**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

# REQUEST FOR PROPOSALS (RFP)

# FOR

# "SCADA"

# SUPERVISORY CONTROL AND DATA ACQUISITION UPGRADE

# FOR WATER AND WASTEWATER

October 4 , 2013

---

RFP NO. ASPA14.1144.ESD.SCADA

Utu Abe Malae

Executive Director

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## Table of Contents

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## NOTICE TO OFFERORS
## REQUEST FOR PROPOSALS

Issuance Date: October 04, 2013
RFP No. ASPA14.1144.ESD.SCADA
PROJECT: FOR SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE FOR WATER AND WASTEWATER
CLOSING DATE/TIME November 7, 2013 @ 2:00 p.m. American Samoa Time

The American Samoa Power Authority (ASPA) requests proposals from qualified firms to upgrade the existing SCADA System for monitoring and controlling the existing municipal water and wastewater systems, booster stations, and lift stations.

ASPA is wishes to undertake the project in 2 phases of work:

1. First Phase: upgrade existing FIX32 HMI to the most current version of GE Proficy iFIX, or another HMI of similar capability, plus integration of three existing water Radio Telemetry Unit (RTU) sites, and two new sites as proof of concept. It is preferred that the existing RTU enclosures and field devices including the installed PLC's and instrumentation be retained. Where this will not be possible, proposers may include replacements or upgrades within there proposal, and integrated into the new SCADA platform. New upgraded SCADA should work alongside with existing SCADA until full change over is completed.

   **First Phase will include:**

   (a) upgrading current FIX32 HMI to iFIX (most current version of GE Proficy iFIX SCADA system) or another HMI of similar capability.

   (b) proposing a new communications medium or use present radio communications to the field RTU's plus re-validation of existing or new frequencies to be used.

   (c) providing a new stand alone SCADA server

   (d)providing a backup / redundant SCADA server

   (e) provide 3 new client computers for Water (W), Wastewater (WW), and SCADA office

2. Second Phase: will be the complete upgrading and integration of all (existing plus new) water RTU sites, and will ultimately cover SCADA installations at the sites listed below:
   - Tafuna Power plant
   - Satala Power Plant
   - Utulei Sewage Treatment Plant (STP)
   - Fogagogo STP
   - Two potable water micro-filtration plants
   - 19 existing potable water booster pump sites (11 with existing RTU)
   - 56 new potable water wells with chlorine dosing systems
   - 30 water reservoir/ tank sites (13 with existing RTU/telemetry)
   - 19 existing wastewater pumping stations (all with existing RTU/telemetry)

ASPA is requesting proposals for the first phase of work only.

The Offeror must provide a proposal that specifically and completely addresses a plan for completion of the tasks which are specified in the scope of work (SOW).

A complete RFP package may be collected from the ASPA Materials Management Office located at the Tafuna Power Plant compound (Security Guard at the Gate will direct you to the Materials Management Office). You may also view this online at www.aspower.com which is the ASPA Website. For more information about this RFP, please contact the following person(s):

Ms. Nancy Tinitali-Mauga
Materials Manager
Tel. 684.699.0105
nmauga@aspower.com

Mrs. Veronica Vaouli-Gasio
Electrical Engineer
Tel. 684.699.7199
veronica@aspower.com

Qualified Offerors must submit proposals in a sealed envelope, box, or other enclosure addressed to the ASPA Materials Manager. The sealed envelope or box must be labeled RFP No. ASPA14.1144.ESD.SCADA, Attention: Nancy Tinitali-Mauga and show date and time of proposal opening. An original, one PDF, electronic copy, and five (5) hard copies of the proposal must be received in the Materials Management Office located in the Tafuna Power Plant Compound no later than **2:00 pm on November 7, 2013.** Late submittals will not be opened or considered and will be designated as non-responsive.

All proposals shall be accompanied by a proposal bond equal to 10 percent (10%) of the total proposal to be forfeited to ASPA in the event of failure of the Offeror to honor the terms of its proposal.

The American Samoa Power Authority reserves the right to:

1. Reject all proposals and reissue a new or amended RFP or addenda as deemed necessary by ASPA;
2. Request additional information from any Offeror;
3. Select a firm for award based on other than "least cost" (e.g. capability to complete work in a timely fashion or proven technical capabilities);
4. Negotiate a contract with the Offeror that is selected for award; and/or
5. Waive any non-material violations of rules set up in this RFP at its sole discretion.

_____ _____

Utu Abe Malae, Executive Director Date

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

# PROPOSAL INVITATION

**AMERICAN SAMOA POWER AUTHORITY**
**MATERIALS MANAGEMENT OFFICE**
**P.O. BOX PPB**
**PAGO PAGO, AMERICAN SAMOA 96799**
**684-699-0105**

**ISSUANCE DATE:** **October 4, 2013**
**REQUEST FOR PROPOSALS:** **ASPA14.1144.ESD.SCADA**

**INSTRUCTIONS:**

1. This Request for Proposals (RFP) shall require an original, one PDF electronic copy, and five (5) hard copies that must be received at **ASPA's Materials Management Office no later than 2:00 pm on November 7, 2013. The envelope or box must be labeled "RFP No. ASPA14.1144.ESD.SCADA**. Late submittals will not be opened or considered and will be determined as non-responsive. All Offerors shall provide sufficient written and verifiable information that responds to the requirements set forth herein and in the Scope of Work (SOW).

