor and materials including taxes, equipment, means, and operations necessary to purchase and the SCADA EMS, other software, and related features.

The CONTRACTOR shall provide operations and maintenance (O&M) services for a period of 25 years after commissioning.
3.2 Special Conditions

It shall be the CONTRACTOR’s responsibility to verify the existing conditions at the site during either
the official pre-bid walkthrough or subsequent site visits to the property. During the pre-bid walkthrough,
al areas for project construction will be available for observation.

Any physical disruption to the site that is necessary for the construction and interconnection shall be
repaired as nearly as possible to its original state.

The CONTRACTOR must maintain a clean worksite and take all necessary measures to prevent any
erosion or distribution of loose material away from the site.

The CONTRACTOR must identify any malfunctioning or defective equipment and report such incidences
to GPA. The GPA project manager will decide on the corrective action.

The CONTRACTOR must ensure that all product warranties are active when the project becomes
operational. Documentation of product warranties shall be provided to GPA upon commissioning.

The CONTRACTOR shall be required to maintain detailed records. For compliance with GPA's
requirements, the CONTRACTOR shall submit monthly reports that track % completion for the major
project tasks.

3.3 Basic Bid Items

The following are general descriptions of the Basic Bid Items listed in the Priced Proposal Worksheet.
The Bidder shall include, in the Project Approach of the Technical Proposal, more detailed scope of work
descriptions for each Basic Bid Item for evaluation.

3.3.1 Mobilization

The CONTRACTOR shall be responsible for all preparatory operations performed by the
CONTRACTOR, including but not limited to, those necessary for the movements of its personnel,
equipment, supplies and incidentals to the project site; for premiums on bonds for the project, and for
other operations which it must perform or costs it must incur before beginning installation on the various
items on the project site(s).

The CONTRACTOR shall submit to GPA for approval a proposed work schedule with milestones,
deliverables and timelines no later than ten (10) days after issuance of the Notice to Proceed. The
schedule shall be prepared in a gantt chart format and shall display scheduled and actual progress. The
schedule shall show the work broken down into major phases and key items with the dates work is
expected to begin and be completed. The schedule shall be updated and submitted to GPA every month.
The schedule shall show actual progress and any proposed changes in the schedule of remaining work.
The CONTRACTOR shall not change the accepted project schedule without prior concurrence of GPA.
3.3.2 Permits, Bonds and Codes

The CONTRACTOR shall secure all permits and bonds required for the construction of this project, including but not limited to those required by the Department of Public Works, Guam Waterworks Authority, Guam-based telecommunication providers, and Department of Parks and Recreation.

The CONTRACTOR shall also be responsible for applying for and obtaining all other federal, local and other applicable permits, agreements, licenses, and certificates to complete this project, unless otherwise stated in this document. Copies of the permits and approvals shall be submitted to GPA before starting work.

The CONTRACTOR shall adhere to all applicable codes governing electrical, mechanical, civil, structural systems, etc.

In the Project Approach of the Technical Proposal, the Bidder shall identify all federal and local permits, licenses and environmental assessments and/or environmental impact statements required to construct and operate the project. The Bidder shall identify environmental impacts associated with the proposed project and its plan to mitigate such impacts if any.

3.3.3 Project Installation Site Survey

The CONTRACTOR shall perform all work required for preparation of the design and as-built drawings and for project completion. All costs required for furnishing instruments and miscellaneous materials for this work shall be included.

CONTRACTOR is responsible this scope of work and for all costs to implement this plan.

3.3.4 Interconnection and Integration Design

The CONTRACTOR shall provide to GPA a design plan that describes all activities regarding integration of the SCADA/EMS and other third-party software delivered under this project with the GPWA network.

The CONTRACTOR shall provide to GPA a design plan that describes all activities regarding integration of the SCADA/EMS and other third-party equipment delivered under this project with the GPWA facility communications and electrical systems.

The CONTRACTOR shall submit to GPA for review the 60%, 90%, 100% and pre-final design drawings in hard copy and PDF prior to the final design drawing submittal.

The CONTRACTOR shall submit to GPA the approved final design drawings in the following formats: hard copy of appropriate size, AutoCAD 2005 and PDF. Construction shall not commence until the design drawings are approved by GPA. The approval of GPA shall not relieve the CONTRACTOR from the responsibility of corrective actions if defective or inadequate work was overlooked.

CONTRACTOR is responsible this scope of work and for all costs to implement this plan.
3.3.5 Communications and Networking Design and Execution Plan

The CONTRACTOR shall provide to GPWA a design and execution plan that describes all activities regarding the migration of existing RTUs from existing GTA communication and from the existing serial DNP 3 protocol to the CNN using secure DNP 3.

CONTRACTOR is responsible this scope of work and for all costs to implement this plan.

3.3.6 Installation Design

The CONTRACTOR shall provide to GPA an integrated design plan that describes all activities on the site regarding the electrical, mechanical, structural, and civil engineering work needed for the installation of the SCADA/EMS and associated facilities and equipment:

The design plan shall include:

A. Site Plan:

Site plan shall identify all construction and installation activities that will be undertaken on the site. The CONTRACTOR shall perform site work as necessary to prepare site for installation activities. Security and access controls shall be implemented to prevent unauthorized entry to site during project installation. The CONTRACTOR shall obtain appropriate approvals and shall construct connections or new systems for electrical power, water, sewer, telephone, and other utilities as needed.

B. Site Map:

The Site Map shall indicate the proposed SCADA/EMS and associated equipment location and the layout of other project components.

C. Building Electrical Interconnection Diagrams:

The CONTRACTOR shall provide complete and detailed electrical interconnection as-built diagrams.

The CONTRACTOR shall submit to GPA for review the 60%, 90%, 100% and pre-final design drawings in hard copy and PDF prior to the final design drawing submittal.

The CONTRACTOR shall submit to GPA the approved final design drawings in the following formats: hard copy of appropriate size, AutoCAD 2005 and PDF. Construction shall not commence until the design drawings are approved by GPA. The approval of GPA shall not relieve the CONTRACTOR from the responsibility of corrective actions if defective or inadequate work was overlooked.

CONTRACTOR is responsible this scope of work and for all costs to implement this plan.
3.3.7 Equipment and Software Cost, Procurement and Delivery

The CONTRACTOR shall be responsible for the procurement and delivery of the SCADA/EMS and other necessary equipment to construct and install this project in a turn-key manner. Any equipment and material prices shall be provided on the basis of CIF to the Guam job site unloaded.

The SCADA/EMS shall comply with the specifications identified in Section 4. The CONTRACTOR shall comply with all sections of the entire procurement documentation including Bid Amendments, Appendices, the GWA SCADA Master Plan, and applicable industry standards and guides. Bidders shall provide a breakdown of the cost components for all Bid Items.

3.3.8 On-Site Construction, Installation and Interconnection

The CONTRACTOR’s primary scheduled activities shall include, but are not limited to:

A. Requirements gathering for design, planning and plan execution activities
B. Equipment delivery and staging
C. Installation and construction activities as needed
D. SCADA/EMS and related equipment assembly and installation
E. Factory Acceptance Testing (FAT)
F. Site Acceptance Testing (SAT)
G. Interconnection installation and construction work as needed.

All construction work must comply with applicable GPA and GWA standards.

The CONTRACTOR shall include the submission of a Master Project Schedule outlining anticipated start and end dates for each of the on-site construction, installation and interconnection activities.

3.3.9 Progress Meetings

Monthly progress meetings with the SCADA/EMS Task Force shall be held throughout the duration of the project. GPWA may request additional meetings if deemed necessary. Such meetings shall be attended by the CONTRACTOR either via phone or in person, by all active subcontractors and by GPA. The purpose of the meetings will be to discuss current work progress, design or construction issues, interface issues, and potential changes to the schedule.

The CONTRACTOR shall meet one a week with the SCADA/EMS Program Management Office or as necessary to track daily and weekly progress and activities. The CONTRACTOR must provide Project Dashboards on GPWA’s iDashboard application to track daily and weekly progress and activities.

3.3.9.1 Work Progress Reports

The CONTRACTOR shall submit to GPA monthly reports on actual work progress. Such reports shall be submitted to GPA prior to the scheduled work progress meetings. The narrative shall contain a description of current and anticipated delaying factors, if any, impact of possible delaying factors, and
proposed corrective actions. The reports shall be submitted as supporting documents for progress payments.

3.3.10 Commissioning, Quality Assurance, and Testing

The CONTRACTOR shall conduct pre-commissioning through final inspection activities with the GPA Project Manager to demonstrate the successful installation and fully functional operation of the SCADA/EMS and other delivered software, systems, and equipment. Additionally, formal and informal testing must occur as part of the CONTRACTOR’s quality assurance and control plan.

The CONTRACTOR shall provide:

A. Factory Acceptance Test (FAT):

The CONTRACTOR shall conduct a Factory Acceptance Test at the CONTRACTOR’s facilities staging the SCADA/EMS and other related equipment as a stand-alone system for thorough testing of the SCADA/EMS and related systems functionality and documented attribute. CONTRACTOR must submit a FAT plan for GPWA’s approval no later than two months prior to the scheduled Factory Acceptance Plan execution. The report shall include a list of software/equipment/products/systems staged, activities and tests to take place during the FAT. Each test element of the FAT must describe the function or attribute under test and the pass/fail criteria. The CONTRACTOR must describe and provide a system for identification of testing variances and their resolution and escalation along with the FAT documentation.

The SCADA/EMS and other related software, systems, and equipment cannot ship to GPWA until the FAT is satisfactorily completed with few minor variances and no critical variances. Upon completion of the FAT, GPWA personnel involved in the FAT must sign-off that the system is ready to be shipped to GPWA. The sign-off can be made with variances upon an acceptable variance resolution plan and successful execution of that plan.

B. Site Commissioning and Site Acceptance Test (SAT):

The CONTRACTOR shall complete commissioning process and testing of all installed SCADA/EMS equipment, subsystems, and related software and equipment to establish acceptability for use in the GPWA operational environments.

The CONTRACTOR shall commission the new SCADA/EMS with the existing SCADA/EMS running in parallel. The CONTRACTOR is responsible for replication of communication services to support this including working with GPA and GWA to transition communications to the Consolidated Communications Network (CCN). The system shall operate in parallel for no less than sixty days as long as the 1000-Hour Availability Test is ongoing.

CONTRACTOR must submit a SAT plan for GPWA’s approval no later than two months prior to the scheduled Site Acceptance Plan execution. The report shall include a list of software/equipment/products/systems commissioned, activities and tests to take place during the
SAT. Each test element of the SAT must describe the function or attribute under test and the pass/fail criteria. The CONTRACTOR must describe and provide a system for identification of testing variances and their resolution and escalation along with the SAT documentation.

Commissioning activities shall include, but not be limited to:

1. Verification of successful point-to-point testing of all existing field RTUs and IEDs
2. Verification of successful testing of each SCADA/EMS, third-party system, and equipment functional element
3. Verification of all SCADA/EMS SCADA:
   a. I/O point tabulars
   b. Charts and trending displays,
   c. Alarm and event tabulars
   d. Electric power system one-lines and geographical one-line displays
   e. Electric power system substation displays
   f. Water system one-lines and geographical one-line displays
   g. Wastewater system one-lines and geographical one-line displays
   h. Tabulars and graphical displays of data from external applications
   i. Electric power substation and distribution automation telemetry and control data tabulars and displays
   j. Water distribution automation telemetry and control data tabulars and displays
   k. Wastewater distribution automation telemetry and control data tabulars and displays
   l. GWA backup power system telemetry and control tabulars and displays
   m. All other tabulars and displays
4. Verification that the SCADA/EMS properly communicates and operates with the following:
   a. GWA
      i. Water and Wastewater Hydraulic Analysis (W/WW HA)
   b. GPA
      i. Automatic Generation Control (AGC)
   c. GPWA
      i. Geographic Information System (GIS)
      ii. Computerized Maintenance Management System (CMMS)/Enterprise Asset Management (EAM)
      iii. Outage Management System (OMS)
   iv. Meter Data Management System (MDMS)
   v. iDashboards
   vi. GENOPS
   vii. Nostradamus
   d. Other external applications that may come under the project prior to FAT.

C. Delivery and Warranty:

The CONTRACTOR shall complete all inspection and commissioning requirements prior to final inspection. The SCADA/EMS shall include industry standard service and parts warranty specified in Volume I, Section 4.18. CONTRACTOR must provide and identify a detailed
comprehensive list of each SCADA/EMS component under the warranty and the specific associated warranty.

D. 1000-Hour Availability Testing:

The CONTRACTOR shall conduct a 1000-Hour Availability Test. Five percent of the total contract will be retained until the successful conclusion of this test. The 1000-Hour Availability Test pass criteria is continuous operation of the SCADA/EMS without failure or major incident for 1000 consecutive hours. The test shall rest upon a major failure of the SCADA/EMS system, subsystem, or critical equipment. The test shall continue until the pass criteria is met, or GPA agrees to a negotiated settlement with the CONTRACTOR at GPA and GWA’s discretion.

F. Final Inspection:

After the Completion of the 1000 Hour Availability Testing, the CONTRACTOR shall conduct a final inspection with the GPA Project Manager and document the findings in a final inspection report. The inspection shall concentrate on the items identified at the pre-final inspection and recorded in the pre-final inspection report. The final inspection report shall: (1) certify that all items of the design have been implemented and that the construction is complete, and (2) include a record of “signed and sealed” as-built drawings and specifications verifying that all development standards have been met. At the final inspection, the CONTRACTOR shall present a completed form for the Transfer and Acceptance of Real Property to GPA for signature and acceptance.

E. Documentation of All Equipment and Construction Work:

The CONTRACTOR shall provide the following documents either during construction or upon commissioning:

1. As-built electrical, mechanical and civil drawings for all installed systems in the following formats: hard copy of appropriate size, AutoCAD 2005 and PDF
2. Owner’s manual for all complete systems
3. All SCADA/EMS system technical and operations manuals including
   a. Fifteen complete bound hardcopies
      i. Seven (7) sets for GPA
      ii. PSCC (3)
      iii. Engineering (1)
      iv. Information Technology Divisions (3)
      v. SPORD (1)
   b. Seven (7) sets for GWA
      i. Engineering (2),
      ii. Operations (2)
      iii. Information Technology Divisions (3)
   c. A complete set of documents in two formats uploaded to a Dropbox account folder specifically set up for this project by GPA
      i. PDF format
      ii. Microsoft Word format that GPA can modify.
3.3.11 Training

The CONTRACTOR shall conduct a training program for GPWA personnel for operation and maintenance of the new SCADA/EMS, third-party systems and applications, and all related items in the list of deliverables. The training shall include testing of the trainees to ensure the imparting of the necessary skills to operate and maintain the SCADA/EMS.

The CONTRACTOR shall provide training manuals and material in heavy duty 3-ring binders or otherwise in a bound fashion, for each participant. The CONTRACTOR shall provide electronic copies of all training materials in the DropBox account set up by GPWA. The training sessions shall be coordinated with GPWA. The CONTRACTOR must record all training sessions for future use.

3.3.12 Demobilization

The CONTRACTOR shall demobilize facilities and construction equipment as necessary, and restore the project site(s) to acceptable conditions. The CONTRACTOR shall document and report on these activities. All costs associated with withdrawing from the site after completion of work, including CONTRACTOR’s personnel, facilities, equipment, cleaning and securing the site shall be included.

3.3.13 Warranty

The CONTRACTOR shall provide the standard warranty specified in Volume I, Section 4.18. Additionally, the CONTRACTOR must assign all third-party licenses and equipment warranties to GPA.
4 SCADA/EMS DETAILED FUNCTIONAL REQUIREMENTS

The bids for the SCADA/EMS shall be developed based on the requirements described below.

The proposed SCADA/EMS shall be designed for cost effective, ease of expansion and alteration. This includes but may not be limited to:

A. Adding and removing telemetry points and displayed quantities
B. Adding and removing system functions and altering computer memory and input/output hardware
C. Permitting database and one-line and tabular displays to be generated, altered and maintained on-line

General SCADA/EMS design criteria include:

A. System designed for a 25-year life cycle
B. System minimum availability of 99.999%

The SCADA/EMS design architecture shall be based on modular and open systems design criteria. The new system shall utilize modern software applications, systems, equipment, and techniques to provide the high-speed data collection, data presentation, and aid in the decision-making processing required in improving power system economy, electric power quality, and reliability. The system shall be designed to augment current operating procedures and interface with existing equipment.

Additional information is contained in the Appendices.

Appendix A – SCADA/EMS System Sizing
Appendix B - Performance and Response Requirements
Appendix C - Fuel Switching Application Specifications
Appendix D – Computer Hardware Specifications

4.1 SCADA/EMS Base Functional Requirements

SCADA/EMS GPWA common functional requirements include but may not be limited to:

A. Supervisory Control and Data Acquisition
B. Alarm Management
C. Event Management
D. Periodic Calculations and Control/Monitoring Scripting
E. Real-Time and Historical Trending
F. Lockout/Tagout Management (control, indication and record keeping)
G. Hot Line order control, indication and record keeping
H. Historical Information System/Historical Information Archival and Retrieval/Information Storage and Retrieval
I. Disturbance Data Collection and Play-back
J. Human Machine Interface (HMI)/Graphical User Interface (GUI)
K. Dynamic Graphical Toolset
L. Electronic Secure Multifactor Authentication System for GPA and GWA Dispatchers and other SCADA/EMS users
M. Access Control Management
N. Screen Capture Printing or to File Capability
O. Automatic Email and Texting Interface
P. System Security Logging and Audit Trails
Q. System Error Logging
R. Web-based User Interface
S. Full DNP 3 and Modbus Protocol Stack Implementation
T. Development/Test System.

SCADA/EMS GWA advanced application requirements include but may not be limited to:

A. Leak Detection Management
B. Pump Condition Monitoring
C. Sequential Control Capability.

GPA advanced application requirements include but may not be limited to:

A. Automatic Generation Control (AGC)
B. Dispatcher Power Flow (DPF)
C. Dispatcher Training Simulator
D. Switch Order Management (SWOM)
E. Load Shedding and Restoration (LSR).

Optional applications (Additive Bid):

A. Generation Dispatch and Control (GPA)
B. Transmission Security Management (GPA)
C. Cabras-Piti Area Intermittent Control Strategy Fuel Switching (GPA)

4.2 Industry Standards

All work manufactured and/or furnished systems under any part of this Specification shall satisfy the latest version of applicable industry standards, but not limited to the following:

A. American National Standards Institute (ANSI)
B. Institute of Electrical and Electronics Engineers (IEE)
C. Instrument Society of America (ISA)
D. American Society of Mechanical Engineers (ASME)
E. National Electrical Manufacturers Association (NEMA)
F. National Electrical Safety Code (NESC)
G. National Fire Protection Association (NFPA) 70 – National Electrical Code (NEC)
H. International Building Code
I. American Water works Association (AWWA)
Additionally, the CONTRACTOR must comply with the following requirements of the following:

A. Federal Occupational Safety & Health Administration (OSHA)
B. G.O.S.H.A. (Guam O.S.H.A.)
C. Guam Board Of Registration For Professional Engineers, Architects & Land Surveyors (Guam PEALS Board)
D. Department of Revenue and Taxation
E. Guam Waterworks Authority
F. Guam Power Authority.

Where recommendations from the above standards differ, the Bidder shall identify these issues as part of the Bidder’s submitted questions and make recommendation as to which standard applies. Unless modified by provisions of this Specification, these standards apply whether mentioned in the text or not. The Bidder shall also note where existing standards are not satisfied, or only partially satisfied. It is the sole discretion of GPWA whether to accept the Bidder’s recommendations or make its own recommendations.

4.3 Language

SCADA system and delivered software and documentation shall use standard American (United States English and grammar).

4.4 SCADA Technical Specifications

This section and subsections describe technical and functional requirements the delivered SCADA/EMS System must comply with.

It shall be noted that although it is the intent of GPWA that the Bidder utilizes standard application software to the maximum extent possible, GPWA reserves the right to accept or reject the Bidders proposal based on compliance to this specification.

Appendix A of this document contains all system and functional sizing
Appendix B of this document contains the performance and response requirements
Appendix C of this document contains the fuel switching application specifications
Appendix D of this document contains the computer hardware specifications
4.4.1 Data Acquisition

The new system shall process and utilize real-time data acquired from remote terminal units (RTU’s), Programmable Logic Controllers (PLCs) and from data links with other SCADA or EMS master stations.

The Bidder’s hardware and software shall establish and maintain a high performance, real-time database, which at any moment in time describes the latest state of the power, water and wastewater systems. The database shall be of sufficient size to satisfy the functional requirements of this Specification.

4.4.2 RTU and Master Station Protocols

The SCADA/EMS master station shall support the DNP3 serial protocol to communicate with GPA RTUs on legacy communication circuits. For all GPA RTUs using CCN services and for all GWA RTUs, the SCADA/EMS shall use DNP3 Secure Authentication (DNP3-SA) over TCP/IP.

In addition, the master is also required to perform scan-by-exception, request and process Sequence of Events (SOE) data and perform time synchronization between the master and remote stations. The ability to control Select-Before-Operate (SBO) points, direct-operate analog set-points and AGC raise/lower control points shall be provided as well.

Communications using the DNP 3.0 serial protocols shall be or 9600 baud data modems or better. Digital circuits shall be provided by GPWA.

The DNP protocol interface shall also include support for dial-up polling of RTUs and unsolicited RTU dial-in reporting.

4.4.2.1 GWA PLC Protocols

The new SCADA/EMS system shall have the capability to communicate with PLCs using the Modbus, Modbus TCP/IP, DNP3, DNP3 TCP/IP, DNP3-SA TCP/IP protocol, whichever protocol the PLC supports. DNP3-SA TCP/IP is the preferred protocol.

In addition, the master (DNP3 only) is also required to perform scan-by-exception, request and process Sequence of Events (SOE) data and perform time synchronization between the master and remote stations. The ability to control Select-Before-Operate (SBO) points, direct-operate analog set-points and raise/lower control points shall be provided as well.

Communications using the Modbus and DNP3 protocols shall be over high speed wide area networks constructed under the GPA’s Smart Grid project and expanded by GWA for GWA SCADA use. Access to these networks shall be provided by GPWA.

4.4.2.2 GWA RTU Submasters

New GWA RTUs shall be capable of serving as a submaster to slave PLCs and IEDs using the Modbus, Modbus TCP/IP, DNP3 or DNP3 TCP/IP protocols, whichever protocol the PLC supports. DNP3 is the preferred protocol. These RTUs will use DNP3-SA to communicate with the SCADA/EMS master station. These RTUs will serve as a data concentrator and forward PLC information to the master station. These RTUs will have the capability to issue control commands.
4.4.3 Periodic Scans

The SCADA/EMS system shall poll real-time data from RTUs and PLCs. At a minimum, the system shall provide scan rates for polling of two (2) second, four (4) second, eight (8) second, ten (10) second, twelve (12) second status and analog data. The accumulator scan cycles shall be synchronized to the system time (for example, the hourly scan occurs at the top of the hour).

In addition to the scan rates described above, at least three other scan rates shall be provided for future use by GPWA. All scan cycles shall be on a rigid time basis with any failure to complete a scan within the designated time period resulting in data being marked with a quality code. Continuous failures of scans shall generate an alarm.

The system shall be provided with the capability for polling status and analog data from RTUs and PLCs using scan-by-exception techniques. However, this feature will not initially be used by GPA and all RTU status and analog data will be polled using status or analog data function code requests.

In addition, the master is also required to perform scan-by-exception, request and process Sequence of Events (SOE) data and perform time synchronization between the master and remote stations. The ability to control Select-Before-Operate (SBO) points, direct-operate analog set-points and AGC raise/lower control points shall be provided as well.

4.4.4 Alarm Inhibit

The SCADA/EMS system shall provide capabilities for the Dispatcher to inhibit and enable alarm processing for any point or RTU/PLC without affecting the processing of the data. If an alarm condition is detected for a point for which alarm processing has been inhibited, there shall be no audible or visual annunciation, message printing or alarm indication on any Dispatcher display. Normal alarm processing shall resume when the point alarm function is again enabled. An alarm inhibit quality code shall be attached to all points for which alarm processing has been inhibited. All points for which alarm processing has been inhibited shall be displayed on an alarm inhibit summary display.

4.4.5 Telemetry Failure

A failure to receive valid data from a data source in response to a scan request command shall cause a software commanded re-transmission of data from that source. The number of re-scans to be attempted shall be user adjustable for each scan rate.

Manual replacement by dispatcher action shall be permitted for any telemetered or calculated point value, with database retaining the replacement value until data acquisition and processing of the point is resumed. Dispatcher removal of any point or an entire data source from scan processing shall be permitted with retention of the last data received prior to scan processing suspension, until either scan processing is resumed, or a replacement value is entered by the dispatcher.
4.4.6 Analog Data Processing

The system shall perform, as a minimum, the following processing of all analog data:

a) Data validity checking
b) Data conversion
c) Filtering
d) Limit checking
e) Data storage in the database

The system shall convert each scanned analog point to engineering units. Both raw and converted data should be able to be stored in the database.

Each analog value in the system (calculated and telemetered) shall be compared to all applicable limits, as described below, each time the value is processed.

The reasonability limits of an analog point are defined as unique high and low value limits, representing the extremes of the valid operation of the point’s measurement element. The reasonability limit checking function shall be applicable to all calculated and telemetered analog values. A reasonability limit violation shall constitute a telemetry failure of the point in question, and shall generate an alarm.

In addition, the reasonability limit checking function shall provide for the database retention of the last valid point value, with appropriate quality code, following a reasonability limit violation. Upon return to a reasonable value of the questionable data, and if the Dispatcher has not removed the point from scan, the new value shall be accepted and a return-to-normal alarm generated.

Reasonability limits shall be user adjustable for each point, preferably as a percentage of the point’s full-scale value. No alarm shall be generated for a reasonability limit violation when the Dispatcher has taken the data source, or its associated communication circuit, out of scan.

All analog values (calculated and telemetered) shall be compared against two high and two low operating limits.

The system will normally utilize default values of the operating limits entered by the User, which shall be stored in the database. It shall however, be convenient for the Dispatcher to override any limit via a dispatcher display.

The limit monitoring software shall prevent annunciation of multiple alarms resulting from a point value oscillation about an alarm limit (alarm chatter).

4.4.7 Status Data Processing

Status data shall be processed to determine the current status and to report any change of status. The newly acquired status shall be compared against the current status data in the database to determine if changes have taken place. If a change of status is detected that is not the result of a control action, an alarm shall be generated. Commanded and manually entered changes of status shall be recorded as events, with the designation of the console and dispatcher, which initiated the change identified.
It shall be possible to define a correspondence between a “normal” condition and the status value (e.g. open or closed). Points, which are not in the normal state, shall be included in abnormal summaries.

The software shall be capable of inverting the state of a contact input point upon receipt of the telemetered data and before processing in the database. The software shall be capable of associating either state of the actual device (for example, open or closed breaker). The User shall specify point definitions individually. The system shall also accommodate non-telemetered points for use by Application programs, displays, or reports.

As a minimum, the system shall accommodate the contact input data types defined as follows:

a) Status: Points having two states typically, alarm or normal. If the status is coming from a positional devices - open or closed.

b) Switch: Points having three positional states, typical examples are: open, closed or in-travel; and on, off or alarm for pumps and motors.

c) Momentary Change Detection (MCD): Points subject to multiple operations that is associated between scans (e.g. breakers with reclosers).

For selected status points that are associated with breakers and switch, a counter shall be maintained to accumulate the number of operations of the device, including all momentary changes.

### 4.4.8 Pulse Accumulator Data Processing

The accumulators shall be frozen by a command transmitted from the system. The freeze-command shall be issued at selected time intervals either as a broadcast freeze-command sent to each RTU communications channel or a selective freeze-command issued to individual RTUs. The GPWA supplied remote terminal units will transfer the contents of the accumulators to a buffer register for retrieval by the system. The freeze command shall not reset the accumulators at the RTUs.

Accumulator data shall be retrieved every hour from each telemetered accumulator defined in the system. Completion of the retrieval process of all accumulator data shall be accomplished during an adjustable time window set by user entry. Initially, the time window shall be set from the top of the hour to one minute after the hour following the freeze request.

If any accumulator cannot be frozen, or if the accumulator cannot be scanned, the system shall substitute, if available, the appropriate integrated value from a periodic calculated point and tag the value to identify it as a non-telemetered reading.

The new SCADA/EMS system shall also be capable of retrieving and processing sub-hourly accumulator data. The collection of sub-hourly accumulator data shall be at User defined rates from 5-minute to 30-minute intervals.

### 4.4.9 Sequence of Events Data Processing

The system shall provide software for processing of sequence of events (SOE) data from RTUs. This capability shall be provided for RTUs with the DNP protocols. These remotes can be defined with SOE
status and/or analog points and a status flag is returned in RTU reply response messages to notify the master station that SOE data is available. To support SOE time tagging the system shall perform time synchronizing with at least half a millisecond accuracy of all RTUs equipped with SOE points. The system shall support SOE reporting from RTUs and/or relays.

The system shall collect the SOE data during channel idle time to minimize normal scanning activity. The collected SOE event data from the RTUs shall be stored in an ODBC accessible format for later analysis and report generation. An event message shall be generated upon receipt of SOE data to inform the System Dispatcher that data is available.

The SOE capability is not to be a substitute for normal status point scanning. The system shall report status changes for SOE points in the same manner as non-SOE points.

### 4.4.10 Alternate Data Sources

The system shall provide, via dispatcher selection, an alternate real-time or calculated data source for a specific Analog Value.

The processing of these multiple source values shall include:

- a) Reasonability limit checking of all values
- b) Ability for the display and storage of data from both the selected and backup source via the historical information storage function

### 4.4.11 System Real-Time Snapshot

The system shall have capabilities to capture, and store a snapshot of the real-time database upon system dispatcher command, on demand, as well as at periodic bases (e.g. 1 minute). A minimum of 1000 full one-minute data base snapshot files need to be maintained: a minimum of 500 snapshot files for GPA and 500 snapshot files for GWA. A snapshot file shall be able to be reloaded and viewed from standard one-lines and tabular displays. A playback function shall be able to allow the dispatcher to step through the available snapshot files from a specified starting time to a specified end time.

The system dispatcher shall be able to purge individual snapshots at any time.

### 4.4.12 Data Display

The system shall provide the capability to display to the System Dispatcher any data value in the system database via any or all of the Dispatcher displays regardless of the source of the data, the frequency of its collection, or the means used to store it in the database. These requirements shall apply to, but are not limited to, the following types of data:

- a) Telemetered data – Analog, status and accumulator data regardless of scan rate
- b) Calculated data – Analog and Boolean
- c) Manually entered data stored in main memory and auxiliary memory
- d) Data generated by all application programs
4.4.13 Dispatcher Displays

Dispatcher displays shall be the primary interface between the System Dispatcher and the system. As a minimum, the display contents shall be selectable from system database information including any of telemetered, calculated, manually entered values and data generated by application programs. The displayed data shall be presentable by any or all of message, tabular data or annotated schematic presentation formats. The manual control activities performed via a set of associated control devices, including a mouse, function keys and alphanumeric keyboard shall be possible.

The Dispatcher display in this specification summarizes the type of menu, overview and tabular displays to be supported by the system. In addition, the system shall support one-line displays and Word Coordinator System based displays for use by System Dispatchers for control and monitoring of the power, water and wastewater systems.

The one-line, process flow and other graphical displays shall be designed by GPWA and constructed by the Bidder with assistance of GPWA. After completion of the one-line displays, training courses on building displays will be provided by the Bidder.

4.4.14 Reporting

In order to satisfy the functional needs of GPWA, the system shall be required to generate on-demand and periodic summary reports of data in the System Real-Time database and from data stored by the Historical Information Storage function or any of the EMS Applications functions. Common tools using ODBC and SQL shall be used to generate reports and logs. The latest stable release of MS EXCEL and MS ACCESS are preferred to meet this functionality.

Customer reports shall be designed and constructed by GPWA personnel following completion of training courses provided by the Bidder and with the Bidder’s support and guidance.

4.4.15 Data Trending

The system shall provide a Data Trending function that allows any data value to be captured, saved and viewed in a graphical trend format on a dispatcher display. At a minimum, the Data Trending function shall provide the User with the following capabilities:

a) Continuously capture samples of selected data values
b) Support horizontal and vertical trending
c) Selection of any data value in the System real-time or application data for trending
d) Selection of the sample rate (2 second minimum)
e) Data collection shall run continuously until deactivated by the User
f) Display of multiple trend variables on a trend display
g) Trend axis shall be automatically scaled in time and engineering units based on the data point under trend
h) Selection of trend color for each data variable
i) Trend display shall be updated at the fastest trend point sample rate
j) Scrolling forward and backward through all the collected trend samples
k) Panning and zooming through all the collected trend samples
l) Print of trend displays on laser printers (color and black & white)
m) Export of selected trend data in CSV format to a disk file
n) A minimum of 3 Trend windows per console plus an additional 8 trend windows.

4.4.16 Disturbance Data Collection

The system shall have a disturbance data collection function that shall collect a user defined set of data points (a minimum of 500 points) with quality codes from the real-time system database. The collection shall be triggered by a status or analog point entering into the abnormal alarm state.

The data collection shall be at a minimum 2-second rate for a period of 15 minutes. The ability of the collection software to also retain data samples prior to the trigger time is required. The pre-trigger data samples should include 5 minutes or samples prior to trigger time.

The ability to store in a minimum of eight buffers on-line should be provided. A set of Dispatcher displays should be provided for viewing, printing and saving the collected data. This display shall also allow purging collection buffers.

The capability shall be provided to access the saved data via ODBC and SQL.

4.4.17 Application Data Processing

The Bidder shall provide various Application Programming Interfaces (APIs), ODBC, SQL, DDE, and XML interfaces to allow development of customer applications and to allow direct interface with the Real-time database via these Industry Standard methods.

The API’s shall provide a convenient method for the addition of future applications, which could be written by GPWA that permits data exchange from the SCADA real-time database and application program.

4.4.18 Supervisory Control

Capabilities shall be provided to perform supervisory control operations via any of the RTUs or PLCs connected to the system. The system shall also have capability for output of analog and status point data to a local I/O facility. All dispatcher initiated control actions shall be logged.

4.4.18.1 Switching Devices

Capabilities shall be provided for Dispatcher selection and operation of any controllable switching device (e.g. circuit breakers and motor operated switches, capacitor and reactor switching devices). The selection and operation of a controllable switching device by the Dispatcher shall require a two-step procedure to prevent inadvertent equipment operation. The Dispatcher shall have the capability to initiate supervisory control action for any controllable device on any Dispatcher display (tabular displays, one-lines, or other graphical displays), given proper authorization.

Supervisory control action shall be initiated using a confirmation-of-selection, prior-to-execution technique. Initiation of the control execute step shall occur after the Dispatcher confirms that the correct point and control execute step, the system shall send control message sequences to address the RTU, obtain verification that the correct point has been selected at the RTU, and then execute the control action.
In addition, the system shall recognize differences in device response times (control timeout), and shall provide indication to the System Dispatcher that a control action is in progress. At the completion of the control message exchange sequence, the system shall report whether the result of the control action with the RTU was completed successfully, or whether the device failed to operate. The system verification that a dispatcher initiated control action response has successfully occurred shall be accomplished by monitoring the appropriate indication for the commanded change. At a minimum the control timeout period shall be individually changeable by the user for each controllable point over a 2 second to 1 minute range.

The system shall recognize the lockout/hot-line order status of any piece of equipment. Control of any equipment with appropriate working tags shall be inhibited in accordance with the restrictions of the tag. At a minimum, each tag shall include the name of the person in responsible charge, the name of the dispatcher issuing the tag, the date/time the tag was issued, the date/time the tag was released and the date/time the tag was removed by the Dispatcher.

4.4.18.2 Load Tap Changing Transformers

Each load tap changing transformer (LTC) will have two supervisory control points. One point is the Auto (ON) / Manual (OFF) control point for the LTC’s local control circuitry. The second point is the Raise/Lower control point for tap position.

The LTC’s local control logic will inhibit any raise/lower supervisory control attempted while the local control is in the AUTO or ON position. The system is not required to recognize or react to this inhibit feature. The tap position control shall be initiated using the confirmation-of-selection, prior-to-execution procedure specified for switching devices. However, it shall be possible to command repeat raise or lower actions without re-selecting the device on the Dispatcher display Job Supervisory Control.

4.4.18.3 Control Inhibit

The system shall provide the means to inhibit and to enable supervisory control of any controllable point or an entire RTU. In addition, the system shall provide indication of Dispatcher displays that a controllable point is in a control inhibit state. The control inhibit indication shall be separate and distinct from the quality flag field for each point. An event message shall be generated each time a control inhibit is initiated or removed.

4.4.19 Local Output Points

The system shall provide the capability for output of status and analog point values from the system database to a Local Output device. The Local Output device shall convert the status and analog values to the desired output signals as specified in Section 4.4.6. The selection of status and analog points to be output shall be User definable through standard data entry procedures. The system shall output the selected status and analog point values at a 2-second rate through an efficient and reliable block, output type message structure.
4.4.20 Periodic Calculations and Control

The system shall be able to perform the periodic calculations and control sequences as discussed below. The results shall be incorporated into the database such that the calculated data is indistinguishable (to other software) from telemetered data.

4.4.20.1 Power System Calculations

The system shall provide built-in power system calculation functions for such quantities as MVA, KVA, MVAR, KVAR, Power Factor, and Amps that are computed from telemetered MW, MVAR, and KV values.

4.4.20.2 Generalized Calculations

The system shall provide capabilities for GPWA to define generalized calculations. The calculations shall use database values as the arguments and simple arithmetic functions as the operations.

The following Calculation Functions shall be provided, as a minimum, for use in generating analog and status calculated points:

1. Algebraic Operations
   a) Arithmetic operation: +, -, /, *
   b) Integer
   c) Modulo
   d) Exponential
   e) Sin, cos, tan (radians or degrees)
   f) Arc sin, arc cos, arc tan (radians or degrees)
   g) Square root
   h) Absolute value
   i) \( X^\) (Exponentiation)

2. Sum, average, and maximum / minimum calculations

3. Boolean functions. These shall include as a minimum:
   a) AND
   b) OR
   c) NOT
   d) XOR

4. Structured conditional statement using:
   a) IF, THEN, ELSE
   b) Logical operations (\(>, =\), \(=\), \(=\), \(<\), \(\neq\)).
4.4.20.3 Data Averaging

The system shall provide a calculation function for computing the average value of a database value over a specified time period having fixed start and end points with respect to system time. An appropriate tag shall be attached to any average for which the database was not being updated for an interval of time exceeding a User adjustable percentage of the period. This function would typically be used for computing integrated MWH and MVARH values produced by integrating telemetered MW and MVAR values, and the daily average flow in gallons per minute and daily average discharge pressure at the water and wastewater facilities.

4.4.20.4 Minimum/Maximum

The system shall provide a calculation function for computing the minimum or maximum, or both, of a database value (calculated or telemetered) during a given time period fixed with respect to system time. The min/max processing shall include the date and time stamp of when the min/max was detected. The Bidder shall provide a description of his proposed method to detect minimum and maximum values.

4.4.20.5 Meter Error

The Bidder shall provide a calculation function or facility for meter error monitoring, for which GPA can utilize to compare selected MWH and MVARH telemetered pulse accumulator measurements with the periodic calculated MWH and MVARH integrated values. The function shall calculate the absolute magnitude of the difference between the integrated IN and OUT MWH values and associated telemetered IN and OUT MWH values. An alarm shall be generated if the difference between any integrated and associated telemetered IN and OUT MWH value exceeds a User entered percentage of the accumulator reading. The meter error alarm shall be inhibited if an insufficient number of samples have been received for the integration calculation.

The system shall provide displays of meter error monitoring information showing the integrated values, accumulator readings, differences between integrated and associated accumulator readings, and other pertinent data. The Bidder shall provide database entry procedures for adding or deleting points from the meter error monitoring function.

4.4.20.6 Automated Control Sequences

The system shall provide a periodic calculation and control function that permits the User to construct an automated control sequence. The function shall test a user specified status or analog point in the system against a predefined value and to initiate a control to a SCADA point if the test condition is satisfied. The function shall report appropriate event messages for any control action.

4.4.21 Alarm Processing

The system shall have the capability of notifying dispatchers of abnormal conditions, required dispatcher intervention or informational system messages.
Alarms shall consist of but not limited to:

a) Un-commanded changes of state of status points
b) The failure of a device to respond to a supervisory control action
c) Limit violations of telemetered or calculated values
d) Failure of a critical system component such as a server.

Events shall consist of but not limited to:

a) Commanded changes of status points
b) Return within limits by an analog value
c) Manual request for system failover or restart
d) Alarm Acknowledgement
e) Initiation of supervisory control actions

Alarm & Event messages shall be saved in an Alarm & Event file when generated. The length of the message shall not exceed one printed or displayed line. Also, the message text shall be identical in both the printed and display form.

Color, flashing, history retention, email and page attributes, and audible attributes shall be assigned to each alarm or event group to reflect the severity of the alarm or event and to identify whether the alarm or event is acknowledged or unacknowledged.

Each alarm group shall be assigned an alarm priority (up to 8), which will be used to filter the alarms on the various alarm summaries.

### 4.4.21.1 Alarm & Event User Interface

Alarms and events shall be accessible to the dispatchers through the Alarm & Event Summary displays. Summaries shall be a filtered list sorted chronologically. The highest priority and most recent alarm shall be at the head of the list.