2. Pre-proposal Questions – Any pre-proposal questions and/or clarifications shall be submitted to Nancy Tinitali-Mauga in writing (through electronic mail or hard copy maugan@aspower.com). Questions and/or clarifications are welcome and should be submitted no later than 4:00 pm on October 21, 2013. ASPA shall issue an addenda to address any questions and/or clarifications as necessary.

**NOTE TO OFFERORS:**

This Request for Proposals (RFP) is subject to the attached General Terms and Conditions of **the RFP for the Supervisory Controls and Data Acquisition (SCADA) upgrade.**

The undersigned Offeror agrees to furnish, within the time specified, the articles and services at the price stated opposite the respective terms listed on the schedule provided, unless otherwise specified by an Offeror. In consideration of the expense to ASPA in opening, tabulating, and evaluating this proposal, and because time is of the essence, the undersigned agrees that this proposal shall remain firm and

irrevocable within **one hundred and twenty (120) calendar days** from the date opening to supply any or all of the items which prices are proposed.

SIGNED:_____DATE:_____

## SIGNIFICANT DATES

The following are significant anticipated Scheduling and Contract Dates for this RFP:

| | |
|---|---|
| October 4, 2013 | RFP Issuance Date |
| October 21, 2013 | Deadline for submitting questions, inquiries, and/or clarifications to. |
| October 25, 2013 | ASPA Deadline to Issue any Addenda to address questions and or clarifications as necessary. |
| 2:00 pm November 7, 2013 | Closing Time/Date. See details of how to send proposals on the Proposal Invitation Form page 6 of this RFP. |
| November 22, 2013 | Inform Successful Offeror/proposal |
| November 31, 2013 | Contract Award |
| December 13, 2013 | Contract Execution and Notice to Proceed |

Dates are subject to change.

## PROPOSAL SUBMITTAL REQUIREMENTS

The Offeror shall provide a collated binder that includes tab separators. An original and **five (5)** copies of the complete proposal must be received in the Materials Management Office no later than 2:00 p.m. local time on or before November 7, 2013.

- Late submittals will not be opened or considered and will be determined as non-responsive.
- All Offerors shall provide sufficient written and verifiable information that responds to the requirements of the RFP, and in accordance with the SOW to include a point-by-point response as outlined in detail for each Part of the proposal.

The binder shall be organized as follows.

1. **Transmittal Form** (Letter on Offeror's Letterhead) - The Offeror shall submit a completed Attachment C "Proposal Transmittal Form."

2. **Tab 1 – Proposal Submission Forms** - The Offeror shall complete and include in Tab 1 all required forms as provided for in this RFP.

   **(i)** **Offeror Qualifications Form** – (Attachment D).

   (a) The Offeror shall submit additional documentation regarding the qualifications of the firm.

   (b) The Offeror shall list and submit a dossier of personnel qualifications and professional credentials.

   (c) The Offeror shall submit a list of three or more references and a project history to document a minimum of seven (7) years of specifically related experience.

   **(ii)** **Licenses** – The Offeror must hold an appropriate and current professional certification(s) and a business license for the requested professional services. A copy of any and all professional certifications and business license(s) is required in this Tab.

3. **Tab 2 – Technical Proposal** - The Offeror shall submit a full and detailed Technical Proposal, as required in this RFP, which describes the goods, services, and procedures that completely addresses the requirements presented in the Scope of Work. The Offeror shall complete and submit Attachments A and B. As part of the Technical Proposal, the Offeror shall provide the following information:

**(i)** **Project Goals and Objectives** – The Offeror shall describe the goals and objectives, project methodology and specifications of the proposed SCADA upgrade.

**(ii)** **Software and Hardware-** All items, including software and hardware, are to be supplied by the contractor for integration into this project. Submittals shall contain information about each item such as manufacturer's specifications, drawings, manuals, etc.

**(iii)** **Project Timetable** - The Offeror shall describe project schedule and milestone dates.

**(iv)** **Project Execution Plan** – The Offeror shall provide a detailed description of the proposed solution and implementation plan.

**(v)** **Technical Details**- The Offeror shall provide an overall system drawing showing details of the proposed solution.

**(vi)** **Offeror's Professional and Installation Team** – The Offeror shall list the individuals and qualifications of the project team with assigned tasks.

**(vii)** **Subcontractors -** The Offeror shall identify, list and submit the tasks to be subcontracted and submit the complete names, business address, and license classification of the subcontractor(s).

4. **Tab 4 - General Terms and Conditions** - The Offeror must provide a description of any and all proposed deviations from the ASPA General Terms and Conditions.

5. **Tab 5 - Additional Information** - The Offeror may include any additional information, including company and product brochures.

ASPA may require re-submission of the submittals until the requirements and intent of this specification are satisfied.

The contractor purchases items at his own risk of non-payment by ASPA prior to the issuance of an approved submittal. Indication by the contractor that the item is already purchased is not a basis for acceptance.

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

# GENERAL TERMS AND CONDITIONS

**For**

# SUPERVISORY CONTROL and DATA ACQUISITION (SCADA) UPGRADE

## 1. INTRODUCTION

The American Samoa Power Authority is soliciting proposals from qualified Offerors to furnish, deliver, install, commission, and provide startup training upon completion for the SCADA upgrade. Offerors must include a detailed list of all required hardware / software specifications with prices.

**a.** Latest drivers for any PLC used.

**b.** Any other costs for services that may not have been covered in the SOP shall also be included.

**c**. Return Merchandise Authorization – RMA will be issued for key ID, (one full function SCADA) as part of the iFIX upgrade

## 2. BACKGROUND

The American Samoa Power Authority (hereinafter referred to as ASPA) is a multi-function public utility that provides electric power, water, waste water, and solid waste services.

ASPA's currently installed SCADA system, incorporates data from its electric, water, and wastewater divisions into an intellution FIX32 HMI platform. The power generation division utilizes Allen Bradley PLC's 5/20 and 5/40 for its generators which are hardwired to power monitors. These PLC's use ABE drivers and are connected through a switch to the FIX32 HMI.

Water and Waste water use a "master – slave" configuration to connect to the field RTU's. The RTU's are comprised of Control Micro-System (micro-16) and radio modems to connect back to the master PLC (SCADApack 32). Data radios used are: model DL-3420 by EF Johnson Co. The master PLC consists of a Control Micro-System SCADAPack 32 using MBE driver connected through the switch to the FIX32 HMI. RTU's installed around the island bring in data at a vhf frequency of 167.0 Mhz, from water tanks, water booster stations, water wells, and the waste water lift stations.

**ASPA existing wide-area SCADA system was commissioned in the 1990's and is now in need of a comprehensive overhaul and upgrade due to the following:**

a. Current SCADA system (FIX32) is aging only runs on Windows 2000, and is no longer supported by vendor

b. Most of the water distribution system is not monitored remotely

c. SCADA computers that were acquired in the year 2000, are very old and require replacement.

d. Technology advances mean original hardware supplied is now obsolete

e. Wide-area communications are not handled well by the existing systems

ASPA currently operates the following infrastructure facilities for its water and wastewater services and has plans to further expand. Not all of these have RTU's:

- 18 water booster stations
- 30 water storage tanks
- 57 wells
- 2 micro-filtration plants
- 2 waste-water treatment plants
- 19 waste-water lift stations

## SCOPE OF WORK

NEW SCADA SYSTEM REQUIREMENTS

The selected Offeror is responsible for, but not limited to, the following:

i. Design, install, test and commission upgraded SCADA system (to the most current version of GE Proficy iFIX) **OR** other proposed HMI, which will provide the following functions:

- Process monitoring
- Process control
- Process alarming
- Event logging
- Historical collection
- Historical trending
- Report generation

ii. New iFIX software **OR** other proposed HMI should interface well with the existing water RTU's, **or** propose an alternative that will monitor and control the following parameters:

Flow, pressure, tank level, current, voltage, Digital I/O's

iii. Should have provision for future expansion (additional RTU sites) as the utilities design and communication requirements change.

iv. Real-time Data
- Collected in real-time
- Made available in useful formats according to ASPA requirements
- Stored for a period of years without the need for archiving and immediately available to SCADA users

v. Open Data
- Easily available to users
- Easily mined to produce operational and management reports
- Displayed in user friendly formats such as statistical charts and graphical trends

vi. Reliability and Upgrade / Expandability
- The provision of a modular and open system that can be simply upgraded and expanded without necessary recourse to vendor
- The provision of a system that includes installed spare capacity as foreseen by ASPA to cover their future expansion requirements; this expansion being able to be implemented using ASPA expertise, without recourse to Vendor for new hardware and licensing

vii. Knowledge transfer and Operability
- The provision of a system that is not overly complex and that allows ASPA to make efficient use of the SCADA functionality purchased
- The provision of practical training, ensuring that beneficial use of SCADA by ASPA is maximized and maintained years after vendor have completed their obligations

viii. Maintenance and Warranty

- The ability to maintain, modify and create new configuration, without recourse to restarting or taking any SCADA machines off line.
- Ability to remotely reconfigure and reprogram SCADA site equipment from the SCADA control room
- Should provide long-term maintenance and upgrade paths to minimize obsolescence issues
- ASPA administered remote SCADA access facility to allow Vendor to check and advise on system issues

Work done should include and have the following:

- A new standalone SCADA server
- One backup / redundant SCADA server
- 3 new client computers for water, operators, SCADA office, all configured as client nodes
- 3 client licenses

- Converting water and wastewater displays
- Reconfigure I/O drivers
- New alarming
- New historical collection
- New reports with XL reporter
- New firewall for VPN connection
- Include factory training for iFIX or other HMI proposed, plus PLC program training for PLC's or RTU's used, and also onsite training.
- All information that is currently monitored from the existing control micro-system RTU's and new needed information shall be programmed and viewed on the new upgraded SCADA system.
- Control configuration (digital outputs) for the remote station pumps shall be fully tested and confirmed working, both in factory and out in the field during installation.

**ACCEPTANCE TESTING:**

A. The contractor shall submit an acceptance test plan not less than 5 days to the commencement of the acceptance test. The acceptance test plan shall include a detailed description of each test. The contractor shall also include one or two ASPA staff to assist with the test and also the estimated duration of the testing period. The contractor must be onsite to perform the tests. Remote testing is not acceptable.

B. ASPA has the authority to revise the submitted field test plan prior to commencement.

C. The contractor, with ASPA present, shall perform the field test plan.

D. ASPA shall prepare a deficiency list resulting from the field test.

E. The contractor shall repair all deficiencies and may be required to re-test only the deficient items with ASPA present.

**MANUFACTURERS' DOCUMENTATION:**

A. The contractor shall supply one set of 4-inch spine, three-ring binders,with closed plastic pouches containing the original materials from the manufacturer(s) consisting of the following information:

1. Software CDs, DVDs, etc.;
2. Manufacture software licenses;
3. User's Manual;
4. Installation instructions;
5. Warranty information;
6. Technical information; and
7. Technical Support Contracts from software manufacturers (one year from date of purchase).