Summaries of Unacknowledged, Acknowledged, and other sorted criteria shall exist. The system shall provide the capability to perform alarm and event searches based on a set of search parameters or filters. An appropriate display shall be available where dispatchers enter the search parameters and obtain the results of a search.

### 4.4.21.2 Alarm Interaction

A dispatcher shall have the capability of inhibiting alarming for any point in which the dispatcher has the authority. When an alarm is inhibited, no alarm processing shall occur, however the alarm shall be placed in the Alarm & Event file. The Alarm inhibit data quality flag shall be placed on points in which alarming has been inhibited and these points shall be placed in the Alarm Inhibited Summary display. It shall be possible to define a point for alarm inhibit in the database definition for the point.

It shall be possible to acknowledge an alarm from any display on which the unacknowledged point or alarm message appears. Dispatchers shall have the ability to acknowledge a single alarm, a page of alarms (such as a page on an alarm summary), or all alarms associated with a particular point. This
dispatcher shall have the capability of deleting alarms either individually or by page. Points shall be configurable such that, when acknowledged, the alarm will be removed from all summaries and lists, or such that the point will remain until the alarm has returned to a normal state. The system shall not permit the deletion of unacknowledged alarms.

4.4.21.3 Alarm Suppression

The system shall have the capability of defining a relationship between certain devices that can be used to suppress alarms from related devices or measurements. The relationship shall be defined in such a way as to establish a dependency between one device and others. An example of this relationship would be if a circuit breaker opens, without dispatcher intervention, under voltage alarms associated with that breaker trip would be suppressed for a user-defined period.

4.4.22 Historical Information System

A commercial database based Historical Information System (HIS) function shall be provided to allow collection of real-time data, archival, for subsequent reports, analysis, ‘Energy Accounting’ or data archiving.

The HIS function shall provide the capabilities for GPWA to define the utilization of the data stored, including, as a minimum, archival period, printing, Dispatcher display and calculations. A standard relational database management system (e.g. Oracle) shall be utilized as the core of this functionality.

4.4.22.1 Data Storage and Archival

The HIS function shall provide features to collect and store data at User definable sub-hourly, hourly, daily, weekly, and monthly intervals. Collection and storage by HIS shall also include provision for daylight savings time and leap year adjustments.

The HIS function shall support storage of data for a minimum period of 2 year on-line. RAID hardware shall be used for storage reliability.

4.4.22.2 Data Archival

The data to be collected and stored shall include telemetered data, calculated data, manually entered data, application program results (e.g., production cost data), and operational messages (e.g., alarms, events and completed interchange schedules). Their data type (telemetered, calculated, manual, etc) shall also be stored.

The archived data shall also collect data quality codes for the telemetered and calculated SCADA data. For maximum and minimum data values, the archived data shall also collect the associated time information for the selected points.

All telemetered data shall be collected and stored, including but not limited to, 2-second scans, 10-second and 1-minute scans.
4.4.22.3 Data Display and Modification

The archived data system shall provide a convenient means for the System Dispatcher to access the data, and by means of a data entry procedure, modify the stored data. The archived data system shall also provide capabilities for the System Dispatcher to modify quality codes as well as the data. Standard reporting tools using ODBC connectivity shall be used to access the historical information. GPWA prefers to use Access or Excel as a font-end client to view and update the historical data. The Bidder shall provide all licenses for these Front-End applications for all supplied consoles.

4.4.23 Data Links

The System shall provide general DNP3 and Modbus Server data link capabilities as described in the following subsections.

4.4.24 System Diagnostics

The SCADA system shall be delivered with a comprehensive diagnostic package for real-time supervision of the control system with all its connected components, for example, Communication Server and RTU. The diagnostic message shall log component captures, trace messages and logging errors and events. Trace messages shall provide information about the execution of applications. The trace information displayed shall be selectively filtered and relates to the current processes of the local application. Messages shall be able to be displayed on local nodes and/or saved to disc for analysis later. The message logging system shall automatically record messages to the standardized Windows Event Log or a specific application log. The application log shall record information of a specific SCADA system application. The event log shall contain information related to system operation.

An advanced Communication Server diagnostics tool shall be provided for the supervision and diagnosis of RTU-links.

The diagnostic message logging component shall provide specific error messages. These messages shall help to understand the system behavior, in case of any problems.

4.4.25 Health Monitoring

4.4.25.1 Introduction

The health monitoring system provided shall monitor Hardware usage (CPU, RAM, disk), table space, and DB fill level status. The application shall track system performance and stores the performance values in the health monitoring repository. It shall report error and warning messages through system event logs or alarming.

There shall be three (3) main functions of the health monitoring system:

a) Monitoring  
b) Evaluating  
c) Reporting
4.4.25.2 Monitoring

In the first level, the objects defined in the configuration shall be monitored.

The monitoring should be performed by health agents. Health agents should run as a Windows service on all computers, which shall be monitored.

The following items shall be monitored by a health agent:

   a) Hardware usage (CPU, RAM, disk)
   b) Tablespace fill level
   c) DB fill level.

4.4.25.3 Evaluating

The result of the monitoring shall be the health state of the monitored item. The health state can be normal, critical, warning, or unknown.

The following mechanisms shall exist to derive the health state:

   a) Threshold value: Compare the value (like disk usage) against a threshold.
   b) Expected value: Compare the value (like state) against a normal state.

The individual health states shall be aggregated in a hierarchy: The health state of monitored group shall be the worst status of all monitored items.

4.4.25.4 Reporting

The health monitoring system shall provide the health states as SCADA measurements. These measurements shall be used as a basis to create SCADA alarms and for visualization in single-line diagrams.

4.5 Development/Test Environment

The Development/Test Environment provides a means to perform complex data model modifications and software changes in a stand-alone, isolated test environment before moving the system changes into the SCADA/EMS production environment.

The Development/Test Environment shall allow the data engineer to perform tests offline before activating data model changes in the Production System. The data management system shall provide the possibility to transfer the complete data model from the production system to a test system, to transfer individual jobs to the Development/Test Environment for test purposes, and to transfer tested jobs back to the Production Environment for activating them into the runtime system. The job life-cycle management shall include the test status of the data modifications to keep track of its status.
The Development/Test Environment shall have the following features:

a) The Development/Test Environment shall be separate from the Production Environment (Real-Time Operational Environment)

b) Consoles (user interface (UI) clients) shall be shared between the Production Environment and the Development/Test Environment.

c) The SCADA/EMS must enable a promotion of the Development/Test Environment data model configuration and software modifications into the Production Environment.

d) The Development/Test Environment shall have program level and quality process level fail safes preventing promotion of corrupt or error-filled data models and software modifications into the Production Environment.

The Development/Test Environment may be hosted as a separate installation of SCADA system with its own hardware. Typically the hardware configuration shall be reduced with respect to the online system. For example, no redundancy.

The proposed system should provide the following features for the Development/Test Environment:

a) The user of the Production Environment should be able to issue a bulk update of data in the Development/Test Environment from the current data model of the Production Environment.

b) The user of the Production environment should be able to transfer a single job from the Production Environment to the Development/Test Environment. The job can then be tested in the Development/Test Environment.

c) The user of the Development/Test Environment should be able to transfer the modifications of a tested job from the Development/Test Environment to the Production Environment. The user in the Production Environment should then accept the modifications and activate the job in the Production Environment.

The SCADA/EMS should provide the following features for the Development/Test Environment:

a) It should be possible to update the Development/Test Environment with the raw SCADA system data available in the Production Environment. In this manner, users in the Development/Test Environment can test applications with the current real time Production Environment.

b) It should be possible to replicate markers and manual updates from Production Environment to the Development/Test Environment.

c) It should be possible to initialize the values of the Development/Test Environment by their normal state or rated value. This initialization should be available using a button in the SAT.

A typical use case of the Development/Test Environment is the following:

a) The user creates and edits a new complex job in the Production Environment.

b) Due to the complexity of the job, the user wants to test the effects of the job first on the Development/Test Environment.

c) Within the operational system, the user sends the corresponding job for test to the Development/Test Environment.

d) Within the Development/Test Environment, the user imports the job and activates it.
e) The user tests the behavior of applications on the Development/Test Environment by using the current values of the operational system.

f) The user implements some modifications in the job on the Development/Test Environment, until the user is satisfied with the results.

g) The user sends the job back to the Production Environment.

h) In the Production Environment, the user accepts the changes performed to the job and activates the job in the Production Environment.

4.6 SCADA Data Model

4.6.1 Data Model

The SCADA data model shall be a comprehensive structure of all object types (for example, field objects, topology, world maps, hardware, applications, etc.) that have to be handled by the control center system. The data model used by SCADA shall provide a logical, object-oriented data model describing GPWA system information, characteristics, and behavior. It shall be used for numerous individual applications without requiring special adaptation. It shall provide a logic structure through which external users can access object data and operate applications. The data model shall be based on CIM (Common Information Model – IEC 61970) and CIM-compliant in its basic structure. It shall match CIM in those parts where it defines information needed for the applications provided by the SCADA Control Center System. The data model contains extensions for all parts that are not covered by CIM. The data model should extend the CIM by defining additions like gas and water networks communication to the physical equipment in the field, in the control center network, authority assignments, presentation logic assignments for field equipment in single line diagrams, etc.

4.6.2 Data Model Maintenance and Customizing

Although the SCADA data model shall cover all engineering data of the entire SCADA system, the data model maintenance and customization features shall allow extending the standard model. Creating and maintaining custom types shall be possible. Extensions to the CIM model (attributes / classes) should be handled through the use of namespace assignments. This should make it easy to maintain compatibility with CIM standard based interfaces.

4.7 SCADA Data Management System Functions

4.7.1 Overview

The function of the SCADA Data Management System shall be a set of tools to control the transfer of data between the engineering database and the SCADA control center runtime databases. The generation of the runtime databases together with the design of the SCADA control center applications should be optimized to achieve an online database change. The process interfaces and all other EMS and GWA applications shall be included in this concept. There shall be no interruption for the real-time operation in the control center during changes of the database. The operational team of network control shall work on their duty without interruption.
4.7.2 Job Management

Job Management shall be the method by which changes of the SCADA engineering database are grouped and managed. To define a new substation and propagate this substation to the runtime system, a job must be created, edited, validated, and activated. The final activation of the job shall provide the changes to the online system. The job history shall be logged (for example, job creation, job activation). Although the Job Management function shall provide the capability to group data changes into a job, it is the data engineer who is in control of which changes should be grouped together into which jobs. This ability to group changes should provide great flexibility as to what data changes should define an increment of change against the database currently in operation.

4.7.2.1 Job Organization

A job shall group data changes that belong together. They shall correspond to changes in the model with the same activation time. Each job shall be identified by a unique name.

Multiple jobs can exist at one time. It shall be possible that several users can work on the different jobs at the same time. A job should be able to be reserved for a particular user. When a job is reserved, only that particular user should have the access to work on that job, other users shall be able to view data for this job. When a job is not reserved any user shall be able to reserve this free job.

4.7.2.2 Change detection

If the user changes data within a job, the modifications shall be detected and recorded in the Change Log. The Change Log shall contain modifications of instances and links. Multiple changes to the same data item due to multiple updates must be merged. The Change Log shall provide a means to view what was changed in the past. It shall be used also by the activation process to determine which changes need to be processed into the operational database of the runtime system.

4.7.2.3 Interlock-Based Job Model

In an interlock-based job model, it shall be possible to view or edit the model as it is at the current time when somebody is in a job. It must be possible to see a logical view of changed data in the selected job and data of the current model used by the runtime system.

Interlocks on an object and link level shall prevent that the same object, link respectively, is changed in more than one job. The jobs shall be independent of each other. Activation and undo of jobs within an interlock-based job model shall be done in any order.

4.7.2.4 Time-Based Job Model

The time-based job model shall add the ability to reflect the evolutionary nature of work. It shall allow scheduling of data changes to reflect construction schedules and the lifecycle planning of GPWA system equipment. Jobs within a time-based job model shall be no longer independent from each other. The jobs shall be ordered by their planned activation time. The job shall be built on top of changes of earlier jobs. The changes of jobs that have an earlier planned activation time shall be visible. A user shall see a logical view of data changes in his job and all changes done in jobs that have an earlier planned activation time and the current model used by the runtime system.
A job in a time-based job model shall allow modifying the same object that another job modified already. There shall be no job interlocking. Jobs have to be activated in the order of the planned activation time. Undo activations have to be done in reverse order of the activation sequence.

4.7.2.5 Validation

After data entry or data modification, the data included in the job shall be validated. Validation shall ensure that the entire data model is still consistent. In addition, validation shall ensure that all necessary data has been entered (completeness check) in a job before the changes become activated into the runtime system. The data validation component shall be accessed via an external customer application using the eXchange Data Format (XDF).

Validation shall be take place in a maintenance environment (that shall be, an engineering context) without affecting the runtime systems and shall be performed on various levels:

4.7.2.5.1 Intra-object validation

The job management function shall verify the correctness of data within a single instance. This shall be done automatically when the data is saved. If an incorrect data value is entered, an error message is issued.

4.7.2.5.2 Inter-object validation

The job management function shall refer to those checks that require multiple instances to ensure data consistency. These checks shall also include instances of different types.

4.7.2.5.3 User-defined validation

The job management function shall allow to create own validation checks and to integrate these checks into the validation process. Simple rules shall be defined in XML, complex rules shall be implemented in PL/SQL.

The data management system shall provide a summary of all validation messages generated during the validation of the corresponding job to assist the data engineer in the correction of the data. It must run validation and fix constraint violations before activation.

4.7.2.6 Activation

The job activation shall provide the propagation of data changes to the associated domain context (that is, to the runtime system) without interrupt of process control. Activation shall create change log data used for auditing and undo, in case that the activation fails. Undo activation shall restore the runtime databases as well as the engineering database to the content prior to activation of the job. Then corrections shall be possible to make to the job and shall be activating again.
4.7.3 Data Management Tool Archive

The data management system shall support archiving of jobs. Jobs in the data management system archive shall provide a past view based on the activation time. It shall allow the user to track data changes over time. Data shall be stored in the archive after a successful activation of the runtime system, if enabled. This should allow the user to view all jobs that have been activated in the past. Retrieving an historical model for any point in time should enable more accurate and correct conclusions of post mortem analyses.

4.7.4 Data Reports

Reporting features provided by data management system components shall allow creating and viewing summary or detail reports of type or instance data.

A report shall be a collection of type or instance data that shall show attributes and properties of the selected type or instance. Reports shall be either predefined and delivered with the SCADA data management system or defined after installation.

The report generator tool shall provide the creation of user-defined reports. Reports should be pre-configured in terms of formatting and style, but the user shall determine the type and amount of information shown specific change log reports for a job. The change log should contain modifications of instances and links. Multiple changes to the same data item due to multiple updates should be merged.

4.7.5 Data Import and Data Export

The data management system shall provide an interface to export and import engineering data in XDF (eXchange Data Format) and CIM-RDF (Common Information Model – Resource Description Format). CIM-RDF shall be based on the IEC 61970 standard for the description of power systems. The data management system shall support complete, partial, and incremental import and export in XDF and CIM-RDF. Import must allow adding new data or existing data to modifying or deleting. All engineering data, including graphic data, shall be possible to export and import.

Profiles shall allow filtering of exported engineering data. They shall be based on types, attributes, and associations. It must be possible to define types, attributes, and associations that make up a profile. An arbitrary number of profiles shall be supported.

Instance filtering of exported engineering data based on logical expression containing one or multiple attributes of one type shall be provided to allow limiting the exported instances to a set matching a certain use case.

The data import and export features of SCADA data management system shall be used for:

- Data migration
- Transfer of instance data and graphics data from legacy systems
- System upgrade.
The import or export feature of SCADA data management system shall allow storing the complete database on file. Then it shall be possible to upgrade the control system and reimport the saved database. External engineering data modification

The import/export feature of SCADA data management system shall allow modifying a large quantity of data information, stored in external files, with a few steps. Then this modified information shall be possible to reimport into the SCADA data model.

4.7.6 Data backup feature

It shall be possible to save the database (including the overall data model) to an external file with an export function.

4.7.7 Profile-based export

Only instances assigned to a certain profile shall be exported.

Upon import, the corresponding information must automatically validate for correctness and completeness. During an import process, the specified data information shall be written to the database. During export, the specified data information shall be transferred from the database to external files.

4.7.8 Import and Export of Engineering Data in XDF or CIM-RDF

XDF and CIM-RDF should be the preferred formats for the bulk data import of engineering data to SCADA data management system, both for initial (bulk) and incremental input. Incremental import jobs should include change detection to ensure that existing data is not lost when the new engineering data is transferred to the runtime database.

Following the data import, validation should ensure that the new engineering data is consistent and does not conflict with any other engineering data in the system.

4.8 Data Management

SCADA data management shall give GPWA the ability to enter and maintain all system related engineering data within a CIM-based central repository.

CIM is an established IEC standard 61970, originating from the EPRI CCAPI (Control Center Application Program Interface) project. The objective was to eliminate the inflexibility and high cost of existing EMS vendor offerings whenever new applications were needed. The CIM is an important industry standard to enable system integration and information exchange based on a common information model. It reduces learning effort, facilitates the implementation of new and future applications, and allows running CIM-based multi-vendor applications.

Engineering data should consist of domain data like equipment, measurements and topology, as well as single line displays and configuration data of the SCADA control center system like hardware and software deployment and application configuration. A set of editors should allow data access and data definition optimized for the different engineering workflows a data engineer needs to perform. Complete, partial, and incremental import and export of engineering data should be provided through CIM-RDF and
XDF formats based on the W3C standard XML. The data management system should also control the activation of data changes to the SCADA control center runtime databases. The data management shall be based on an object-oriented data model using a Relational Database Management System (RDBMS).

The data management component should have the following features:

- **Job Management**: A job is an organized set of data changes. The user should be in control of which changes are collected into a job. Multiple jobs should be allowed at any time.
- **Allow multiple and concurrent users to make data modifications at the same time without any impact on the operational database within a secure environment**
- **Should provide life-cycle management for data modifications**
- **Automatic change detection should allow tracing of all changes done by users at any time**
- **Job activation should provide the ability to transfer the incremental data changes online to the operational system without interrupt of process control, including the ability to undo changes**
- **Choice between interlock-based job model and time-based job model should support different business logics regarding data maintenance.**

### 4.8.1 Common Information Model (CIM)

The Data Model shall be based on IEC 61970 (EMS Application Program Interface) and its extensions according to IEC 61968 (System Interfaces for Distribution) and IEC 62325 (Energy Market Communication)

The Data Model shall:

- **Allow easy enterprise integration and data exchange between control centers and applications of different suppliers.**
- **Provide the basis for vertical and horizontal integration.**
- **Allow easier, faster, and lower-risk software/system/database upgrades, and migration of existing data.**

CIM data shall remain stable, and data model expansions for example, additional types or attributes shall be easy to implement.

CIM must be the key standard for Smart Grid interoperability as identified from NIST (National Institute of Standards and Technology) System and Data Integrity including but not limited to:

- **Multilevel security service must be provided**
- **User authorization, User access rights Instance level access rights.**
- **Audit records of every change made to graphical or domain data.**
- **Powerful validation shall mean to secure the integrity of the model.**
- **IT security checks as part of the system test (Red Team Vulnerability Assessment).**
- **Secure installation procedure**
4.8.2 Data Archive

Data version management and automatic data model archiving facilities. A history of model changes shall enable retrieval of the data model at any point in past times.

4.8.3 User Interface (UI)

One common user interface for data entries shall cover all aspects of data engineering. The UI shall have the following features:

- Domain data topology should derive from the graphic model (single line diagrams)
- Viewed and accessed using Microsoft Internet Explorer
- Multi-screen and multi-window data entry sessions (MS Windows look and feel)
- Report generator function
- Online help.

4.8.4 Hierarchical Data Model Maintenance

In a huge system which is divided into several control centers, a change of the data model at one control center can affect more than just one’s own control center. Generally, planned data changes must be submitted, and reviewed for feasibility, approved or rejected, and then implemented at the operating level.

The responsibilities and rights for the entire data model must be clearly defined within data management system; these processes shall be possible to automate to a wide extent. The Hierarchical Data Model Maintenance feature shall support the exchange of engineering data between hierarchically arranged control centers by means of change requests. Change requests shall be basically jobs. Multiple states shall define the life-cycle of a change request. The features for Hierarchical Data Model Maintenance shall provide automate processes to a wide extend, minimizing labor intensive and time consuming tasks, lower the risk of inconsistent models and increase the data integrity. The data management system shall help to ensure lasting data consistency within a hierarchical control center environment.

4.8.5 Data Management Tool System Security

The data management system security service must be part of the overall SCADA control center security strategy to protect the system against unauthorized use. A multilevel security concept must ensure the secure operation of SCADA data management.

The SCADA data management system shall maintain an audit log of all data changes made to type, graphical instance or domain instance data. It must be possible to identify users which changed data or activated data changes, by using the audit log.
4.8.5.1 Authorization and Security

The SCADA data management system security shall be based on user authorization (by logon) and on access rights:

4.8.5.1.1 User authorization by logon

User authorization shall be performed when a user log on to SCADA data management system (user name and password).

4.8.5.1.2 User access rights

Data entry and activation shall be controlled by access rights. Data management system should provide granular access rights dependent on the dataset (for example, real time, user management) and the requested action (for example, data engineering, and activation).

4.8.5.1.3 Instance level access rights

The instance level access rights shall control access to instance data. They shall be assigned individually for each instance.

Instance level access rights must ensure clear responsibilities and rights within the whole data model. For example, they must ensure data integrity within hierarchical data model maintenance. Conflicts within model merge processes shall be easily detected.

4.9 Communications Server (CS)

The CS shall be a SCADA component used for communications with Remote Terminal Units (RTUs) and Programmable Logic Controllers (PLCs) of different manufacturers. The CS shall pre-process all data received, thus reducing the process charge of the downstream components.

Preprocessing should include the following:

- Data reduction routines including old/new comparison, threshold check.
- Data conversion including scaling and smoothing of measured values.
- An integrity check including completeness and cycle monitoring checks while generating data RTU/PLC communication traffic statistics

CS component having the following features:

- State-of-the-art standard hardware components
- Fully integrated into SCADA/EMS system such that data modeling and engineering actions are carried out in the SCADA/EMS
- Processing communication protocols as required in other sections of the Bid
- High connect capacity
- No less than 720 RTU/IED PLCs (e.g. IEC60870-5-101)
No less than 256 TCP/IP based links (e.g. IEC60870-5-104)
Mix of both per Communication Server component
Ability to double connections upon expansion
High availability, redundancy, and online activation.

4.10 Communication Protocols

Interoperability should be provided for RTU types, which are compatible with the following communication protocols:

**Master functionality**
- IEC60870-5-101 / IEC60870-5-104
- IEC 61850
- DNP 3.0 / DNP3
- Modbus

**Slave functionality**
- IEC 60870-5-101 / IEC 60870-5-104

4.11 Communication Network Configuration

The SCADA CS shall support multiple RTU/PLC/IED network configurations:

- Point-to-point (peer-to-peer) configuration for fast and highly reliable RTU/PLC/IED connection.
- Point-to-multipoint configuration, using master slave protocols, for economic RTU/PLC/IED connection in particular for small data volumes per RTU/PLC/IED.
- Data concentrator configuration for collecting data from satellite RTU/PLC/IEDs with or without protocol conversion.
- Redundant connections to dual ported RTU/PLC/IEDs to provide utmost communication reliability.

4.11.1 Features and Functions

Data Acquisition

There shall be 2 basic methods of controlling the data flow from the RTU to the Communication Server:

- Data transmission controlled by the RTU/PLC/IED
- Report by exception. IEC: Balanced transmission mode. In this mode data is transmitted by the RTU based on change of state of digital data and out of dead-band change state for analog data.
- Data transmission controlled by CS.
- Polled master/slave data. IEC: Unbalanced transmission mode. In this mode RTU data is collected by the CS via a poll request to the addressed RTU.
4.11.2 Completeness and Updating Check

To keep data consistent and updated the following routine checks shall be applied on teletransmitted information:

- Completeness Check
- Updating Check

4.11.2.1 Completeness Check

The Completeness Check follows always the General Interrogation (GI) Command sent by the CS to the RTUs/PLCs after a preset time. This command shall be issued either after start-up of a system component, timer-controlled or manually by operator intervention. After the GI timer has expired the CS checks data for completeness. If not complete, the GI shall be repeated (configurable). If still incomplete, an alarm message shall be generated and reported to the operator.

4.11.2.2 Updating Check

Cyclically transmitted data such as analog values shall be monitored for being updated in predefined periods. If the periodical updating process fails, an alarm shall be generated and all affected values marked as not updated.

4.11.3 Data Pre-processing

To avoid unnecessary data flow into subsequent components and to release them from routine processing the following preprocessing functions shall be available in CS:

- Old-new comparison for spontaneously transmitted indications.
- Intermediate state suppression for double-point information, individually configurable per data point.
- Threshold check of analog values (integration method)
- Conversion of analog raw values into engineering values via linear or nonlinear characteristic curve.
- Zero-point suppression of analog values (negligible values are forced to zero)
- Digital smoothing of analog value, to filter out disturbance peaks.
- Meter readings (or Integrated Totals in IEC terminology) received from RTUs shall be converted from protocol-specific format into the SCADA representation.
- Sequence of events (separation of double-transmitted flagged values from normal values) shall be processed independent from RTU type.
- Inversion of digital values
- The signal change from ON to OFF shall be interpreted as appearing information.
Time stamping in case no time information is transmitted together with the value. Resolution: 10 ms. Resolution of teletransmitted time stamp in the range of 1 ms (depends on RTU and protocol type).

- Maintaining of counters for communication statistics
- Processing of events (or fleetings)
- Only the appearance of this information is of interest. The disappearing signal shall be ignored.

### 4.11.4 High-Availability Feature

The Communication Server shall be highly reliable. Following the no loss of data strategy, the CS component as a highly critical component shall be designed for highest availability.

High availability of the Communication Server system shall be achieved by:

- Server failover to redundant Communication Server in case of active Communication Server failure
- Configurable load sharing between 2 or more Communication Servers
- Supervision of standby communication line (channel), including telegram buffering (protocol-specific)
- Line Level Redundancy

It shall be possible to define redundant links from several interfaces on the same or different Communication Servers to one RTU/PLC.

With line level redundancy, all servers of a redundant set of CS shall be in active state. However, it shall be possible to select one of the redundant lines to a remote terminal unit to become active.

The switchover on line level shall be triggered as follows:

- **Manually**
  - Switchover of a line by locking (disabling) an active interface
  - Switchover of a line by setting a preference on a standby interface
  - Switchover of an RTU/PLC by locking an active link (not applicable for single-ported RTUs/PLCs)
  - Switchover of an RTU/PLC by setting a preference on a standby interface or a standby link (not applicable for single ported RTUs/PLCs)

- **Automatically**
  - Switchover of a single RTU/PLC after detection of a link failure (not applicable for single ported RTUs/PLCs)
  - Switchover of a whole line after detection of an interface failure
  - Switchover upon a server failure.
Granular Online Activation.

There shall be maximized availability during engineering data is modified. Only the affected RTU/PLC links shall be shortly interrupted when engineering data is modified and activated.

**Test and Diagnosis Features**

The following test and diagnosis features shall be integrated in the CS system:

- **RTU/PLC telegram trace**
  - The contents of selected messages (telegrams) shall be output at different points of processing. For example before preprocessing and after preprocessing.

- **Communication statistics**
  - For each communication link accumulators shall be maintained to count sent messages, received messages, message errors, fail over actions and similar events.

- **Multiple CS status displays**
  - All status information of CS and communication links such as Failure, Locked, and Preference (and others) shall be automatically displayed and updated in a dedicated summary view.

### 4.12 Alarm Forwarding

Wireless Alarming should forward the incoming alarm to the user on duty (e.g. 2 standby users for each area of responsibility), in case of an unmanned control room. The user must be alarmed through an SMS (mobile telephone), or voice mail, after the alarm has passed the wireless alarm filter and the cascade of Wireless Alarming is activated.

The user should respond using a telephone voice callback system and should enter the acknowledgment code in the telephone keypad to avoid the start of the escalation strategy. The Wireless Alarming component shall monitor the response for time-out. User acknowledgment in the control center or through the remote user interface shall also stop the escalation strategy.

### 4.13 Emergency Backup Control Center

An emergency backup control center (EBCC) shall be proposed as an additive bid item. Typically the EBCC shall be installed at a separate location far from the main control center. The main purpose of the EBCC shall be that it can take over operation, if the main site can no longer be operated due to a disaster.

At minimum, the following main control center data shall be continuously synchronized to the emergency-backup control center:

a) All SCADA data including manually entered data, switching procedures and sequence of operation procedures.

b) The complete data model:
c) The archive: HDA (Historical Data Archive)

d) Forecasts and schedules: FA (Forecast Applications) and COP (Current Operating Plan)

e) The current state of CS (Communication Server), ICCP (Inter control center communication), PA (Power Applications), and all other applications configured in the new system.

f) Data of the TNA (Transmission Network Applications) and all other network applications.

The emergency-backup control center is down in normal operation: Only the basic SCADA processes shall be started; the SCADA Application Toolbar (SAT) shall be available and single-line diagrams can be opened for monitoring purposes, but no interaction shall be possible in this mode.

When the main control center fails, the emergency-backup control center shall be started manually and then takes over the operation. It shall not take more than 10 to 20 minutes depending on the configuration.

4.13.1 Backup Control Center Support

Systems having Emergency-Backup Control Centers require synchronized engineering databases between the main and backup control centers. Data consistency (editing and activating) between both sites must be guaranteed using Oracle Data Guard functionality. The respective data versions on the main control center and the emergency-backup control center must be displayed on the user interface.

When there is a switch or fail over from the main control center to the backup, authorized data engineers shall be possible to set the current control center as master for the SCADA system at any time.

4.14 SYSTEM HARDWARE CONFIGURATION REQUIREMENTS

The system configuration shall be of a cost-effective design and shall possess a high degree of availability, maintainability, dependability, operating effectiveness, and expandability during actual operation.

4.14.1 Open System Requirements

The configuration of the SCADA/EMS System shall have a distributed computing environment with open system architecture.

To be recognized as a true open computer system, all internal communications among the SCADA/EMS System processors and all external communications between the SCADA/EMS System and other computer systems shall be based on widely accepted and published internal or industry standards, which are appropriate and relevant to the open systems concept. This applies to the operating system, database management system, and display management, system, as well as to APIs providing standardized interfacing between systems software and application software.

The following design concepts shall be met:

a) The SCADA/EMS System configuration shall be based on Open Systems Standards in which the software is totally transparent of the hardware such that any hardware adhering to these standards can be replaced / upgraded with a functionally similar device not necessarily manufactured by the original manufacturer.
b) The system must be field operational on at least 2 distinct hardware makes and models and two distinct operating systems.

c) Major subsystems shall be distributed to different sets of processors, such as SCADA processors, Application processors, and User Interface consoles.

d) All processing units of the SCADA/EMS System shall be interconnected using industry standard Local Area Networks (LANs). The LANs shall support exchange of data from the various system components to include; processors and servers, user consoles, communications processors, terminals, gateways, any stand-alone disks and tape drives, etc.

e) The same revision of a widely accepted operating system shall be used. For Intel-based processors, the MS WindowsTM operating system shall be used.

f) All software shall be written in a single cohesive, standard ANSI high-level language. The SCADA/EMS System shall be designed to provide the highest possible level of hardware and software independence through the use of standard products, the use of standard toolkits, and through application modularity.

g) Expandability shall be provided through the use of a hardware and software platform that allows for vertical growth, and a configuration that allows horizontal growth and distributed computer/server support.

4.14.2 Availability

The availability design criteria for the SCADA/EMS system shall be such that a single component failure shall not cause the loss of any critical system function. For all devices having a high failure rate or a potentially long repair time, multiple device failures shall not cause the loss of any critical system function. For example, a configuration is desired that permits redundant server computers to operate with a high availability disk drive system for storage of critical System Database using RAID technology. The bidder shall provide “mean time between failure” MTBF and “mean time to repair” MTTR data for all hardware components provided critical to SCADA system operation.

The SCADA/EMS System shall have an overall system availability of 99.999%. The Bidder shall demonstrate the availability over an extended period of actual system operation (Availability Test). In addition to the availability described above, the Bidder shall provide capability for extensive means of failure and pre-failure detection and automatic substitution of backup devices in order to achieve the required availability level.

The availability is defined as

$$\text{AVAILABILITY} = \frac{\text{RUNTIME}}{\text{RUNTIME} + \text{DOWNTIME}} \times 100\%$$

Where, RUNTIME shall be the Availability Test time.

The SCADA/EMS System shall be considered available when the following critical System functions are performing as specified:

a) Data Acquisition
b) Supervisory Control
c) AGC/ED
d) User Interface
4.14.2.1 Maintainability

Following system failure detection, the cause shall be promptly isolated and corrected. As an aid to the diagnosis and correction of hardware problems, the system design shall permit the execution of diagnostic programs with the SCADA/EMS System either on-line or off-line. The operation of on-line diagnostics shall not degrade any critical system functions except for devices(s) under test or device(s) used in testing.

Off-line system maintenance shall utilize off-line diagnostics (provided by Bidder). Off-line diagnostics shall support complete maintenance of all hardware elements and the diagnosis and isolation of any hardware fault.

The level of system repair to be undertaken by GPWA maintenance personnel shall be at the unit replacement level or circuit board level for user maintainable hardware. The Bidder’s regularly scheduled maintenance training classes shall provide the training of GPWA maintenance personnel in the use of the off-line diagnostics.

4.15 System Hardware Configuration

The SCADA/EMS system shall consist of redundant servers and workstation computers. The server and workstation computers shall have at least a 64-bit (minimum) processor sufficient to perform the system functions and may consist of multiple processors. The proposed servers and workstations shall support a minimum of two local area networks (LANs), multiple large capacity disk and tape drives, large RAM capability and high I/O throughput. Network access equipment, such as routers, terminal servers, print servers, etc., shall utilize a minimum 1000 Base-T network connections.

All servers shall be of industrial grade rack-mount with multiple processor capability.

Under normal operating conditions, the SCADA/EMS system shall operate with one set of server computers performing real-time functions (Primary System) with the other set of server computers acting as backup (Backup system). In the event of a Primary System failure, the Backup System shall perform all assigned critical system functions without degradation in response times and performance.

The functional requirements of each constituent part of the system, presented in the following sections are provided in order to enable the Bidder to configure the hardware in a manner which will provide GPWA with the most cost effective system. The number of peripheral devices indicated in the specification is based on a redundant system configuration.

The system architecture must include a minimum of four (4) LANs supported by its own dedicated LAN hardware card. All LAN hardware shall utilize a minimum of 1000 Base-T technology. As a minimum, the servers and workstations must be configured with redundant LAN hardware that shall allow them to communicate concurrently and independently over two (2) LANs. One LAN for Server, peripheral and Main Machine functions and one LAN for dedicated RTU interface scanning. Each of the LANs shall be configured with redundancy for high availability.

The system architecture shall be capable of using dynamic traffic balancing techniques to distribute LAN traffic. The Bidder shall describe how the proposed system accomplishes this and if any additional hardware or software is required. If the Bidder utilized Front End Processors or RTU servers via a LAN,
then a separate dedicated LAN shall be provided between these devices and the Primary and Backup System servers. The Front End Processors or RTU server LAN shall not support other non-real-time communications.

The Bidder shall propose RAID Disk capability for the Primary and Backup System servers for storage of the main System Database (or other critical information) to achieve high availability operations. The proposed system shall provide reliable Primary System database write operations that are recorded on both the disk Drives and the Backup system in order to support automatic failover and software maintenance functions.

The consoles to be provided shall be for desktop or suitable facility mounting on GPWA-provided desk or suitable facility.

Servers should be rack mounted in GPWA-supplied cabinets. Communication equipment shall be installed in existing GPWA cabinets. GPWA will provide new Server Cabinets in the Server Room of the new Gloria B. Nelson Public Service Building in Fadian, Mangilao. The cabinets will feature standard 19” mounting space with the following outside dimensions – 30” wide x 42” deep x 78.5” high.

The SCADA/EMS shall support redundant Bidder-supplied communication system. The communication system shall employ and support emerging technologies such as fiber optic, wireless, etc. The Bidder shall provide all necessary hardware for supporting a redundant communication system.

GPAs’s incumbent communication system is comprised of end-to-end connectivity achieved through a field and rack modem system proprietary to Raymar Telenetics. The Bidder shall provide all necessary hardware for supporting redundant modems. The Bidder shall perform the complete installation and all testing of the modems with the RTUs and the Bidder’s SCADA/EMS system.

4.15.1 Uninterruptible Power Supply

Uninterruptible power will be provided by GPWA for the entire Server Room. Please see Appendix D for workstation UPS specifications. Bidder shall evaluate the adequacy of the GPWA UPS for this project. The Bidder is responsible for any UPS inadequacy. If GPWA UPS is inadequate, the Bidder must state so in its technical proposal and provide the cost for remediation as part of its priced bid.

4.15.2 Security

The proposed SCADA/EMS system must provide for a highly secure environment, which only allows authorized users to interact with the SCADA/EMS and consequently with the GPWA systems.

A multi-level security strategy must be inherent in the design of the SCADA/EMS system including as a minimum the following:

a) Use of firewalls to only allow authorized users access into the SCADA/EMS LANs and computing environment.

b) Use of user name and password on all servers and workstations for general operating user log in.
c) Use of user name and password on all workstations for log in to the SCADA/EMS User Interface.

d) Use of Areas of Responsibility and Console Partitions to allow CONTROL, MONITORING, and VIEWING for authorized users and disable such capability of unauthorized users.

The SCADA/EMS system must be capable of limiting the log-in times for users. The system must be capable of logging in users for a specified length of time. For example, Dispatchers must be able to log in for only the time period of their shifts. The system must automatically log out the dispatcher after his specified shift period.

4.16 USER INTERFACE REQUIREMENTS

The User Interface (UI) shall provide a common “look and feel” interface for all users to interact with the SCADA/EMS System.

All applications, which utilize a hierarchical set of one-line diagrams (SCADA, Network Analysis), shall use the same set of one-line diagrams, thus minimizing system maintenance as well as maintaining consistency of use for dispatchers, engineers and other users. Starting with the overall system one-line the UI should enable the user to drill down to specific substation or facility one-line and then to specific equipment detail, tabular or graphical information. Figure 4-1 shows an sample one-line from the current GPA SCADA/EMS.

![Sample One-line from Current GPA SCADA/EMS](image)

4.16.1 User Interface Consoles

The primary User Interface between the SCADA/EMS system and the user shall be workstation-based consoles. Each Dispatcher console shall be assigned to one or more function partition (Areas of
Responsibility), thus limiting the Dispatcher console to only those actions defined within the assigned function partition(s). All defined function partitions shall be assignable to single or multiple consoles.

4.16.2 **General User Interface Requirements**

The following types of displays shall be supported:

- a) One-line diagrams of generating units, power transmission lines, sub-transmission lines, substations, switches, and distribution circuits.
- b) Process flow diagrams and graphical representations of GWA’s water/sewer treatment plants, pump stations, water/sewer lines, water springs, water wells, reservoirs, valves, system meters, sewer manholes and other components of a water and wastewater systems.
- c) Tabular displays, many of which also include imbedded graphical data representations.
- d) List based / Query based displays.
- e) Graphical displays of electrical circuits, pump stations, plants, and other facility types and components including, but not limited to photographs and geographical maps.

A Windows based Full Graphics User Interface system shall be provided which adheres to the MS Windows standards. The following minimum functionality shall be supported:

1. World Coordinate System based displays
2. Panning
3. Zooming
4. Decluttering
5. Multiple Windows per Monitor
6. Split Screen Capabilities for each monitor
7. Navigation Window
8. Scrolling
9. Page based Tabular Displays
10. Support for pictures to include, but not limited to bit-maps, jpeg, tiff, meta, gif, etc.
11. Support for a large number of Electrical, Mechanical, Plumbing and Civil symbols
12. DXF import and export
13. 25 or more colors
14. Blinking colors
15. Comment / Notes through the SCADA/EMS
16. Control and Data Entry dialogs
17. On-line Help facilities
18. Dynamic database linkages for value
19. Dynamic database linkages for color
20. Dynamic database linkages for Object Shape or Line thickness
21. Multiple Font Types and Font Sizes
22. Support Page Data Entry on Tabular Displays
23. Ability to support serving of displays via a standard Web browser

The UI shall provide a symbolized and/or color-coded “quality” indicator field associated with each dynamic data field. In cases where a multi-quality condition develops for a single variable, the Bidder...
shall provide a priority scheme for determining which condition should be displayed. A blank quality field shall be used for data quality condition in the ‘good’ state.

The UI shall provide symbolized for denoting those points for which control has been inhibited. The control inhibit indicators shall be different from the quality codes described in the previous paragraph. In addition each control inhibit indicator shall alter the color of the device to which the indicator is attached.

The UI shall provide dispatcher guidance for all User interfaces by utilizing feedback for each step of a multi-step procedure through the use of text messages, color changes, blinking cursor targets, or dialog boxes with soft push buttons to denote permissible options. Feedback shall be provided for all User inputs whether accepted or not accepted.