B. Multiple photocopies will not be accepted. Only original documents from the manufacturers are acceptable. Multiple documents may be required for submission. For example, if two copies of software are required for redundancy, then the contractor shall submit two full sets of documentation including the original licenses.

C. Copies of CDs, DVDs, etc., are not acceptable.

D. Photocopies of software licenses are not acceptable.

E. The contents of each binder shall be clearly printed on the binder cover. The spine of each binder shall have the title of the contents printed.

**OPERATIONS AND MAINTENANCE MANUAL:**

A. The contractor shall submit an operating and maintenance manual describing the theory of operation, maintenance, and operation of the system.

## OPERATIONS AND MAINTENANCE TRAINING:

A. The contractor shall provide two types of training prior to issuance of final project acceptance as follows:

    1. Operator training, and
    2. Maintenance training.

B. Operator training shall consist of one- three (3) hour class for Water operators.

C. The content of the operator training classes shall be focused on operating the SCADA system from the HMI displays including alarming, trending and reporting.

D. Operator training topics shall include but not limited to the following:

    1. General Overview of system;
    2. Screen Navigation;
    3. Security – login, logout & timeout
    4. Detailed review of each process display;
    5. Changing setpoints;
    6. Viewing historical trends;
    7. Detailed review of all alarming features;
    8. Event logging;
    9. Detailed review of primary alarm callout features;
    10. Alarm annunciation; and
    11. Report generation.

E. Maintenance training shall consist of a one day class for Water SCADA maintenance personnel focussing on troubleshooting and maintenance of the SCADA system

F. Maintenance training topics shall include detailed reviews of the configuration and troubleshooting techniques of the following topics:

    1. All of the topics as listed for Operator training
    2. System architecture;

3. Functions of the SCADA server;
4. Functions of the client computers;
5. RTU & PLC communications to SCADA;
6. SCADA/PLC configuration server applications;
7. IO driver configuration;
8. SCADA startup configuration;
9. SCADA database;
10. Historical collection configuration;
11. Historical trending configuration;
14. SCADA Alarming configuration
16. Report configuration
17. Adding an additional RTU site

G. Maintenance training shall not be limited to only those topics or items that are included in the contractor's scope of work. If the contractor modifies existing software or hardware, then the contractor is responsible for training on only the items modified and not the entire system.

H. The contractor shall submit electronic copies of all training materials prepared by the contractor. This shall be considered one of the deliverables as part of meeting the training requirements.

**DOCUMENTATION**:

a. The contractor shall provide two hard copies of the documents listed below. Electronic copies of each type of document shall also be submitted.

b. Software data flow diagrams shall be submitted to represent the interrelationships and communications between all software applications. An explanation of the software flow diagram shall accompany each diagram.

c. The contractor shall submit a Master IO list that is a current and accurate record of all the IO addresses utilized in the project. The contractor should verify all addresses contained in the Master IO list. The Master IO list document shall contain both field device IO tag names, descriptions, IO addresses, engineering units, scaling and scan times.

**PROJECT WARRANTY:**

A. The contractor shall provide the following warranties for all of the items within the scope of work as follows:

1. Software manufacturer's factory warranty
2. Hardware manufacturer's factory warranty
3. Contractor's programming & installation warranty

B. The contractor's programming and installation warranty shall be for a period of one year after ASPA's beneficial use of the hardware and software installations, or date of final acceptance (which ever is first).

**PROJECT WARRANTY & MAINTENANCE SERVICES:**

A. The contractor shall provide the following services during the warranty period:
   1. Remote VPN access for software warranty modifications.
   2. Remote VPN system maintenance.

B. All Software Improvement Modules (SIMs), Patch files, Bug Fixes and upgrades within the current software version release shall be installed by the contractor as required during the warranty period. Remote support is acceptable.

C. The contractor shall provide the following response times during the warranty period:
   1. System Emergency:
      a. 1 hour VPN response
   2. Non-critical warranty:
      a. 24 hour VPN response
   3. Routine Maintenance:
      a. 1 week VPN response

D. The contractor shall provide 24 hours, 7 days per week system emergency assistance by telephone during the contractor's warranty period

E. The contractor shall coordinate activities with ASPA whenever a remote VPN connection is made to any of the systems for warranty or maintenance services.

F. Remote VPN connections shall only be performed with the knowledge and approval of the plant supervisor or his appointed representative (such as a maintenance technician).

G. Operations that may affect the operations such as database reload, rebooting computers, program downloads, etc shall only be performed when a plant operator is advised in advance and present at the affected facility.

H. The contractor shall be in direct communication with the plant supervisor or his representative whenever modifications are performed that may affect the operations of the facility.

I. The contractor shall maintain the project installation during the warranty period. The maintenance services include, but are not limited to the following items for the server only:

1. Backup critical programs and data
2. Server performance & maintenance;
3. Disk space management;
4. General communications performance monitoring.

**PROJECT ACCEPTANCE:**

Final acceptance shall be awarded upon completion of all items on the Weekly Status Report plus beneficial use of the upgraded SCADA systems by ASPA.

ASPA will release payment for the final 10% retainage, upon project final acceptance.

# HARDWARE

## PART 1: GENERAL

A. The contractor shall provide fully functional, commercial off the shelf, non-proprietary hardware to be installed as part of the SCADA system. All hardware shall be supplied and installed according to the project specifications.

B. The scope of work in this section includes the supply, installation, wiring, configuration, testing, training and warranty of the hardware as listed in this section and also shown on the drawings.

C. The scope of work in this section also includes interconnection and wiring and testing of existing equipment that is modified in any way under the scope of this contract.

D. This contract includes communications to the existing RTU's, via I/O drivers which communicate with the primary SCADA system.