All display screen targets shall be cursor selectable. The term “display screen targets’ are defined as areas of each display screen format for which interactive functions have been defined. The Cursor Positioning Methods shall include the use of forward and backward tab keys, pointing device and cursor keys.

The UI shall provide for extensive error checking of all User entries. Invalid entries (e.g. entering an invalid point value or an illogical sequence of actions) shall be reported to the User on the display screen by an error message that shall be in plain English with no acknowledgement required or reference document required for interpretation. In addition, the invalid entries shall be highlighted. The UI shall provide the capability to correct an error without requiring the entry of data or the performance of actions that were correctly executed prior to the error.

Each point in the database including calculated and non-telemetered points shall be assignable to a single partition by the user. For each point assigned to a partition, all permissible Dispatcher actions including supervisory control, data entry, alarm control, etc., defined for that point, shall be restricted to only those consoles, which have been assigned the same partition to, which the point has been assigned. Any attempt to select a point for Dispatcher action not assigned to the consoles assigned partition shall result in an error message on the display screen. Hardcopy messages, e.g., alarm and data entry messages for a point shall be printed only on those printers that have been assigned the assigned partition.

Only consoles with the appropriately assigned console function partition may be permitted to request and view a display that has been defined for that function partition.

Methods for User selection of displays must be rapid, convenient and reliable and shall include cursor selection of a display select target area on any display screen format, including menu, graphic and tabular displays. In addition, cursor selection of an alarm message on any alarm summary display or on the alarm lines followed by actuation of a display request pushbutton shall cause a pre-selected display for the point in alarm to appear on the display screen. The UI shall also allow user selection of a display by pressing a dedicated display request pushbutton (hard or soft key). Displays to be selectable by this means shall include but are not limited to menu displays, overview displays and alarm summary displays.

Paging through multi-page displays by means of page forward and page backward push buttons shall be provided. Display paging shall be user definable by standard display editing procedures. The UI shall provide for a Display Recall pushbutton that shall cause the display that was on view immediately prior to the current display to be recalled. Displays shall also be accessible by entering a display identifier. The identifier shall be user definable through standard display editing identifier. The identifier shall be user definable through standard display editing procedures and shall consist of alphanumeric characters.
4.16.3 Supervisory Control

The UI function shall provide the System Dispatchers with secure interactive procedures that allow performance of the supervisory control functions. As a minimum, the following dedicated buttons shall be supported:

a) Open/Off/Manual
b) On/Off/Alarm
c) Hand/Off/Auto
d) Close/On/Auto
e) Trip/Close
f) On/Off
g) Open/Close
h) Execute
i) Cancel
j) Raise
k) Lower
l) Tagging

Summary displays shall be provided by the SCADA/EMS system to include, but not limited to the following: Off-Normal summary, Out-of-Scan Summary, Alarm Inhibit summary, Control Inhibit summary, and Alarm/Event History Summary.

The System Dispatcher shall have the capability to initiate supervisory control action for any controllable device on any display the device appears except from the Off-Normal Summary, Out-Of-Scan Summary, Alarm Inhibit Summary Control Inhibit Summary and the Alarm/Event history Summary displays. Any dispatcher initiated supervisory control actions shall be by either Select-Before-Operate (SBO) or jog supervisory control. The System Dispatcher may cancel a requested supervisory control action at any time prior to depressing or selecting the Execute function pushbutton.

For the SBO technique, the User selects the device intended for control action and then depresses the desired control action function pushbutton. The UI function shall acknowledge with a display message that shows the device selected and control action requested. The selected device is highlighted on the display screen from which control action was initiated. The User can then use the ‘Execute’ or ‘Cancel’ function pushbuttons for the next step. If the Execute function is selected, the UI shall proceed with the execution of selected supervisory control action and generate an event message describing attempted control action. The UI shall then de-select the device control action and generate an alarm for either a successful device change of state or control action failure following a time-out. If the User selected the “Cancel” function then the UI de-selects the device control action.

Jog Supervisory Control is typically used for LTC repositioning. For this supervisory control technique the UI activity and response shall be the same as described for the SBO technique except there shall be no de-selection of the device and control action request following the ‘Execute’ function. The User may continue with multiple depressions of the Execute function pushbutton or de-select the control sequence by the ‘cancel’ function pushbutton, selecting another point for control or by selecting another display.
The UI shall provide a means to inhibit and to enable supervisory control of any controllable point or an entire RTU. The control inhibit/enable procedure shall be similar to that described for supervisory control; except no separate execute step is required. Control inhibit/enable actions shall be processed as events and shall generate a message to the appropriate logger.

The UI procedure for entering the state (e.g., open, closed, etc.) of non-telemetered or out-of-scan status points shall be similar to that described for supervisory control, except no separate execute step is required.

4.16.4 Tagging

Database values shall be tagged to call the users’ attention to exception conditions for field devices and to inhibit supervisory control actions. It shall be possible to apply a tag to any database point. The SCADA/AGC shall support at least sixteen tag types. It shall be possible to place up to 12 tags of any type on a single point.

If the point is configured for supervisory control, the tag type shall determine what control action is permissible for the point. Each tag type shall be configured by the user to inhibit supervisory control actions as follows:

a) All control allowed.
b) Control in one direction, such as close, inhibited.
c) Control in the other direction, such as trip, inhibited.
d) All control inhibited.

When a user attempts to control a point tagged with a control inhibited tag type, the SCADA/AGC shall block the control and inform the user of the inhibit condition. The user shall be able to override the control inhibit only by removing the tag.

In addition to control inhibit tags, at a minimum, the following tag types shall be provided:

a) Alarm inhibit
b) Event inhibit
c) Scan inhibit
d) Information only tag

At the request for the placement of a tag, the SCADA/EMS system must require that the user logs in and be recognized as an authorized user for tagging.

Each placement of a tag shall result in an entry into a database-ordered Tag List. Each entry shall contain the following information:

a) Date/Time of Tag Placement
b) Clearance or Tag number
c) Tag Type
d) Station Identifier
e) Device Identifier
f) Person in responsible charge if a red tag, blue tag or Hot-line order tag
g) Date/Time tag was accepted by field person  
h) Dispatcher issuing the clearance/tag  
i) Comment field (60 character minimum)  
j) Field person who placed the tag in the field if applicable  
k) Date/Time tag was released by field  
l) Name of person releasing the tag  
m) Date/Time tag was removed by dispatcher  
n) Name of dispatcher removing the tag

As part of the tag placement process, the SCADA/AGC shall prompt the user to enter alphanumeric comment information to be stored with the tag. The comment field shall be at least sixty characters in length. It shall be possible to modify the tag comment information. Tags shall be individually removed by user command. Each tag placement and removal shall be recorded as an event.

4.17 Software Requirements

This section describes the required characteristics of the system software, database and software utilities of the SCADA/EMS system. It is neither intended nor possible to list all software or all characteristics of the software required in the Bidder’s approach to system design. The Bidder is responsible, however, for including all the necessary software to satisfy the system functional requirements described in this Specification.

4.17.1 Design Characteristics

The Bidder shall propose a system based on its standard product line to the extent possible if the functional requirements of this specification are met.

All software to be provided by the Bidder shall be completely described in the Bidder’s proposal. New software, or software modified to satisfy the Specification shall be considered specially designed for this project. GPWA reserves the right to approve the design of such software without relieving the Bidder of the responsibility to meet the functional requirements of this specification.

All software shall be capable of easy expansion to accommodate the anticipated growth of the system. The size and configuration of the system shall be specified by easily modified parameters contained in the database, not the parameters contained in individual programs. The GPA power system will expand with the addition of new generating units, substations, transmission/distribution lines and other equipment. The GWA water and wastewater systems will likewise expand with the addition of new treatment plants, water wells and pump stations. The system will grow through the addition of main memory, disk drives, peripherals, RTUs/PLCs and communication channels.

All software shall be designed with sufficient modularity to minimize the time and complexity involved in making a change to any program. The modularity should include the separation of hardware interface modules from other software modules. Logic and data shall be separated into distinct modules. Communication among programs for data or program control shall be symbolic rather than absolute so that a given program is an essentially independent unit. The system design shall minimize changes required in one program because of changes in another. The software shall be well organized in the use of memory. The modularity shall optimize the use of main memory and utilize the protect features of the main and disk memory.
The software shall be completely maintainable by GPWA personnel, using the software facilities provided by the proposed system. No Bidder support shall be necessary to modify logic or data within the parameters defined for the ultimate system sizing or the maximum capabilities of the proposed software system.

All software contracted under this specification must be installed, operating and completely documented in final form, including all standard software changes and field changes initiated by the Bidder and their suppliers, prior to acceptance of the system by GPWA.

4.17.2 Programming languages and API (Application Program Interface)

The system shall support a full program development environment. Tools provided shall include a version control tool, a C compiler, or a C++ compiler and a symbolic debugger. At a minimum, a programming toolkit shall be provided with compilers, linkers, API, SQL (Structured Query Language), Java, HTML (Hyper Text Markup Language) and XML (Extensible Markup Language) support.

The following features, at a minimum, shall be included in the API provided:

a) Access to the database, including all point values, description parameters.
   b) The ability to generate alarms and events.
   c) The ability to schedule programs.
   d) The ability to send and receive messages between programs.
   e) The ability to perform calculations.

The system software shall be easily field-upgradeable, requiring little or no support from the software supplier. New versions of software shall be well documented and indicate which system files have been changed since the last software release.

4.17.3 Real-Time Database

The real-time database shall form the core of the SCADA functions. It shall be structured for optimal performance of RTU polling and operations. The following defines the features required of the real-time database.

A proprietary real-time database is acceptable for performance reasons provided that an initiative and user-friendly tool is available for creating and maintaining the database. The real-time database shall also be accessible using SQL calls as well as ODBC interface to transfer data in and out of the database tables.

The system shall utilize a data replication service to transfer data between the hot and standby systems, and between the primary system and the “off-site” backup.

The frequency of the data replication shall be configurable and utilize Snapshot Updates, Exception Updates, Transfer Queue Updates, and Function Updates. A database management tool shall provide graphical user interface and forms based facilities for creation and maintenance of all database information within the system.
4.17.4 Historical Database

The historical database engine used as part of the Historian function shall be a popular and commercially available Relational Data Base Management system (RDBMS). All software licenses including replication and backup functionality for the proposed RDBMS shall be supplied.

Bidder shall provide RDBMS options to be selected by GPWA such as Oracle and MS SQL Server. GPWA will select an option after review of the proposed configuration and hardware.

4.18 GPA Advanced Application Requirements

4.18.1 Automatic Generation Control

The AGC program shall regulate the power output of generators in response to changes in system frequency, real-time system load, or the relation of these to each other, in order to maintain the scheduled system frequency, scheduled load profile and/or the established net interchange with other Companies within predetermined limits.

It is the CONTRACTOR’s responsibility to research and study GPA’s existing AGC program to retain the same control and operation functionality, and to provide complete integration with GPA’s existing AGC field equipment including controllers and communication devices. Contractor will be responsible for required additional signal and control points, field equipment, and third-party services.

GPA currently has seven generators with existing AGC controls equipment installed. Cabras 1&2 and TEMES CT & generators have Metso AGC controllers working in conjunction with GE MKV turbine controllers. Cabras 3&4 and MEC 8&9 generators have the AGC control functions built into their unit governor/DCS.

4.18.1.1 General Characteristics

The AGC program shall execute every 2 seconds, and shall compute and process an area control error (ACE). System ACE shall be calculated per the NERC standard.

\[
ACE = (NIA - NIS) - (10 \times B \times (FA - FS) - IME)
\]

Where;

NIA = Net Interchange Total Actual
NIS = Net Interchange Total Scheduled
B = System Bias
FA = System frequency Actual
FS = System frequency Scheduled
IME = Interchange Metering Error

Unit control logic and the allocation of control to dispatch units shall execute at a rate between 2 and 4 seconds.
The AGC ACE calculation control mode shall be selectable by the System Dispatcher via an appropriate Dispatcher display and at a minimum shall include control modes for Constant Tie-line Control and Constant Frequency Control.

### 4.18.1.2 ACE Processing

The AGC program shall determine how much, if any, control action should be executed based on the characteristics of ACE. AGC monitoring and predictive logic shall consider ACE random variations, integral of ACE, and feed-forward of known generation and interchange changes when AGC is operating permissively.

Non-linear filtering techniques, which reduce control actions are required.

The type of AGC control utilized shall be determined by comparing the ACE magnitude with certain User definable limits. For small values of ACE, AGC shall utilize command control and for intermediate values of ACE, AGC shall utilize permissive control. For large values of ACE, AGC shall utilize emergency assist action that shall bypass economic considerations and cause all regulating units operating in the On-Control mode to be moved in a direction to minimize ACE.

The AGC program shall be capable of either raise/lower pulse outputs or set-point output for control signals sent to generating unit controllers. As units are committed/decommitted for regulation or to meet native load, the system will recalculate the system bias, the system megawatts/ hertz, used for calculating ACE and for proportional generation control in the AGC system. ACE shall be recalculated following the change of state of any generation unit breaker status. Allocation of ACE shall be in priority order for normal regulation requirements. For larger ACE deviations, ACE shall be allocated among all available units to maximize the system response.

### 4.18.1.3 Unit Control Modes

At a minimum, the AGC program shall have provisions for the following classes of dispatch units:

- **a)** Not Available – The unit is out of service, and is unavailable to the Dispatcher.
- **b)** Off Line – The unit is off-line, but available for normal service if needed.
- **c)** Plant Control – The unit is on-line, but under the direct control of the plant operator due to such conditions as running heat rate tests, vibration tests of bringing the unit on-line while waiting for temperatures to stabilize.
- **d)** Off Control – The unit is on-line and being manually loaded by the plant Operator, and is being dispatched economically.
- **e)** On Control – The unit is controllable by the AGC program within the high/low regulating limit settings entered by the plant Operator.
- **f)** Fixed Load without Regulation – The unit is being controlled to a dispatcher entered base-point and moved at a dispatcher entered ramp rate.
g) Fixed Load With Regulation – The unit is being controlled to a dispatcher entered base-point and moved at a dispatcher entered ramp rate, and participates in power system regulation based on its regulating participation factor.

h) Automatic Non-Regulating – The unit is being controlled to follow the load based on the unit’s economic base-point and economic participation factor calculated by the EDC. The unit does not participate in normal regulation, but does respond to excessive ACE conditions.

i) Automatic – The unit is under full control of AGC to follow the load based on the unit’s economic base-point and economic participation factor, and participates in regulation based on its regulating participation factor.

In particular, unit control modes that enhance operations in an ISO ancillary services environment are desirable.

The Plant Operator has the ability to place units on and off AGC control. The Plant Operator entering AGC control status shall be telemetered to the system. It shall not be possible for the System Dispatcher to place a unit in the On-Control mode unless the Plant Operator places the unit on AGC control. When the Plant Operator takes a unit off of AGC control, the system shall automatically set the control mode to Off-Control. When a unit’s breaker is open, the unit control mode shall be automatically set to Off-Line and the megawatt output shall be set to zero. When the breaker of the unit in the Off-Line control mode closed, the unit control mode shall be automatically set to Plant Control.

4.18.1.4 Unit Limits

The following unit limits shall be supported:

a) Total Capability – The total capability of the generating unit is the maximum maintainable output.

b) Regulating High Limit – This limit is the highest maintainable output with the equipment in service at the time. The Plant Operators will enter this limit. The AGC shall recognize this limit as an absolute high limit. In addition, the AGC program shall pulse units in the On-Control, Fixed Load with Regulation Mode and On-Control, Automatic mode into the region defined as, “Regulating High Limit minus Economic High Limit”, only when power system conditions warrant additional generation for non-economic regulating purposes.

c) Economic High Limit – The AGC shall recognize this limit as a “soft” limit, representing the upper limit of generator output during power system “normal” conditions, when economic constraints dominate the AGC control output execution. The System Dispatcher will enter this limit.

d) Economic Low Limit – The AGC shall recognize this limit as a “soft” limit, representing the lower limit of generator output during power system “normal” conditions when economic constraints dominate the AGC control output execution. The System Dispatcher will enter this limit.
e) Regulating Low Limit – This limit is the lowest maintainable output with the equipment in service at the time. The Plant Operators will enter this limit. The AGC shall recognize this limit as an absolute low limit. In addition, the AGC program shall pulse units in the On-Control, Fixed Load with Regulating mode and On-Control, Automatic mode into the region defined as, “Economic Low Limit minus Regulating Low Limit”, only when power system conditions warrant less generation for non-economic regulating purposes.

f) Low Capability Limit – This limit represents the minimum net generating capacity maintainable without becoming unstable and being forced to shut down.

g) Response Limit – This limit represents the maximum sustained rate-of-exchange for the unit output.

The AGC shall perform a reasonability check of items a) through f) above to ensure that the relationship of entered values to each other are the same as the order in which they are listed. If not, an alarm shall be generated and AGC control suspended for the unit until the limits are corrected.

4.18.1.5 Unit Desired Generation

The desired generation for each unit shall be computed as follows:

\[ UDG = UEDG + (UEPF \times dG) + (URPF \times ACE) \]

Where, \( UDG \) = Unit Desired Generation.

\( UEDG \) = Unit Economic Desired Generation or manually-entered base-point.

\( UEPF \) = Unit Economic Participation Factor (computed by EDC program).

\( dG \) = Change in total generation since last run to ED.

\( URPF \) = Unit Regulating Participation Factor (shall be normalized based on units in Fixed Load with Regulation and Automatic control modes).

\( ACE \) = Area Control Error.

The AGC shall model each unit’s response characteristics to anticipate unit response and feedback full effects of control outputs. The model shall result in a reduction of control action outputs to each unit, thus avoiding overshoot. In addition, it shall provide the means for determining when a unit fails to respond. The model shall permit AGC to utilize a Unit’s stored energy to move the unit faster than its rated response limit for short periods. Unit dead-bands and other logic shall be utilized to avoid output change request smaller than the control resolution of units, while ensuring control errors do not accumulate.

4.18.1.6 AGC Control Suspension

The AGC function shall provide automatic initiation of AGC control suspension for a single unit when data cannot be collected from a unit or data indicates the unit is not responding for a period of time exceeding a User adjustable time limit for the unit. The control mode of the offending unit shall be
automatically set to Off-Control and an alarm shall be generated. An AGC control trip shall require manual intervention to restore control.

The AGC function shall also provide automatic initiation of AGC Control Suspension for all units when excessive frequency deviations occur (magnitude of deviation shall be User adjustable) or when excessive ACE magnitude occurs (magnitude of deviation shall be User adjustable).

In addition, AGC Control suspension shall occur for telemetry failure of any tie-line (except in Constant Frequency control mode), or for failure of the primary frequency source. The AGC program shall use a time-out limit for these failed telemetry values before suspending. The time-out limit shall be User adjustable. Automatic tripping shall be prevented and AGC control resumed (with appropriate messages describing all events) if the telemetry becomes valid prior to time-out, the System Dispatcher enters a replacement value, or the System Dispatcher selects a redundant source for telemetry.

4.18.1.7 AGC Performance Analysis

The AGC program shall provide control performance monitoring capabilities based on the current NERC Control Performance Criteria CPS 1 and CPS 2. In addition, the AGC program shall maintain statistics for an AGC performance report that includes how long the AGC program was active and on-control during the past 24 hour period and how long it was in monitor mode, or unavailable. The AGC program shall store the performance statistics on a daily basis in the Historian database.

In addition, the AGC system shall monitor and record adherence to NERC BAL-001 and BAL-002. The time intervals and frequency triggers shall be adjustable to better fit the GPA system requirements.

4.18.1.8 Economic Dispatch

The Economic Dispatch (ED) program shall allocate total generation among available dispatchable units in such a manner as to optimize a selected system variable including but not limited to the following:

a) Penalty Factors  
b) Unit Incremental Heat Rate  
c) Production Costing  
d) Reserve Monitoring  
e) Short-Term Load Forecast

The ED program shall have the capability to optimize other parameters when expressed in economic terms such as transmission losses, environmental constraints, transmission constraints, or total fuel input.

4.18.2 Security Analysis Applications

The requirements of this Section are to include all hardware and software needed to support the requirements defined. The Security Application shall be sized to meet the requirements of Appendix A System Sizing.

The Security Applications shall provide an integrated group of functions that collectively aid the electric system dispatchers in continually assessing the general security of the electric system. These functions shall include the following:
a) Network Topology Processor  
b) State Estimator  
c) Power Flow  
d) Penalty Factor Calculation  
e) Contingency Analysis

The application shall be fully integrated from the point of view of information exchange between the functions and the User Interface.

A control capability shall be provided which coordinates the execution of the combined security assessment functions on the occurrence of specific events including:

a) Changes in network topology, e.g., the outage (either scheduled or forced) of a line or of a transformer  
b) Sudden and significant changes in the electric system load  
c) Change of transformer tap settings  
d) Reactivation of RTUs and/or communication channels  
e) Dispatcher request of security assessment functions.

The security assessment shall be executed in both real-time and study mode. Execution in real-time shall make use of real-time data to reflect current network conditions. Execution in the study mode shall be based on dispatcher defined power system states. The study mode analysis shall involve only power flow and contingency analysis.
INVITATION FOR MULTI-STEP BID

NO.: GPA-072-15

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

Volume III

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1. Cybersecurity

GPA and GWA have adopted the NIST Framework for Improving Critical Infrastructure Cybersecurity. The Bidder shall provide a description and discussion of the following relative to what the Bidder proposes to deliver:

1. Types of cyber security measures used by industry and industry’s perceptions of what cyber security measures are necessary
2. Types of physical security measures used by industry and industry’s perceptions of what physical security measures are necessary
3. Network connections normally used by domestic SCADA systems and the security protocols used between inside and outside connections
4. A gap analysis that identifies current holes in the security of SCADA systems including GPA’s proposed general framework.

CONTRACTOR will deliver a system that is cyber secure and physically secure. GPA will be acquiring services for vulnerability assessments and penetration testing. The Bidder will describe how it will work with GPA to ensure SCADA/EMS physical and cyber security.

2. Standards

The CONTRACTOR shall design communications, physical and electronic security for the SCADA/EMS based on but not limited to the following standards:

- IEEE Standards
  - 789-1988, IEEE Standard Performance Requirements for Communications and Control Cables for Application in High Voltage Environments
  - 1379-2000, IEEE Recommended Practice for Data Communications Between Remote Terminal Units and Intelligent Electronic Devices in a Substation (W/D)
  - 1615-2007, IEEE Recommended Practice for Network Communication in Electric Power Substations
  - 1686-2013, IEEE Standard for Intelligent Electronic Devices Cyber Security Capabilities
  - 1062-1998 (R2002), IEEE Recommended Practice for Software Acquisition
The CONTRACTOR shall design communications, physical and electronic security for the SCADA/EMS based on but not limited to the following guides:

- National Renewable Energy Laboratory (NREL)
  - INEEL/EXT-04-01517
- Roadmap to Achieve Energy Delivery Systems Cybersecurity, DOE (2011)
- The CERT® Resilience Management Model (CERT®-RMM), Software Engineering Institute
4. **Minimum Hardware/Software Requirements For Secure Network Services**

An allowance for 100% future growth of doubling of the initial capacities. Bidder must provide its analysis with the Technical Proposal. Minimum Hardware/Software requirements for securing SCADA/EMS network services include:

- **Server and Storage system** – the SCADA system will require a new Server and Storage system to host the services and applications.
- **Separate authentication service** – the authentication service for the SCADA network must be distinct from that of the enterprise network. Active Directory and Network Policy Services would be a good choice for device authentication.
- **Log Event Manager (LEM)** – we must be able to collect events and status for the entire SCADA network and be able to use the collected data for analysis whenever required. Data collected by the LEM can be used for forensics and post-analysis from any cyber-related incident.
- **Network Management System (NMS)** – provides status on device health, network performance, link status, server health, and a multitude of other data that will be useful in monitoring the overall status of the network.
- **Firewall Pair** – a firewall pair (for High-availability) must stand in between the Enterprise network and the SCADA network to create a separation between the security zones.
- **Intrusion Prevention/Detection System (IPS/IDS) pair** – an IDS/IPS system should be used to monitor and detect threats and anomalies moving in and out of the security zones.
- **Backup/Archiving Hardware and Software** – this will serve as a contingency plan in the event of system or device failures.
- **Perimeter Anti-virus appliance/solution** – primary defense against malicious code (Malware) which usually serves as a precursor for a cyber-attack.
4.1. High-Level Minimum Requirements for Network Security Related Hardware

The Bidder shall perform the due diligence work to ensure adequate sizing of hardware and software with an allowance for 100% future growth of doubling of the initial capacities. Bidder must provide its analysis with the Technical Proposal. High-Level minimum Hardware/Software requirements for securing SCADA/EMS network services include:

1) Server Hardware
   - Technical specifications (CPU, memory, NIC capacity, etc.) will be dependent on vendor recommendations.
   - Supports 1GbE and 10GbE interfaces.
   - Redundant “Hot-swappable” power supplies.
   - Supports Fibre Channel (FC).
   - Blade server system is preferred but not required.

2) Firewall/s (pair is required)
   - High-availability (HA) features such as clustering, active/active, and/or active/standby modes.
   - Performs stateful inspection.
   - Capable of supporting Dynamic Routing Protocols RIP, OSPF, and BGP.
   - Capable of performing route distribution.
   - Supports NetFlow, SNMPv3, and Syslog.
   - Supports VLANs.
   - Supports Remote Access VPN (SSL and IPSec) and Site-to-site VPN.
   - Maintenance contract must allow for a device replacement time frame of no later than 3 days.

3) Intrusion Prevention/Detection System (pair is required)
   - High-availability (HA) features such as clustering, active/active, and/or active/standby modes.
   - Minimum of 6 Gigabit Ethernet (RJ-45/SFP) ports or able to support 3 Gigabit inline-pairs.
   - Individual sensors for each inline-pair.
   - “Fail-open” feature
   - Supports SNMPv3 and Syslog.
   - Redundant “Hot-swappable” power supplies (preferred but not required).
   - Advanced Threat Detection and Global Correlation capabilities.
   - IPS Throughput of 500Mbps
   - Supports LDAP and RADIUS integration.
   - Maintenance contract must allow for a device replacement time frame of no later than 3 days.

4) Backup/Archiving Hardware
   - Max data throughput of >=5TB/hr.
   - Logical Capacity =>500TB / Usable Capacity of =>70TB.
   - Supports at least 4x 8GB FC.
   - Electronic Industries Alliance (EIA) rack mountable.
   - Redundant Power Supplies.
   - Supports RAID-5 and RAID-6.
   - Supports Link Aggregation Control Protocol (LACP).
5. Guidelines And Recommendations

5.1. Security Controls

5.1.1. Minimum Operational and Administrative Requirements

The Bidder shall perform the due diligence work to ensure adequate security controls. Bidder must provide its analysis with the Technical Proposal. Minimum operational and administrative requirements include:

- Environmental status monitoring must be included as part of the SCADA overall network.
- Automatic auditing of firewalls and other security devices.
- Backup and archiving of the SCADA MTU, historian, and the configuration of critical network devices should be a part of a contingency plan.
- Configuration Management policies and procedures must be included as part of the SCADA project; Configuration change processes must be documented. (refer to NIST SP 800-12 and 800-70) for guidance.
- The Log Event Manager (LEM) and Network Management System (NMS) should be able to notify administrative personnel of high risk incidents.
- IPS/IDS systems must be installed as part of the network architecture. This will help in monitoring events and logging data of traffic patterns and file accesses for future analysis.
- Anti-virus and malware protection systems must be implemented to address vulnerabilities.

5.1.2. Minimum Technical Requirements

The Bidder shall perform the due diligence work to ensure adequate security controls. Bidder must provide its analysis with the Technical Proposal. Minimum technical requirements include:

- Multi-factor authentication must be used to access the SCADA network.
- Network infrastructure related services must be separate from Enterprise network.
- Logically separate network traffic through the use of VLANs.
- Introduce Role-based access control (RBAC) to accurately define access and authorization controls.
- Use VPNs (IPsec/SSL/SSH) between endpoints within the SCADA network.
- ACL configurations should begin with a “deny all” then permit ACLs be configured above it explicitly. Certain traffic may also have to be denied explicitly.

5.2. Network Architecture

5.2.1. Firewalls

The Bidder shall perform the due diligence work to ensure adequate security network architecture. Bidder must provide its analysis with the Technical Proposal. Minimum requirements include:
• State-full inspections should be the minimum required feature.
• Packet Filtering
• Stateful Inspection, Deep Packet Inspection, Stateful Protocol Analysis
• High-availability (HA) firewalls, which allow one firewall to take over for another if the first
  firewall fails or is taken offline for maintenance is a mandatory requirement

### 5.2.2. Logical Separation of Network (Network Segregation)

The Bidder must provide a discussion on network segregation. GPWA’s minimum requirements include:

• Firewalls must be used to separate control networks and to define security zones.
• SCADA network and Enterprise network MUST be in distinct security zones and separated
  through the use of firewalls.
• Networks belonging to the same security zone may be separated through the use VLANs.
• Dual-homed workstations and/or servers (Dual Network Interface Cards) is not acceptable in a
  SCADA network. Workstations requiring internet access must belong to a security zone other
  than the SCADA security zone (e.g Enterprise network).

### 5.2.3. Firewall Policies

The Bidder must provide a discussion on firewall policies. GPWA’s minimum requirements include:

• Enterprise to SCADA network access must be very limited and access to field devices from
  Enterprise network workstations should be prohibited.
• A SCADA DMZ network will be introduced into the overall network architecture. The objective
  is to limit access to the SCADA production network. SCADA services and data to be accessed
  will be accessible on the SCADA DMZ network.
• All untrusted (Outside network) traffic will be blocked from entering the SCADA network.
• ACLs in the Firewalls must be granularly designed by allowing specific port types (TCP/UDP)
  and port numbers.
• Unused or unneeded ports and services will be explicitly “denied” and will be defined in the
  design of the Firewall ACLs.
• All inbound traffic to SCADA network must be “denied” and authorized traffic should be
  explicitly configured to be permitted.

### 5.2.4. Device Configurations (guided by defense-in-depth methodologies)

The Bidder must provide a discussion on device configurations. GPWA’s minimum requirements include:

• All unused ports (routers and switches) must be administratively disabled.
• MAC address locking will be implemented to secure endpoint devices/hosts and in order to avoid
  “man-in-the-middle” attacks.
• All default passwords on devices must be changed with complex ones.
• AAA authentication will implemented on all network devices.
• LDAP (Active Directory) and RADIUS will be the infrastructure service for authentication and
  authorization.
• Telnet, HTTP, and other forms of unsecure, “clear-text” access will explicitly disabled.
6. Proposed SCADA/EMS Network Architecture (Logical)

The Bidder must provide a discussion on SCADA/EMS network architecture both internal to the SCADA/EMS network and relationships with the external SCADA DMZ Network, GPWA Enterprise Network, GPWA DMZ Network, and the Public Internet. Figure 1 illustrates GPWA’s proposed network architecture.

Figure 1: Proposed GPWA Network Infrastructure
Figure 2: Proposed GPWA SCADA Network Zones
INVITATION FOR MULTI-STEP BID

NO.: GPA-072-15

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

PHASE I

Volume IV

Appendices
APPENDIX A

Bid Checklists
### DOCUMENT RECEIPT CHECKLIST

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Proponent Initial</th>
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<tbody>
<tr>
<td>Volume I: Commercial Terms and Conditions</td>
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<tr>
<td>Volume II: Technical Qualification Requirements</td>
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<td>Volume III: Energy Storage Contract (Draft)</td>
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<td>Volume IV: Appendices</td>
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<td>APPENDIX A – Bid Checklists</td>
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<td>APPENDIX B – Bid Bond Form and Instructions</td>
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<td>APPENDIX C – Major Shareholders Disclosure Affidavit</td>
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<td>APPENDIX D – Non-Collusion Affidavit</td>
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<td>APPENDIX F – Performance Bond</td>
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<td>APPENDIX G – Bid Compliance Worksheets</td>
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<td>APPENDIX H – GWA SCADA Master Plan</td>
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<td>APPENDIX I – GPA RTU Configuration Database</td>
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<td>APPENDIX J – No Gratuities or Kickbacks Affidavit</td>
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<td>APPENDIX K – Ethical Standards Affidavit</td>
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<td>APPENDIX L – Declaration Re Compliance with U.S. DOL Wage Determination</td>
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<td>APPENDIX M – Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property</td>
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<td>APPENDIX N – Deferred Payment Agreement (Sample)</td>
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<td>APPENDIX O – Qualitative Proposal Scoring Worksheet</td>
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<td>APPENDIX P – SCADA/EMS System Sizing</td>
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<td>APPENDIX Q – Performance Response Requirements</td>
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<td>APPENDIX R – Fuel Switching Application Specifications (Additive Bid)</td>
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<td>APPENDIX S – Computer Hardware Specifications (Notional)</td>
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<td>APPENDIX T – Factory Acceptance Test Attendees</td>
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Contiguous Amendment Notifications From Amendment No. 1 through

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<td>Audited Financial Information on Bidder and Sub-Contractors</td>
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1 Quantities supplied for each item must comply with minimums established in Volume I of the Invitation for Bid documents.

2 Proposal is subject to automatic disqualification if this article is not provided.
APPENDIX B

Bid Bond Form and Instructions
BID BOND

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 $_____________, 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 ___________________ 2015.

(PRINCIPAL) (SEAL)

(WITNESS)

(TITLE)

(MAJOR OFFICER OF SURETY)

(TITLE) (TITLE)

(RESIDENT GENERAL AGENT)
SEE INSTRUCTIONS 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.
APPENDIXC

Major Shareholders Disclosure Affidavit
SPECIAL PROVISION
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. 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:

<table>
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<tr>
<th>Name</th>
<th>Address</th>
<th>Percentage of Shares Held</th>
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   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:

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<tr>
<th>Name</th>
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<th>Amount of Commission Gratuity or other Compensation</th>
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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 __________. 
APPENDIX D

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 _____ 2015.

)Seal(

____________________
Notary Public
SPECIAL PROVISIONS

All offerors are required to submit a current affidavit; failure to do so will mean disqualification and rejection of the proposal.
APPENDIX E

Local Procurement Preference Application
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
APPENDIX F

Performance Bond
PERFORMANCE AND PAYMENT BONDS

KNOW ALL MEN BY THESE PRESENTS that ____________________________
herein after called CONTRACTOR and ____________________________
(Name of Contractor)  
(Name of Surety)
a corporation duly organized under the laws of Guam (hereafter referred to as: “Surety”) authorized to transact business in Guam as Surety, are held and firmly bound unto the Guam Power Authority, as obligee, for use and benefit of claimants as herein below defined, in the amount of ___________________Dollars ($__________) for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated ____________, 20____, entered into a Contract with the Guam Power Authority for the ____________________________ in accordance with Drawings and Specifications prepared by the Guam Power Authority, which Contract is by reference made a part hereof, and is hereafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly and faithfully perform said Contract, and shall promptly make payment to all claimants as hereinafter defined for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

A. The Surety hereby waives notice of any alteration or extension of the time made by the Guam Power Authority provided the same is within the scope of the Contract.

B. Whenever Contractor shall be and is declared to be in default under the Contract by the Guam Power Authority, and the Guam Power Authority has performed its Contract obligations, the Surety may promptly remedy the default or shall promptly:

1. Complete the Contract in accordance with its terms and conditions; or

2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the Guam Power Authority and the Surety of the lowest responsive, responsible bidder, arrange for a Contract between such bidder and the Authority, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less than balance of the Contract price, but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph shall mean the total amount payable by the Guam Power Authority to Contractor under the Contract and any amendments thereto, less the amount properly paid by the Guam Power Authority to Contractor. No right of action shall accrue on this bond to or for the use of any person or corporation other than the Guam Power Authority or successors of the Authority.

C. A claimant is defined as one having a direct contract with CONTRACTOR, or with a subcontractor of CONTRACTOR for labor, material, or both, used or reasonably required for use in the performance of the Contract labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
D. The above-named Contractor and Surety hereby jointly and severally agree with the Guam Power Authority that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) calendar days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Guam Power Authority shall not be liable for the payment of any costs or expenses of any such suit.

E. No suit or action shall be commenced hereunder by a claimant:

1. Unless claimant, other than one having a direct contract with CONTRACTOR, shall have given written notice to any two of the following:

   CONTRACTOR, the Guam Power Authority, or the Surety above named, within ninety (90) calendar days after such claimant did or performed that last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be personally served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to CONTRACTOR at any place the principal maintains an office or conducts its business.

2. After the expiration of one (1) year following the date on which the last of the labor was performed or material was supplied by the party bringing suit.

3. Other than in a court of competent jurisdiction in and for Guam.

F. The amount of the payment bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens, which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

SIGNED AND SEALED THIS _________________ day of _______________ 20__.  

IN THE PRESENCE OF: 

(Note: If the Principles are Partners, each must execute the Bond) 

(WITNESS) 

(CONTACTOR) (SEAL) 

(TITLE) 

(MAJOR OFFICER OF SURETY) 

(MAJOR OFFICER OF SURETY) 

(TITLE)
APPENDIX G

Bid Compliance Worksheets

(Refer to electronic file folder “Appendix G - Bid Compliance Worksheets”)

Bidder must completely fill in whether their bid complies with the bid section requirements in the worksheet tabs: Volume I, Volume II, Volume III, and Volume IV. Use the picklist in the light blue highlighted cells.
APPENDIX H

GWA SCADA Master Plan

(Refer to electronic file folder “Appendix H - GWA SCADA Master Plan ”)
APPENDIX I

GPA RTU Configuration Database
APPENDIX J

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

SUBSCRIBED AND SWORN to before me this _day of ____________, 2015.

__________________________
Notary Public
In and for the Territory of Guam
My Commission Expires:
APPENDIX K

Ethical Standards Affidavit
ETHICAL STANDARDS AFFIDAVIT

AFFIDAVIT
(Proposer)

TERRITORY OF GUAM )
HAGATNA, GUAM )

) SS:

, 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 __________, 2015.

______________________________
Notary Public
In and for the Territory of Guam
My Commission Expires:
APPENDIX L

Declaration Re Compliance with US 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;

(4) That I have attached the most recent wage determination applicable to Guam issued by the U.S. Department of Labor. [INSTRUCTIONS – Please attach!]
APPENDIX M

Restriction against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property
SPECIAL PROVISIONS

Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property

GCA 5 §5253(b) restricts the OFFEROR against employing convicted sex offenders from working at Government of Guam venues. It states:

(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.

________________________
Signature of Bidder Date
Proposer, if an individual;
Partner, if a partnership;
Officer, if a corporation.

SUBSCRIBED AND SWORN to before me this ___day of _____________, 20___.

Notary Public __________________________
In and for the Territory of Guam

My commission expires: _________________
APPENDIX N

Deferred Payment Agreement (Sample)
DEFERRED PAYMENT AGREEMENT

This Agreement is made and entered into on the ___ day of __________, by and between: CONTRACTOR, ____________________, and GUAM POWER AUTHORITY (hereinafter “GPA”).

RECITAL

WHEREAS, GPA and CONTRACTOR entered into a contract, ____________________________, which commenced on _______________ and completed on _______________; and

WHEREAS, GPA and CONTRACTOR agreed to perform the contract scope of work under a financing plan; and

WHEREAS, the maximum principal amount is U.S. $______________.

WHEREAS, FOR VALUE RECEIVED, the undersigned GPA (the “Borrower”) hereby acknowledges the debt owed to CONTRACTOR (the “Lender”) and promises to pay to the Lender at (Contractor’s Address) the principal amount of _______________, or otherwise adjusted by the parties, based on work performed by CONTRACTOR and invoiced to GPA and interest at the rate of _____% per annum on the unpaid balance. Payments will be made as follows:

1. GPA will pay thirty-six (36) equal monthly installments of $_______________ each. GPA’s monthly payments shall not, in any month, or cumulative, exceed the amount of actual work performed and invoiced.
2. GPA will pay the first installment on _______________.
3. Interest will accrue based on total cost of actual work performed and invoiced to GPA by CONTRACTOR, and a similar installment on the first day of each month after until the principal and interest have been paid in full.
4. Payments will be applied first on interest and then on principal.
5. GPA will pay the entire amount of the principal and interest within thirty-six (36) months ending in _______________.
6. GPA may prepay all or any part of the principal without penalty.
7. Payment on interest for GPA’s failure to make installment payments within 30 days shall be made in accordance with the provisions of the Prompt Payment Act (PPA), 5 GCA 22502-22507.

WHEREAS, CONTRACTOR agrees that the principal and interest payment shall start after upon completion and acceptance of the project.

This agreement shall be governed by, and construed and enforced in accordance with the laws of Guam.

IN WITNESS WHEREOF the parties hereto have caused this Deferred Payment Agreement to be executed on this date.