## PART 2: PRODUCTS

### HARDWARE PRODUCTS

A. Prior to purchase of any hardware, ASPA must approve any variation to the detailed specification in writing. Any variations in the specifications shall be submitted as part of the submittal package for approval by ASPA.

B. All hardware shall be Commercially available Off The Shelf (COTS) and therefore commonly available. Spare parts shall be readily available.

C. The contractor shall advise ASPA as part of the submittals for approval, if it is determined that any hardware as specified in this section may be no longer manufactured in the near future or is considered "legacy" hardware.

D. All hardware shall be industrial grade and rated at a minimum temperature of 40 degrees Centigrade, unless specified otherwise.

E. All hardware spare parts, assembly manuals, operating instructions and warranty shall be neatly assembled, labeled and presented to ASPA at the completion of the project and as specified in the General Conditions of this specification.

F. Contractor is responsible for the protection of all hardware after delivery on site. ASPA will provide a secure area in each facility for the storage of hardware. ASPA is not responsible for any damages or theft of hardware on the premises until after the start of ASPA's beneficial use of the hardware. The contractor shall take any additional measures to ensure the security of all hardware delivered onsite.

## HARDWARE REGISTRATION & WARRANTY REQUIREMENTS:

A. All hardware which is supplied for permanent use on this project shall be registered in the name of ASPA as required by the manufacturer. ASPA will provide contractor with ASPA's primary contact name, address and other pertinent information for hardware registration.

B. The contractor shall supply ASPA with detailed manufacturer's warranty and support information for all registered products supplied under this contract.

C. The contractor shall supply to ASPA all hardware assembly instructions, operation manuals and other documentation in the original manufacturer packaging.

D. The contractor shall supply ASPA, as part of the Operations and Maintenance manuals, the hardware vendors' technical support information including registration, support and warranty information.

E. The contractor shall supply ASPA with manufacturers annual renewal support agreements. It is ASPA's responsibility to extend the manufacturer's warranty and support contracts after the expiration of the manufacturer's warranty period.

F. Refer to General Requirements for more information regarding Software Licensing and Warranty Requirements.

## PRIMARY SCADA SERVER HARDWARE:

A. Provide, install and configure one primary SCADA server, and one identical backup scada server.

B. Acceptable manufacturers are as follows:
   1. IBM
   2. Hewlett-Packard

3. Dell
4. Or approved equal

Contractor to provide specifications, etc.

**SCADA SERVER RACK:**

A. Provide one 19″ server rack for the SCADA servers
B. Acceptable manufacturers:

1. Rittal
2. Hoffman
3. or approved

C. The server rack must have the following minimum specifications:

1. all steel frame construction
2. 19″ wide
3. 36″ deep
4. 72″ high
5. glass door
6. key latch front and back
7. keyboard shelf with pullout mouse shelf
8. monitor shelf
9. 2 extra shelves for software storage
10. rack construction must be compatible with scada server manufacture requirements

D. The primary scada server shall be located in the scada control room.

**SCADA SERVER OPERATING SYSTEM LICENSE:**

Provide license for Microsoft® Windows® Server 2008, Service Pack 2. Note: Windows Server 2008 has continuous updates and therefore run the Windows update feature to get the latest software.

**SCADA CLIENT HARDWARE:**

A. Provide a total of three SCADA client computers with one for each of the following locations. One computer should be equipped with a 4 - port monitor port card to enable attachment of multiple monitors.
    - Water office
    - Operators office
    - Scada office

B. Acceptable manufacturers are as follows:

    - IBM
    - Hewlett-Packard
    - Dell
    - Or approved equal

Contrator to provide specifications for the scada client pc's

**SCADA CLIENT OPERATING SYSTEM LICENSES:**

Provide one license for each client workstation of the Microsoft® Windows®7 Professional operating system.

**MONITORS**:

Provide monitors for both the primary and secondary SCADA server and each SCADA client computer. The manufacturer shall be the same as the server and client manufacturer.

All monitors shall be of the same resolution so that all displays can be viewed from any monitor without affecting the layout of the graphics.

**SOUND PERIPHERALS:**

Provide external stereo speakers at each client computer.

**UNINTERRUPTIBLE POWER SUPPLY HARDWARE:**

Contractor to supply UPS for the SCADA servers.

**SURGE SUPRESSION:**

Surge suppressors shall be provided at all client computer locations

**FIREWALL**

Contractor shall supply and install a hardware firewall. The firewall shall provide both virus and intrusion protection, plus serve as a vpn connection.

**ETHERNET SWITCHES:**

Ethernet switches shall be provided by contractor. Contractor will program, test and maintain the switches for the duration of the project.

**PRINTER:**

Contractor to provide one LaserJet printer for report generation.

The contractor shall program the report generation software to print reports automatically on the printer.

Acceptable manufacturers:

1. Hewlett Packard: Color LaserJet 3000

2. or approved equal

Supply one spare cartridge for each color and one black cartridge.

**SOFTWARE**

**PART 1: General**

**SCOPE OF WORK:**

A. The contractor shall provide the most current version of GE Proficy (Intellution) iFIX SCADA software, **OR** similar other HMI proposed, for process monitoring and control, process alarming, local historical collection, trending and local report generation. All according to the project specifications.

B. The scope of work in this section includes the supply, installation, licensing and programming of the SCADA software and associated software applications including display development, new displays as needed, IO driver programming, database development, alarm configuration, historical collection, historical trend display, and report generation. The programming, testing and training shall include, but not limited to the following:

- Process monitoring
- Process control
- Process alarming
- Event logging
- Historical collection
- Historical trending
- Report generation
- Alarm history
- Alarm summary display
- Screen displays
- Pop up displays
- Realtime trend displays
- Navigation
- Realtime data links
- Database tags

- Scripting
- Security configuration
- I/O driver configuration
- Network communications

C. The scope of work in this section also includes the supply and installation of all necessary software (IO drivers) for interface and communications between the primary SCADA server and the existing field devices.

D. The IO drivers should communicate with the existing RTU's used for the water stations that connect to the master SCADAPAC 32 PLC,. Replacement IO drivers may be required if the existing I/O drivers are not compatible with the current version of iFIX or the new operating system.

E. Controller programming software for the existing units shall be supplied by contractor as it may not be with ASPA.

**SOFTWARE PRODUCTS – GENERAL REQUIREMENTS:**

A. The products listed in this section are acceptable, providing they also meet the detailed requirements of this specification.

B. All software applications shall exhibit strong compliance with Microsoft's Windows Open Systems Architecture (WOSA) standards, such as in its use of dialog boxes and menus.

C. All software must support running as a service if the feature is available. Software applications shall be configured to automatically run as a service at server boot up and set to "automatic" start.

**SOFTWARE LICENSING & WARRANTY REQUIREMENTS:**

A. All software which is supplied for permanent use on this project shall be registered in the name of ASPA. ASPA will provide contractor with ASPA's primary contact name, address and other pertinent information for software registration.

B. The contractor shall supply ASPA with detailed licensing information for all licensed products supplied under this contract.

C. The contractor shall supply to ASPA all software CDs, DVDs, manuals and other documentation in the original manufacturer packaging.

D. The contractor shall supply ASPA, as part of the Operations and Maintenance manuals, the software vendors' technical support information, including licensing information and warranty information.

**SOFTWARE**

**PART 2: Products**

**ACCEPTABLE SCADA SOFTWARE MANUFACTURERS:**

The following are approved SCADA Software manufacturers for iFIX:

1. GE Fanuc – Proficy HMI/SCADA (iFIX) – most current version.

**SERVER FAILURE RECOVERY CRITERIA:**

A. The SCADA software must be programmed to automatically reboot and recover after a total power failure including UPS failure.

B. The recovery or all applications shall occur without any intervention from a local keyboard entry or remote VPN control.

**SCADA SERVER DEVELOPMENT LICENSE:**

A. Provide one server unlimited tags development license for either iFIX **OR** other proposed HMI, to ASPA.

B. The iFIX SCADA development license OR similar shall be loaded and run from the primary SCADA server.

C. Provide one licensed copy of each IO drivers to be loaded on the primary and back up SCADA server as required by the field hardware RTU, PLC or other controllers. Existing IO drivers may be used if compatible with the new software and hardware

**SCADA CLIENT RUNTIME LICENSES:**

A. Provide one runtime client license for either iFIX, **OR** other proposed software for each client workstation as required by the SCADA software manufacturer. This software shall be a thick client.
B. An Return Merchandise Authorization (RMA) will be issued for the FIX32 software ID as part of the iFIX upgrade for the runtime clients licenses.

**UNLICENSED SOFTWARE:**

All software that is not licensed in the name of ASPA is considered "Unlicensed Software."

The contractor shall only load licensed software on hardware that is deliverable for the project and is to be retained by ASPA.

Temporary software including demo software shall not be loaded on any hardware associated with this project without approval from ASPA prior to installation.

## SCADA DATA FLOW DIAGRAMS:

A. The contractor shall provide a data flow diagram of communications and interrelationships between various software applications.

B. All diagrams shall be prepared utilizing Microsoft Office Visio 2007.

## IO DRIVER SOFTWARE:

A. Acceptable IO driver manufacturers:
   1. iFIX SCADA IO drivers;
   2. SoftwareToolbox, Inc.- TopServer;
   3. Kepware;
   4. Matricon;
   5. Or approved equal.

B. Wherever possible and if available, the contractor shall provide an OPC certified IO driver for communications between field devices and the SCADA software. The OPC IO driver is also used for direct communications to other applications such as Alarm Notification software.

C. The I/O driver should support the existing master-slave configuration used for water and wastewater RTU's that use SCADAPACK 32 for the master PLC and control-micro16 for the slave RTU's.

## LOCAL HISTORICAL COLLECTION SOFTWARE:

A. The iFIX local historical collection software (if upgraded to iFIX) is used for the collection of data that is to be stored on the primary and back up SCADA server hard drive.

B. The historical collection software that is an integral part of the iFIX SCADA server software shall be used for the collection and display of this data.

**REPORT GENERATION SOFTWARE:**

A. Provide one licensed copy of report generation software for the primary iFIX SCADA Server **OR** other HMI proposed.

B. The Report Generation Software shall have the following features:

1. OPC compliant data collection;
2. Report collected data directly into Excel;
3. Background report execution;
4. Push data using Microsoft COM automation into report forms;
5. Automatic report generation from templates;
6. Ability to format, color-coding, sorting and filtering;
7. Automatic report distribution by e-mail, web, hard copy, or file format;
8. Automatic scheduled printing to a specified printer;
9. File formats include XLS, HTML and PDF; and

**ALARM AND EVENT (A&E) NOTIFICATION SOFTWARE:**

A. Acceptable Alarm & Event Notification Software manufacturers:

1. Specter Industries – WIN911 Professional Edition version 7.11
2. Or approved equal.

B. A&E software shall have the following features available for use:

1. Local voice annunciation (at server only);
2. Dial-out voice annunciation (cellular or POTS);
3. E-mail notification;

4. SMS text messaging;
5. Alarm log;
6. Detailed message log;
7. Remote acknowledge;

C. Supply and install the A&E software in the primary and back up iFIX SCADA server.

**MICROSOFT OFFICE PROFESSIONAL SOFTWARE:**

Provide one licensed copy of Microsoft Office 2007 (Word and Excel) on the primary and back up SCADA server and each iFIX client computer.