DATE: _______________

Contractor’s Authorized Representative

Guam Power Authority (GPA)
General Manager
APPENDIX O

Qualitative Proposal Scoring Worksheet
### Qualitative Proposal Scoring Worksheet

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Item Weight (A)</th>
<th>Max Raw Rating Score (B)</th>
<th>Max Weighted Score (C)</th>
<th>Score (Lowest: 0, Highest: 5) (D)</th>
<th>Weighted Score (A x D)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>Adequate overall work plan to perform, meet and achieve the objectives</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td></td>
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<tr>
<td>2</td>
<td>Adequate work plan for each bid item</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Adequate SCADA hardware specs</td>
<td>15</td>
<td>5</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ability to provide “turn-key” project</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adequate plan for training and supervision</td>
<td>3</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Experience of project team members in SCADA design</td>
<td>15</td>
<td>5</td>
<td>75</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>Experience of project team members in SCADA implementation</td>
<td>15</td>
<td>5</td>
<td>75</td>
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<tr>
<td>8</td>
<td>Experience of project team members SCADA commissioning</td>
<td>3</td>
<td>5</td>
<td>15</td>
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<td></td>
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<tr>
<td>9</td>
<td>Experience of assigned project manager</td>
<td>15</td>
<td>5</td>
<td>75</td>
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<tr>
<td>10</td>
<td>Knowledge and experience in complying with U.S. federal and local standards pertaining to the scope of work</td>
<td>3</td>
<td>5</td>
<td>15</td>
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<tr>
<td>11</td>
<td>Adequate organizational chart with respective roles</td>
<td>5</td>
<td>5</td>
<td>25</td>
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<tr>
<td>12</td>
<td>Adequate project schedule</td>
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<td>5</td>
<td>15</td>
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<tr>
<td>13</td>
<td>Ability to complete project within the specified completion time</td>
<td>2</td>
<td>5</td>
<td>10</td>
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<td></td>
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<tr>
<td>14</td>
<td>Adequate letters of reference or recommendation from previous clients of similar projects</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>Adequate insurance policy</td>
<td>2</td>
<td>5</td>
<td>10</td>
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<tr>
<td>16</td>
<td>Certificate of Good Standing to conduct business in jurisdiction of residence</td>
<td>2</td>
<td>5</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td>500</td>
<td></td>
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</tr>
</tbody>
</table>

**Final Score = (Total Weighted Score / 500) = %**

**Conditions for Proposal Disqualification:**
1. SCADA requirements specified in Volume II must be met.
2. The Local Project Manager must have a minimum of three (3) years of project management experience

Proposal Disqualified?  Yes [ ]  No [ ]
If Yes, indicate reason:
APPENDIX P

SCADA/EMS System Sizing (Notional)
<table>
<thead>
<tr>
<th>System Sizing</th>
<th>Initial Sizing</th>
<th>Ultimate Sizing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GPA</td>
<td>GWA</td>
</tr>
<tr>
<td><strong>FEP/DAC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Leased Line Comm. Channels to Master Station</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>No. of Digital Comm. Channels</td>
<td>0</td>
<td>132</td>
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<tr>
<td>No. of DNP Protocol Channels</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>No. of SCADA Protocol Channels (DNP and Modbus)</td>
<td>132</td>
<td>350</td>
</tr>
<tr>
<td>No. telenetics FlashPoll Modems (GPA provided)</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>No. of scanned RTUs</td>
<td>25</td>
<td>80</td>
</tr>
<tr>
<td>No. of scanned RTUs and PLCs</td>
<td>132</td>
<td>350</td>
</tr>
<tr>
<td>No. of IP based RTUs (if any)</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>No. of IP based RTUs and PLCs</td>
<td>132</td>
<td>350</td>
</tr>
<tr>
<td><strong>SCADA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Substations Monitored</td>
<td>32</td>
<td>80</td>
</tr>
<tr>
<td>No. of Water/Wastewater Facilities Monitored</td>
<td>132</td>
<td>350</td>
</tr>
<tr>
<td>No. of pseudo Substations</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>No. of Telemetered Analog Points</td>
<td>4,000</td>
<td>6,000</td>
</tr>
<tr>
<td>No. of Calculated Analog Points</td>
<td>15,000</td>
<td>500</td>
</tr>
<tr>
<td>No. of Telemetered Status Points</td>
<td>3,000</td>
<td>3,500</td>
</tr>
<tr>
<td>No. of Calculated Status Points</td>
<td>3,000</td>
<td>500</td>
</tr>
<tr>
<td>No. of Control Points</td>
<td>750</td>
<td>700</td>
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<tr>
<td>No. of Accumulator Points</td>
<td>500</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>MMI/Consoles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of dispatcher consoles-local 4-21” LCD</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>No. of dispatcher consoles-local 3-21” LCD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No. of dispatcher consoles-local 2*21” LCD</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No. of dispatcher consoles-local 1-21” LCD</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of Remote PC Consoles (Software only)</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>No. of Maintenance Consoles 2-21” LCD</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>No. of Engineering Consoles 2-21” LCD</td>
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<td></td>
</tr>
<tr>
<td>No. Projection Mapboard Drivers (Single screen)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>No. of Map-board Status Points</td>
<td>600</td>
<td>To be determined</td>
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<tr>
<td>No. of Digital Display (i.e. Time, Frequency, Voltage, Windspeed)</td>
<td>6</td>
<td>1</td>
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<tr>
<td><strong>Historical Archival</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of analog points archived per hour</td>
<td>2,000</td>
<td>6,500</td>
</tr>
<tr>
<td>No. of status point archived per hour</td>
<td>500</td>
<td>4,000</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Retention period of hourly data (months)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. of analog points archived per ½ hour</td>
<td>1,000</td>
<td>2,000</td>
</tr>
<tr>
<td>No. of status point archived per ½ hour</td>
<td>250</td>
<td>250</td>
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<td>Retention period of ½ hour data (months)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. of analog points archived per ¼ hour</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>No. of status point archived per ¼ hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retention period of ¼ hour data (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of analog points archived per 5 min</td>
<td>50</td>
<td>4,000</td>
</tr>
<tr>
<td>No. of status point archived per 5 min</td>
<td>50</td>
<td>2,500</td>
</tr>
<tr>
<td>Retention period of 5 min data (months)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. of analog points archived per 1 min</td>
<td>100</td>
<td>2,500</td>
</tr>
<tr>
<td>No. of status point archived per 1 min</td>
<td>10</td>
<td>1,500</td>
</tr>
<tr>
<td>Retention period of 1 min data (months)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. of analog points archived per 4 sec</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>No. of status point archived per 4 sec</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Retention period of 4 sec data (months)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. of Disturbance Data Collection Sets</td>
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<td></td>
</tr>
<tr>
<td>Alarm Retention (months)</td>
<td>24</td>
<td>24</td>
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<tr>
<td>SOE Retention (months)</td>
<td>24</td>
<td>24</td>
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</table>

**Generation Scheduling and Dispatch**

| No. of Units | 32 | 40 |
| No. of Units on AGC Control | 32 | 40 |
| No. of Combined Cycle Units | 0  | 10 |
| No. of Peaking Units | 20 | 30 |
| No. of Jointly Owned Units | 0  | 2  |
| No. of IHR Curves per Units | 1  | 4  |
| No. of Total IHR Curves | 100 | 100 |
| No. of Fuel Types per Unit | 3  | 4  |
| No. of Dynamic Schedules | 0  | 0  |
| No. of Tie Lines | 0  | 0  |
| No. of Frequency Sources | 1  | 3  |

**GPA Network Analysis (Internal Model)**

<p>| No. of Buses | 500 | 500 |
| No. of Lines | 200 | 200 |
| No. of Transformers | 150 | 150 |
| No. of Loads | 100 | 100 |
| No. of Switches | 750 | 750 |
| No. of Generators | 50  | 50  |</p>
<table>
<thead>
<tr>
<th></th>
<th>50</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Areas/Zones</td>
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<td>1</td>
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**GWA Network Model**

**Water System:**

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<tr>
<th></th>
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<tbody>
<tr>
<td>No. of Deep Wells</td>
<td>42</td>
<td>124</td>
</tr>
<tr>
<td>No. of Water Treatment Plants</td>
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<td>6</td>
</tr>
<tr>
<td>No. of Springs</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>No. of Water Booster Pump Stations</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>No. of Reservoirs</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>No. of System Meters</td>
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<td>65</td>
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<tr>
<td>No. of Pressure Regulating Valves</td>
<td>1</td>
<td>73</td>
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<tr>
<td>No. of Water Lines</td>
<td></td>
<td></td>
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<tr>
<td>No. of Areas/Zones</td>
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**Wastewater System:**

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</thead>
<tbody>
<tr>
<td>No. of Wastewater Treatment Plants</td>
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<td>2</td>
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<tr>
<td>No. of Wastewater Sewer Pump Stations</td>
<td>77</td>
<td>78</td>
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<tr>
<td>No. of Manholes</td>
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<td></td>
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<td>No. of Wastewater Lines</td>
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<td></td>
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<tr>
<td>No. of Areas/Zones</td>
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**Save Cases**

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<tbody>
<tr>
<td>Network Analysis Application (LF, SE, CA)</td>
<td>Bidder shall propose applications available for GWA</td>
<td>Bidder shall propose applications available for GWA</td>
</tr>
<tr>
<td>SCADA Snapshots</td>
<td>500</td>
<td>500</td>
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**Hardware**

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<th></th>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>SCADA Servers (redundant)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>FEP/DAC (redundant)</td>
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<td>2</td>
<td>2</td>
<td>2</td>
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<td>APPS Server (redundant)</td>
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<td>Historian Servers (redundant)</td>
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<td>Program Development System (PDS) Servers</td>
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<td>1</td>
</tr>
<tr>
<td>GPA time &amp; Frequency Unit</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GWA Time Unit</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firewalls (redundant)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
APPENDIX Q

Performance Response Requirements
### Performance Test Scenarios

<table>
<thead>
<tr>
<th>Test Period</th>
<th>Steady State</th>
<th>High Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 Analog points changing every 2-second scan</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2000 Status points changing every 2-second scan</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>No. of Analog imports from a file per 10 sec.</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>No. of Status imports from a file per 10 sec.</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>No. of Analog exports to a file per 10 sec.</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>No. of Status exports to a file per 10 sec.</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>No. of alarms generated per second</td>
<td>50</td>
<td>1000</td>
</tr>
<tr>
<td>Periodicity of display requests from all consoles</td>
<td>15 seconds</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Control Request from a least 3 consoles</td>
<td>2 per minute</td>
<td>10 per minute</td>
</tr>
<tr>
<td>AGC Controls issued to Units</td>
<td>50% of all units</td>
<td>100% of all units</td>
</tr>
<tr>
<td>UC/TE Study request</td>
<td>1 per 5 minutes</td>
<td>2 per 5 minutes</td>
</tr>
<tr>
<td>Historical Archival of Analogs</td>
<td>5,000 points per 1 minute</td>
<td>10,000 points per 1 minute</td>
</tr>
</tbody>
</table>

### Response Requirements

<table>
<thead>
<tr>
<th>Response Requirements</th>
<th>Steady State</th>
<th>High Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Call-up time ---------One-line and any graphical displays</td>
<td>1 sec.</td>
<td>1.5 sec.</td>
</tr>
<tr>
<td>Display Call-up time ------SCADA Tabulars</td>
<td>1 sec.</td>
<td>1.5 sec.</td>
</tr>
<tr>
<td>Display Call-up time ------Alarming Tabulars</td>
<td>2 sec.</td>
<td>2.5 sec.</td>
</tr>
<tr>
<td>Historical Reports</td>
<td>5 sec.</td>
<td>5 sec.</td>
</tr>
<tr>
<td>Control Completion time (local RTU/PLC)</td>
<td>1 sec.</td>
<td>1.5 sec.</td>
</tr>
<tr>
<td>Alarm Acknowledgement time</td>
<td>1 sec.</td>
<td>1.5 sec.</td>
</tr>
<tr>
<td>Alarm Delete time</td>
<td>1 sec.</td>
<td>1.5 sec.</td>
</tr>
<tr>
<td>Applications------UC-168 hour study</td>
<td>60 sec.</td>
<td>120 sec.</td>
</tr>
<tr>
<td>Applications------Load Flow</td>
<td>4 sec.</td>
<td>8 sec.</td>
</tr>
<tr>
<td>Applications------State Estimator</td>
<td>10 sec.</td>
<td>15 sec.</td>
</tr>
<tr>
<td>Applications------CA-25 Full contingencies</td>
<td>60 sec.</td>
<td>90 sec.</td>
</tr>
<tr>
<td>Applications------STLF-24 hour forecast</td>
<td>10 sec.</td>
<td>15 sec.</td>
</tr>
<tr>
<td>Applications------options available for GWA</td>
<td>As recommended</td>
<td>As recommended</td>
</tr>
<tr>
<td>Loading Requirements</td>
<td>Steady State</td>
<td>High Activity</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>FEP/DAC Servers</td>
<td>&lt;40%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>SCADA Servers</td>
<td>&lt;40%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>APPS Servers</td>
<td>&lt;40%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>Historian Servers</td>
<td>&lt;40%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>Dispatcher Consoles</td>
<td>&lt;40%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>Local Area Networks</td>
<td>&lt;5%</td>
<td>&lt;10%</td>
</tr>
</tbody>
</table>
APPENDIX R

Fuel Switching Application Specifications (Additive Bid)
Fuel Switching Application

The Fuel Switching Application shall collect and process meteorological information for three purposes: compliance with the Cabras-Piti Area, Intermittent Control strategy (CPAICS), daily load forecasting and support of future environmental studies.

Cabras-Piti Area, Intermittent Control Strategy (CPAICS)

The operating permit for the Cabras-Piti Complex Power Plants requires Guam Power Authority (GPA) to operate a meteorological monitoring station (MET Tower) at the power plant site to determine when fuel switching procedures at the plant are to be initiated. When on-shore winds persist for at least 15 minutes, the power plants are required to switch to a low-sulfur fuel for generating electrical power. Under off-shore wind conditions, the power plants are allowed to burn a more economical fuel containing higher amounts of sulfur. The Cabras-Piti Complex meteorological monitor station consists of a 60-meter tower that is instrumented with wind speed and wind direction sensors at the 60 and 10-meter levels. The 10-meter level also has a vertical wind speed sensor. Ambient air temperature is measured at the 2-meter level. Solar radiation and precipitation are measured by sensors mounted approximately 1 meter above ground level. Only the wind speed and wind direction sensors are used for fuel switching requirements.

This fuel switching strategy or protocol is called the Cabras-Piti Area, Intermittent Control strategy (CPAICS). It is an agreement between the United States Environmental Protection Agency (USEPA) and the Guam Power Authority on fuel-use operations at the Cabras-Piti Generation Complex.

This fuel switching protocol describes rules and procedures governing the regulation of fuel switching at all RFO-fired generation plants within the Cabras-Piti Complex. The USEPA first issued this protocol in July 1993 as an adjunct to a waiver of certain Clean Air Act requirements pursuant to section 325 of the Clean Air Act (40 CFR S 69.11).

The USEPA and GPA modified this fuel switching twice. Modifications effective on August 15, 1997 reflect changes in the ownership and operations of the Piti Power Plant. On September 9, 1996, the United States Navy (USN PWC) transferred the Piti Power Plant to GPA by lease. Modifications effective September 18, 2000 reflect changes in the procedures due to the automation of the Cabras Power Plants.
Two slow-speed diesel powered electric generators (No. 8&9) are operated by an independent power producer (IPP) at the MEC (Marianas Energy Corporation) Power Plant. These two IPP units are referred to as the “IPP portion of the Piti Power Plant” within this Cabras-Piti area Intermittent Control Strategy (CPAICS). The Cabras and Piti power plants are located on adjacent properties.

If GPA does not comply with the CPAICS, the USEPA may elect to levy fines against GPA or revoke GPA’s clean air act waivers. Loss of this waiver would increase GPA’s fuel costs by about $3,832,500 annually. Fines levied generally are $5,000 per incident of non-compliance.

1.1 Definitions

The CPAICS predicates fuel use constraints based upon the determination of adverse and nominal wind conditions. GPA internal policy also includes the provision for erratic wind conditions.

1.1.1 Adverse Wind Condition

For the purpose of compliance with the Cabras-Piti Area, Intermittent Control Strategy (CPAICS), the following shall constitute an adverse wind condition:

Whenever, on a single fifteen-minute average, the wind speed is less than 1.0 meters per second or the wind is from a direction outside an arc between 240 degrees from true north and 20 degrees from true north in a counterclockwise direction, using GPA’s Cabras-Piti meteorological monitoring station as the apex of the arc. Adverse wind conditions shall include all single fifteen minute wind direction averages equal to 20 degrees or 240 degrees. Adverse wind conditions shall also include all single fifteen-minute wind speed averages equal to 1.0 meters per second.

On the determination of an adverse wind condition, all RFO-fired generation units within the Cabras-Piti Complex must switch to Low Sulfur Fuel within five minutes.

1.1.2 Nominal Wind Condition

For the purpose of compliance with the Cabras-Piti Area, Intermittent Control Strategy (CPAICS), the following shall constitute a nominal wind condition:

Whenever, on a single fifteen minute average, the wind speed is greater than or equal to 1.0 meters per second or the wind is from a direction inside an arc between 20 degrees from true north and 240 degrees from true north in a clockwise direction, using GPA’s Cabras-Piti meteorological monitoring station as the apex of the arc.
On the determination of a nominal wind condition, all RFO-fired generation units within the Cabras-Piti Complex may use High Sulfur Fuel.

1.1.3 Erratic Wind Condition

Wind conditions at the Cabras-Piti Complex may result in long stretches of continuous alternating fifteen-minute intervals of adverse and nominal wind conditions. Prolonged frequent switching of fuel types may lead to increased valve and valve-control equipment wear. For the purpose of preventing unnecessary wear on these components, the Dispatcher may declare the existence of erratic wind conditions and maintain the use of Low Sulfur Fuel at all plants until such a time that the dispatcher believes that his condition has ended.

Since declaration of erratic wind conditions can be a subjective process, GPA chooses to automate the process and make it a requirement for the Fuel Switching Application function.

The following scenarios shall constitute an erratic wind condition:

Scenario 1

Plants are already constrained to using low sulfur fuel by a previous determination of adverse conditions

The next determination of wind condition is nominal

This determination of wind condition is within five degrees from an adverse wind condition boundary

Scenario 2

Plants are already constrained to using low sulfur fuel by a previous determination of adverse condition

The next determination of wind condition is nominal

A second determination of adverse wind condition occurs within three fifteen minute intervals from the original adverse wind condition.

On the determination of an erratic wind condition, all RFO-fired generation units within the Cabras-Piti Complex shall remain on Low Sulfur Fuel. The Fuel Switching Application will take the appropriate control actions to initiate a switch to low sulfur fuel.

The return to high sulfur fuel use after an erratic wind condition is determined by the occurrence of any of the following scenarios:
Scenario 1

After a determination of erratic wind conditions there are four consecutive fifteen-minute intervals of nominal wind conditions.

Scenario 2

There are three consecutive determinations of nominal wind conditions after a determination of the original adverse wind condition.

At least two of these determinations of nominal wind conditions must be more than five degrees away from an adverse wind condition boundary.

The Fuel Switching Application will take the appropriate control actions to initiate a switch to high sulfur fuel.

1.1.4 Adverse Condition

An adverse condition is any condition requiring RFO-fired Cabras-Piti Complex generation plants to immediately switch to low sulfur fuel. These events include the following:

Adverse Wind Conditions:

Loss of communications between the SCADA/EMS and the Cabras-Piti Complex Meteorological Monitoring Station;

Loss of communications between the SCADA/EMS and the Fuel Switching Application;

Loss of communication between the Cabras-Piti Complex RFO-fired generation plant RTUs and the Fuel Switching Application

Whenever the number of good one-second data samples used to compute a fifteen-minute wind speed or wind direction average is less than 600 data samples;

Whenever the wind speed does not vary by more than 0.1 meters per second for three consecutive hours;

Whenever the wind speed does not vary by more than 0.5 meters per second for twelve consecutive hours;

Whenever the wind direction does not vary by more than one degree for three consecutive hours;
Whenever the wind direction does not vary by more than ten degrees for eighteen consecutive hours.

1.1.5 **Adverse Condition Recording**

The Fuel Switching Application shall record the following codes as part of wind speed and direction whenever an adverse condition occurs:

- **Adverse Wind Conditions:** record actual wind speed and direction and issue appropriate alarms

- **Loss of communication between the SCADA/EMS and the Cabras-Piti Complex meteorological monitoring station:** record -777.0 for wind speed and wind direction averages and issue appropriate alarms

- **Loss of communications between the MET RTU and the Fuel Switching Application:** record -888.0 for wind speed and wind direction averages and issue appropriate alarms

- **Loss of communication between the Cabras-Piti Complex RFO-fired generation plant RTUs and the Fuel Switching Application:** record actual wind speed and direction and issue appropriate alarms

- **Whenever the number of good one-second data samples used to compute a fifteen minute wind speed or wind direction average is less than 600:** record -999.0 for wind speed and wind direction averages and issue appropriate alarms

- **Whenever the wind speed does not vary by more than 0.1 meter per second for three consecutive hours:** record actual wind speed and direction and issue appropriate alarms

- **Whenever the wind speed does not vary by more than 0.5 meter per second for twelve consecutive hours:** record actual wind speed and direction and issue appropriate alarms

- **Whenever the wind direction does not vary by more than one degree for three consecutive hours:** record actual wind speed and direction and issue appropriate alarms

- **Whenever the wind direction does not vary by more than ten degrees for eighteen consecutive hours:** record actual wind speed and direction and issue appropriate alarms.
1.1.6 **Reportable Event**

A reportable event occurs when the following conditions apply:

- An adverse condition exists and;
- Any plant has not switched to low sulfur fuel within five minutes of the onset of the adverse condition.