**ANTI-VIRUS SOFTWARE:**

The contractor will provide Anti-Virus software on the primary SCADA server and each iFIX client workstation.

The contractor shall coordinate installation of AV software with the IT department.

**SOFTWARE LICENSING:**

All software licenses shall reside on the iFIX SCADA server or workstations as required for normal local operation.

**CENTRAL DOCUMENTATION REPOSITORY:**

A. The Primary SCADA Server shall also function as a central depository of all critical files, applications, training manuals and technical data for this project.

B. The following is a list of the types of data and files stored on the Primary SCADA server:
   1. Project Specifications;

2. Project Drawings;
3. Project Correspondence;
4. SCADA project files;
5. SCADA programming documentation;
6. PLC & RTU programs for all plants and water stations, if available;
7. PLC & RTU programming documentation if available;
8. Master IO list for each plant and pumping station;
9. Training documentation;
10. Manufacturers' User manuals;
11. Electronic copies of all submittals;
12. Manufacturers' technical reference information; and
13. Any other reference materials related to the project.

C. As the project proceeds, the contractor shall continually place project documentation, references and other project information on the primary SCADA Server.

D. All of the above listed documents and programs shall be retained by ASPA for future reference.

E. All of the above documentation and programs are considered confidential information and shall not be distributed to any parties outside of the ASPA.

**SCADA SERVER DEVELOPMENT:**

A. The iFIX SCADA development software **OR** similar shall be loaded on both primary and back up SCADA Server.
B. All other necessary software applications, such as IO drivers, shall also be loaded on both SCADA Servers.
C. The SCADA development software shall have the capability to load, modify and run the project file associated with each plant from the primary and back up SCADA Server.

**SCADA SERVER UPGRADES:**

A. The contractor shall install Software updates, Software Improvement Modules (SIMs), Patch files and other upgrades within the current software version release.

**IO DRIVERS:**

A. IO drivers shall be installed on the primary and back up SCADA Servers, and shall communicate with RTUs and PLCs .

B. Digital input points shall be programmed to collect data "On Change."

C. Analog input points shall be programmed to collect a new value based on deviation of the analog value outside a preset deadband or percentage deviation.

D. Fixed polling times shall be used only if an analog point requires precision data for historical collection purposes.

E. In addition to the above listed data samples, all inputs shall have a regularly scheduled poll of once every 3 minutes.

F. The contractor shall document the IO driver settings for each tag in an Excel spreadsheet. Documentation shall include RTU or PLC, SCADA tag name, IO address, OPC tag name, tag type, Data collection method, deadband, poll time, and comments. Reports generated directly from the OPC driver are also acceptable. The spreadsheet shall be submitted as part of the final project documentation.

**HISTORICAL COLLECTION:**

A. Historical data is collected and displayed on the primary SCADA server.

B. All digital data (ON/OFF, OPEN/CLOSE, etc.) that requires display on a trend chart or other types of display shall be stored as short-term historical data.

C. Digital tags shall be collected on an "On Demand" basis.

D. All data shall be collected and stored on the primary SCADA server's local hard drive.

E. Analog data that is designated for historical collection shall be programmed to collect a new value based on deviation of the analog value outside a preset deadband or percentage deviation.

F. All short-term data shall be stored no longer than one year. FIFO rules of deleting shall be programmed for all short term historical data.

**HISTORICAL DATA DISPLAY:**

A. Provide historical charts displaying historical data from the iFIX Historical(if iFIX HMI will be used) collection application provided within the primary iFIX SCADA server software.

B. Historical charts shall have the following features:
   1. Multiple pens;
   2. Legend;
   3. Data scrolling (forward and reverse);
   4. Data zoom;
   5. Multiple axis;
   6. Multiple pen colors; and
   7. Auto refresh and/or real-time trending.

C. Refer to the "Historical Data Collection Parameters" chart for a list of data points to be collected as shown below.

## LONG-TERM HISTORICAL DATA COLLECTION:

A. Long-term historical data can be defined as process information required to be stored over a long term storage due to regulations and/or plant administration, operation and maintenance purposes.

B. The following applies to long term data storage:
   1. Only analog data shall be stored over a long period of time.
   2. Data collection shall be filtered such that only analog data shall be collected when the process value falls outside a present deadband based on the last data point stored; and
   3. Data collection shall also be stored on a regular time basis to confirm communications.

C. Data storage duration shall be as follows:
   1. Data shall be stored on the local hard drives for a period of five years;
   2. This duration may be adjusted per recommendations of the ASPA.
   3. Contractor shall estimate the amount of disk space required for five years of data storage and report findings to ASPA prior to completion of project.

D. Refer to the "Historical Data Collection Parameters" table as shown below for a listing of the Long Term Historical data types for collection.