1.2 **Allowable Limits**

Valid wind speed readings are between zero and twenty-five meters per second, inclusive. Valid wind direction readings are between zero and 360 degrees, inclusive. If any of these limits are out of range, the sample reading is considered invalid and not counted towards the fifteen minute averages.

1.3 **Fuel Switching System Functional Requirements**

In compliance with the CPAICS, the Fuel Switching Application must perform the following functions:

- Display and monitor wind speed and direction from GPA’s meteorological monitoring station at both the ten and sixty meter levels
- Process wind speed and direction information and compare them to preset discriminants for adverse wind conditions
- Determine the availability of data from the ten and sixty meter levels
- Valid data from instrumentation at the sixty meter level is the preferred source of data to base fuel switching decisions upon
- The fuel Switching Application shall use instrumentation readings from the ten meter data sensors if the preferred sixty meter level source is not available.
- Determine and initiate the appropriate control actions at the Cabras Steam Plants, Cabras Slow-Speed Diesel Plant and MEC Slow-Speed Diesel Plant
- Determine and initiate appropriate alarms
- Display and record current fuel use conditions at the plant
- Display and record required fuel use
- Display and record fuel consumption by type
Display and record on-duty Dispatchers and Plant Shift Supervisors’ names, titles and on-duty times

Display and record total duration, fuel consumption and fuel type for each continuous fifteen minute interval burning one type of fuel
Determine via heart beat signals whether or not the communications between the following are available:

SCADA/EMS and the Fuel Switching Application

SCADA/EMS and Meteorological Monitoring Station

Plant RTUs and the Fuel Switching Application

Based upon the condition of the heart beat signals take appropriate control actions and issue appropriate alarms

Provide sequence of event information for every control action taken and every change of state related to the Fuel Switching System

Determine whether a violation of the CPAICS has occurred

If a violation has occurred, immediately notify via text message and e-mail individuals and agencies on a call-list and print a form to be filled out and signed by each dispatcher on duty at the time of the violation

Record wind speed and direction information, fuel switching alarms, fuel use conditions and required fuel use

Display and record all fuel switching control actions

Time synchronize all data-loggers, computers and remote terminal units (RTUs) used by the Fuel Switching System

Generate timely and accurate reports for use by USEPA

Create Audit trails for the process

The Fuel Switching Application shall continuously monitor and record wind speed and direction from GPA’s Cabras-Piti meteorological monitoring station. The Fuel Switching Application shall use this MET data to calculate wind speed and direction at intervals of 15-minute averages, with hourly cycle of averages beginning on the hour.

The Fuel Switching Application shall calculate 15-minute averages of wind speed and direction according to the procedures set forth in US EPA’s “Meteorological Monitoring
Guidance for Regulatory Modeling Applications (EPA-454/R-99-005).” GPA’s Cabras-Piti meteorological monitoring station has a set of wind speed and direction sensors each at the 10-meter and 60-meter tower levels. The Fuel Switching Application shall compute a set of these fifteen minute averages for information measured by each of these wind speed and direction sensors.

1.4 Alarms

The Fuel Switching Application shall provide an appropriate alarm for each of the following conditions:

On each occurrence of loss and re-establishment of communications between the following:

SCADA/EMS and the Fuel Switching Application
SCADA/EMS and Meteorological Monitoring Station
Plant RTUs and the Fuel Switching Application

For each fifteen minute interval, the Fuel Switching Application shall provide an alarm with the following information:

Wind speed and wind direction used to determine appropriate fuel use
Sensor level of the wind information used to determine appropriate fuel use
The type of condition: adverse condition or nominal condition
Controls initiated (Switch to High Sulfur Fuel/Switch to Low Sulfur Fuel)
When control signal is received by the RTUs
When the plants switch fuel
Whether or not the fuel switch is made within five minutes from the time the Fuel Switching Application determines which fuel to use
Whenever there is a violation of the CPAICS
Dispatcher alarm
E-Mail and page notification alarm
Printed form Alarm
The Fuel Switching Application shall follow GPA’s current convention of reporting all 15 minute readings of wind speed and direction 20 seconds into the minute. (i.e., 0:00:20, 1:15:20)

1.5 Data Archiving

For every fifteen minute intervals, with hourly cycles of intervals beginning on the hour, the Fuel Switching Application shall archive the following meteorological information and status information:

- Fifteen minute wind speed average
- Fifteen minute wind direction average
- Wind condition based on the above fifteen minute averages
- Sensor Level (10 meter or 60 meter level)
- Current instantaneous wind speed
- Current instantaneous wind direction
- Data Quality Code
- Which sensor was issued to compute the fifteen minute averages used by the Fuel Switching Application to determine the fuel switching requirement
- Communications status between the following:
  - SCADA/EMS and the Fuel Switching Application
  - SCADA/EMS and Meteorological Monitoring Station
  - Plant RTUs and the Fuel Switching Application
  - Fuel Switching Control
  - Fuel Use Status at each plant covered by the CPAICS
- The names, titles and on-duty times of all Dispatchers and Plant Shift Supervisors on duty.
The EMS shall make this information available on an ODBC (Open Database Connectivity) compliant database for the period of three years before it is archived to permanent backup storage. GPA must retain all records for ten years.

The Fuel Switching Application shall follow GPA’s current convention of reporting all 15 minute readings of wind speed and direction 20 seconds into the minute. (i.e., 0:00:20, 1:15:20)

1.6 Reports

The Fuel Switching Application shall generate the following reports automatically for submittal to USEPA, Guam EPA, GPA Planning & Regulatory Division and Upper Management:

- A table containing all 15-minute wind speed and direction averages used to determine appropriate fuel use within the fiscal year quarter along with the following information: parameter value, source, quality code, time tag, RTU location (MET RTU)
- A table indicating missing 15-minute wind speed and direction averages for the quarter
- A table containing the time start, time end and duration for each contiguous period of adverse and nominal conditions along with the following information: fuel type and amount burned during the period for each plant under the CPAICS
- A table indicating on-duty Dispatcher and Plant Shift Supervisors and their shift times
- A table indicating all violations of the CPAICS that details all conditions and mitigating circumstance pertinent to the violation and the names and titles of those on duty during the violation and contacted soon after.

Any other report required by USEPA, GEPA or Planning & Regulatory Division.

The Fuel Switching Application shall follow GPA’s current convention of reporting all 15 minute readings of wind speed and direction 20 seconds into the minute. (i.e., 0:00:20, 1:15:20)

1.7 Other Requirements

The Fuel Switching Application shall record and process all necessary data for load forecasting and PSD (Prevention of Significant Deterioration) permit support. The requirements for PSD permitting support are listed in GPA’s Meteorological Monitoring Quality Control and Quality Assurance Manual.

References:
SP-083 – Air Quality control contingency Plan (Piti-Cabras Complex), Issued 08/06/1993
APPENDIX S

Computer Hardware Specifications (Notional)
### Workstation Hardware Specifications

**TOTAL NUMBER OF WORKSTATIONS: 31 EACH**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Intel Core i7 Processor (Minimum)</td>
</tr>
<tr>
<td>Operating System</td>
<td>Windows 7 Professional 64-bit English (Includes Windows 8.1 Pro license)</td>
</tr>
<tr>
<td>Applications</td>
<td>Adobe Acrobat Professional (Latest edition)</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Office 2013 Professional</td>
</tr>
<tr>
<td>Graphic Card</td>
<td>2GB Memory with 4 Display Port Outputs</td>
</tr>
<tr>
<td></td>
<td>Minimum Resolution: 2560 x 1440</td>
</tr>
<tr>
<td>Chassis</td>
<td>Mid Tower Chassis</td>
</tr>
<tr>
<td>Memory</td>
<td>8GB DDR4 Memory</td>
</tr>
<tr>
<td>Hard Drive</td>
<td>One (1) 256 GB SATAIII Solid State Drive</td>
</tr>
<tr>
<td>Optical Drive</td>
<td>DVD-RW Drive</td>
</tr>
<tr>
<td>Sound</td>
<td>Integrated Audio</td>
</tr>
<tr>
<td>Speakers</td>
<td>Desktop Stereo Speakers</td>
</tr>
<tr>
<td>Network Card</td>
<td>Two 1000-BaseTx Network Interface Cards</td>
</tr>
<tr>
<td>Keyboard</td>
<td>US English (QWERTY) 114 Key, USB</td>
</tr>
<tr>
<td>Mouse</td>
<td>USB Optical Mouse</td>
</tr>
<tr>
<td>USB Extension Cables</td>
<td>Two (2) 25’ USB Extension Cables for Keyboard and Mouse</td>
</tr>
<tr>
<td>UPS</td>
<td>1500VA (Minimum) Uninterrupted Power Supply</td>
</tr>
</tbody>
</table>
Server Hardware Specifications

Vendor is required to provide/propose proven server architecture (compute and storage), hardware, and configuration (cluster, active/standby, server load-balancing (SLB), etc.) that will ensure 99.999% system availability.

Server Compute Hardware

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong></td>
<td>Two (2) Intel Xeon E5 2.2GHz 10Core (Minimum)</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows Server 2012 64-bit Edition</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td>Adobe Acrobat Professional (Latest edition)</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Office 2013 Professional</td>
</tr>
<tr>
<td><strong>Graphic Card</strong></td>
<td>(1) Integrated Video Output</td>
</tr>
<tr>
<td><strong>Chassis</strong></td>
<td>19” Rack Mountable Chassis with full mounting brackets</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>32 GB DDR4 Memory ECC expandable to 256 GB</td>
</tr>
<tr>
<td><strong>Hard Drive</strong></td>
<td>RAID 5 configuration with Solid State Drives</td>
</tr>
<tr>
<td><strong>Storage Transport</strong></td>
<td>FC, FCoE, SCSI, iSCSI; 8GB/s (Minimum)</td>
</tr>
<tr>
<td><strong>Optical Drive</strong></td>
<td>DVD-RW Drive (optional)</td>
</tr>
<tr>
<td><strong>Network Interface (IP Transport)</strong></td>
<td>Four (4) SFP/SFP+ ports for 1GB/10GB SFP/SFP+ Fiber Optic MM Modules (OR better)</td>
</tr>
<tr>
<td><strong>Other Supported Features</strong></td>
<td>NIC Teaming, Link Aggregation (1IEEE 802.3ad), KVM over IP, Stateless Computing (Minimum), Media Pass-Thru, SNMP, Syslog</td>
</tr>
</tbody>
</table>
## Server Storage Hardware (SAN)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raw Capacity</strong> (installed / MAX)</td>
<td>20TB / 100TB</td>
</tr>
<tr>
<td><strong>Storage/Disk Processor</strong></td>
<td>Intel Xeon 5600 series (minimum)</td>
</tr>
<tr>
<td><strong>Redundancy Features</strong></td>
<td>2x Storage/Disk Processor, Standby Power System</td>
</tr>
<tr>
<td><strong>Storage I/O Ports</strong></td>
<td>Four (4) Fibre Channel (FC) ports</td>
</tr>
<tr>
<td><strong>RAID Options</strong></td>
<td>0/1/10/5/6</td>
</tr>
<tr>
<td><strong>Hard Drive Options</strong></td>
<td>7.2k RPM, 10k RPM, 15k RPM, Solid-State (SSD)</td>
</tr>
<tr>
<td><strong>Storage/Disk Performance Features</strong></td>
<td>Storage-tiering, sub-LUN tiering, SSD Cache</td>
</tr>
<tr>
<td><strong>Data Protection Features</strong></td>
<td>LUN Mirroring, LUN Snapshot/Cloning</td>
</tr>
<tr>
<td><strong>Fabric/SAN Switch</strong></td>
<td>Two (2) Fabric/SAN Switches, 16 x 8Gb Fibre Channel (FC) ports (SFP+), rack-mountable (19”)</td>
</tr>
<tr>
<td><strong>Other Supported Protocols</strong></td>
<td>SNMP, LDAP, iSCSI, FC, FCoE, NTP</td>
</tr>
</tbody>
</table>
### Other Required Hardware

<table>
<thead>
<tr>
<th>Hardware Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Switches</td>
<td>Four Gigabits Managed Switches with Power over Ethernet (POE)</td>
</tr>
<tr>
<td>Patch Panels</td>
<td>Four (4) CAT6 24-Ports Patch Panels (26-22 AWG Solid Wire) with Cable Management</td>
</tr>
<tr>
<td>External Storage</td>
<td>Two (2) 2TB Network Attached Storage Drives</td>
</tr>
<tr>
<td>KVM Switches</td>
<td>Two (2) 4 Ports Rack mountable USB KVM Switches &amp; Eight (8) Desktop USB KVM</td>
</tr>
<tr>
<td>Rack Mount Monitor</td>
<td>Two 20” LCD Rack Mount Monitor with keyboard Drawer</td>
</tr>
<tr>
<td>Keyboard</td>
<td></td>
</tr>
</tbody>
</table>
GPA’s WORKSTATIONS MONITOR QUANTITY: 16 Each

<table>
<thead>
<tr>
<th>Station</th>
<th>Position</th>
<th>27” Monitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System Dispatcher</td>
<td>4</td>
</tr>
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<td>Generation Dispatcher</td>
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<tr>
<td>3</td>
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<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Auxiliary Desk (Dispatcher)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Dispatcher Training Simulator</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Chief Dispatcher</td>
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</tr>
<tr>
<td>7</td>
<td>PSCC Manager</td>
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</tr>
<tr>
<td>8</td>
<td>Computer Technician Supervisor</td>
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<tr>
<td>9</td>
<td>Communication/Electronic Supervisor</td>
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<tr>
<td>10</td>
<td>Programmer Analyst Supervisor</td>
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<td>11</td>
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<tr>
<td>12</td>
<td>Assistant General Manager, Operations</td>
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<tr>
<td>13</td>
<td>Server Room Workstation No. 1</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Server Room Work Station No. 2</td>
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<td>15</td>
<td>SCADA Hardware Lab</td>
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<tr>
<td>16</td>
<td>SCADA Communication Lab</td>
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**GWA’s WORKSTATIONS MONITOR QUANTITY: 15 Each**

<table>
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<tr>
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<td>System Dispatcher</td>
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</tr>
<tr>
<td>3</td>
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</tr>
<tr>
<td>4</td>
<td>Trouble Dispatcher</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Auxiliary Desk (Dispatcher)</td>
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</tr>
<tr>
<td>6</td>
<td>Dispatcher Training Simulator</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Systems Control Center Supervisor</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>IT Manager</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>IT Network Supervisor</td>
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<td>10</td>
<td>IT Lab</td>
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<td>11</td>
<td>Assistant General Manager, Operations, Water</td>
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<td>12</td>
<td>Wastewater Production Manager</td>
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<td>13</td>
<td>Wastewater Collection Manager</td>
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<tr>
<td>14</td>
<td>Engineering Workstation</td>
<td>3</td>
</tr>
</tbody>
</table>
Minimum Technical Requirements for Network Security Related Hardware

The Bidder shall perform the due diligence work to ensure adequate sizing of hardware and software with an allowance for 100% future growth of doubling of the initial capacities. Bidder must provide its analysis with the Technical Proposal. Minimum technical requirements for securing SCADA/EMS network services include:

1) Server Infrastructure Hardware
   - Intel Xeon E5 2.2GHz 10Core (Minimum)
   - 32GB (Minimum) DDR4 Memory ECC expandable to 256GB
   - 19” Rack-mountable with full mounting brackets.
   - Supports 1GbE and 10GbE interfaces.
   - Supports NIC Teaming.
   - Supports SNMPv3 and Syslog.
   - Supports “Hot-swappable” Hard Disk Drives.
   - Supports Link Aggregation (802.3ad).
   - Supports Fibre Channel (FC), FCoE, SCSI, iSCSI; 8GB/s.
   - Blade server system is preferred but not required.
   - Maintenance/support contract must allow for a device replacement time frame of no later than 3 days.

2) Firewall/s (pair is required)
   - High-availability (HA) features such as clustering, active/active, and/or active/standby modes.
   - 19” Rack-mountable with full mounting brackets.
   - Performs stateful inspection.
   - Capable of supporting Dynamic Routing Protocols RIP, OSPF, and BGP.
   - Capable of performing route redistribution.
   - Supports NetFlow, SNMPv3, and Syslog.
   - Supports VLANs.
   - Supports Remote Access VPN (SSL and IPsec) and Site-to-site VPN.
   - Maintenance/support contract must allow for a device replacement time frame of no later than 3 days.

3) Intrusion Prevention/Detection System (pair is required)
   - High-availability (HA) features such as clustering, active/active, and/or active/standby modes.
   - Minimum of 6 Gigabit Ethernet (RJ-45/SFP) ports or able to support 3 Gigabit inline-pairs.
   - 19” Rack-mountable with full mounting brackets.
   - Individual sensors for each inline-pair.
   - “Fail-open” feature
   - Supports SNMPv3 and Syslog.
   - Redundant “Hot-swappable” power supplies (preferred but not required).
   - Advanced Threat Detection and Global Correlation capabilities.
   - IPS Throughput of at least 500Mbps
   - Supports LDAP and RADIUS integration.
   - Maintenance/support contract must allow for a device replacement time frame of no later than 3 days.
4) Backup/Archiving Hardware
   • Max data throughput of >=2.5TB/hr.
   • Total usable capacity of >=20TB.
   • Supports Fibre Channel (FC).
   • Supports Deduplication.
   • 19” Rack-mountable with full mounting brackets.
   • Redundant Power Supplies.
   • Supports Link Aggregation Control Protocol (LACP).
   • Allows for integration with any Backup and/or Archiving software.
   • Maintenance/support contract must allow for a device replacement time frame of no later than 3 days.
APPENDIX T

Factory Acceptance Test Attendees
Most SCADA/EMS database and display building activities insofar as practical will be performed using virtual teams. The Factory Acceptance Test shall be attended and performed by the following numbers and designations of staff listed in the table below. The CONTRACTOR will be responsible for scheduling of FAT participants and for their travel expenses and per diem.

<table>
<thead>
<tr>
<th>Section</th>
<th>Dispatcher</th>
<th>SCADA Technician</th>
<th>SCADA Programmer</th>
<th>Network/Communications Engineer</th>
<th>Database Administrator</th>
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<td><strong>6</strong></td>
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APPENDIX U

Priced Proposal Worksheet
## SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

### GUAM POWER AUTHORITY

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
<th>Unit Cost</th>
<th>Total Cost</th>
<th>Total Cost</th>
<th>Qty</th>
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**Basic Bid Total Cost:** $__________

**Additive Bid**

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<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
<th>Unit Cost</th>
<th>Total Cost</th>
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**Additive Bid Total Cost:** $__________

*All prices shall include overhead, administration cost, profit and applicable taxes

Total Bid Cost (Basic + Additive): $__________

Bid Cost in Words: ____________________________

Name of Bidder: ____________________________

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**GUAM WATERWORKS AUTHORITY**

**Total Cost Total**

**Cost Total**

**Material**

**Labor**

**Equipment**

---

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GOVERNMENT OF GUAM

GENERAL TERMS AND CONDITIONS

SEALED BID SOLICITATION AND AWARD

Only those Boxes checked below are applicable to this bid.

[ ] 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 Compiler 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.

[ ] 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.

[ ] 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.

[ ] 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.

[ ] 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.

[ ] 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.

[ ] 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.

[ ] 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.

[ ] 10. BID ENVELOPE: Envelope shall be sealed and marked with the bidder’s name, Bid number, time, date and place of Bid Opening.

[ ] 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 fifteen percent (15%) of his highest total bid offer. 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.

[ ] 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 equal to ONE HUNDRED PERCENT (100%) of the contract prices 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 of the Guam Power Authority will have the right to declare the bid contract null and void and to recover the bond or present the bond to the contractor as security for performance and proper fulfillment of the contract.

G.S.A. Form 112 Revised 9/2008
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).

[X] 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.

b) The compliance with all of the conditions to the Solicitation.

[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 not 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.

[X] 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.

[ ] 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 item
description and quantity. Letter marking shall not be less than 3/4" in height.

[ ] 25. SCHEDULE FOR DELIVERY: 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 Bill 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 indicating 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
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 replaced, repaired, 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, sex, 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.

[ ] 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.

[ ] 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 Paragraph 1 (Default) of the Termination for Default Clause of this contract and fails to cure in the time specified, the contractor shall be liable for damages for delay in the amount of two thousand dollars ($2,000.00) of outstanding order per calendar day from date set 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 be 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: ____________________

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SEALED BID SOLICITATION 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.

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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 data 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 the 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.

e. 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.

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