## HISTORICAL DATA COLLECTION AND DISPLAY:

A. The following table applies to the types of historical collection

HISTORICAL DATA COLLECTION PARAMETERS:

Historical Data Collection Parameters

| Process Variable | Data Type | Setpoint | Feedback | Short Term Historical | Long Term Historical |
|---|---|---|---|---|---|
| pH | analog | | | | YES |
| Water Flow: (Million Gallons per Day) | analog | | | | YES |
| Pressure | analog | | | | YES |
| Turbidity: NTU | analog | YES | YES | | YES |
| Amperage: Amps | analog | | | YES | |
| Voltage: Volts | analog | | | YES | |
| Dosage: | analog | YES | YES | | YES |
| Chlorine Residual: PPM (mg/l) | analog | YES | YES | | YES |
| | | | | | |
| Speed: RPM | analog | YES | YES | YES | |
| Level: Feet | analog | YES | YES | | YES |
| Cycle: ON/OFF – START/STOP | digital | | | YES | |
| Digital Position: OPEN/CLOSE | digital | | | YES | |
| Analog Position: % OPEN / CLOSE | analog | YES | YES | YES | |
| Starts: (# times equipment started over time) | analog | | | | YES |
| Runtime: Hours over specified period of time | analog | | | | YES |
| Temperature: degrees Fahrenheit | analog | YES | YES | YES | |

**SECURITY CONFIGURATION:**

A. Due to the confidential nature of security settings, ASPA will provide detailed information regarding the configuration of security after contract award.

**SCADA SERVER REPORTING SOFTWARE EXECUTION:**

A. One licensed copy of the Report Generation software shall be loaded, configured and tested on each SCADA server.

B. Data for reports shall be collected from two sources:
   1. Local SCADA server real-time data;
   2. iFIX historical data OR other

C. Contractor to develop a custom report and automatically sent by email to 2 persons.

D. Able to automatically save report to a file on a daily basis.

E. ASPA will determine report contents and design after award of the project.

F. Reports shall be scheduled to generate automatically and printed on the local network printer.

G. All automatically generated reports shall also be concurrently stored on the primary SCADA server hard drive.

H. All reports shall display the date and time of the report values.

**ALARM AND EVENT (A&E) NOTIFICATION EXECUTION:**

A. The A&E software provides the primary method of informing the operators and maintenance staff of a process alarm for both during and after working hours.

B. One licensed copy of the A&E software shall be loaded, configured and tested on the primary and back up SCADA server.

C. The A&E software shall be programmed to annunciate alarms using the following features:

1. E-mail notification.
2. telephone voice message (usually to a cell phone)

D. E-mail notification shall be programmed as follows:
   1. The contractor shall program the A&E software to send e-mail alarm notification to a maximum of 3 recipients from the primary SCADA server;
   2. The e-mail alarms are sent in conjunction with text and voice alarms annunciation;
   3. All e-mail messages shall be sent at the beginning of the alarm notification sequence; and
   4. Only critical alarms shall be programmed to be sent by e-mail as follows:
      a. All high level alarms;
      b. Power failure alarms;
      c. Communication failure alarms;

E. ASPA will provide the contractor with a list of operator, maintenance and administration staff with the following information:

   1. Name;
   2. Cell phone number;
   3. Types of alarms to receive;

F. All text, voice and e-mail messages shall be as follows:
   1. Unique text messages shall be developed for each individual alarm;
   2. Each message shall contain:
      a. Location;
      b. Detailed alarm description; and
      c. Alarm state (Alarm or Return to Normal).
   3. General and non-specific alarm descriptions are not permitted.

**MICROSOFT OPERATING SYSTEM SOFTWARE: CONFIGURATION:**

A. Load and configure each Microsoft operating systems on the primary and back up SCADA server and the SCADA client workstations.

B. Setup the primary SCADA server with security rights as directed by the ASPA SCADA tech / IT department.
C. The IT department will assign static IP addresses for the primary SCADA server and each client workstation.

**MICROSOFT OFFICE SOFTWARE:**

A. Install Microsoft Office 2007 (Word and Excel) in the primary and back up SCADA server and each SCADA client workstation.

**ANTI-VIRUS INSTALLATION:**

A. The Contractor will provide anti-virus protection software for the SCADA servers.

B. The contractor shall coordinate with the ASPA IT department the installation of AV software prior to connection of any server to the internet.

C. The contractor shall take every precaution to avoiding virus infection from contractor owned hardware such as thumb drives, CDs, etc., when connected to the SCADA server and workstations.

**SECTION: SOFTWARE**

**PART 4: SCADA DISPLAY EXECUTION**

**GENERAL REQUIREMENTS:**

A. The contractor shall rebuild and create a new SCADA (latest version) system, **OR** other proposed platform which includes existing SCADA functions on the current FIX32 installation. The work includes but is not limited to the following:

1. Converting existing & developing new water and wastewater screen displays
2. Pop-up displays
3. Realtime trend displays
4. Alarm summary display
5. Navigation
6. Realtime data links
7. Add additional tags to existing database if required to receive data from the pump stations and convert existing database
8. IO driver configuration
9. Alarming
10. Historical collection
11. Historical trending
12. Alarm history

B. Control configuration (digital and analog outputs) for the remote equipment shall be fully tested and confirmed working out in the field during installation.

3. Preparation Instructions

The quote must contain one (1) part. Offerors shall prepare all quotes in detail accordingly.

**a.** Quote Price: Offeror must set forth the rate for each type of item including shipping and handling costs as stated on the attached Quote Form (page 44) , which is incorporated herein as if fully set forth.

4. Qualification of Offerors

ASPA may make such investigations as it deems necessary to determine the ability of the Offeror to perform the work, and the Offeror shall furnish to ASPA such information and data for this purpose as ASPA may request, or the Offeror may be deemed non-responsive.

5. Basis of Award

Quotes for the specified items will be evaluated by the Procurement Department and approved by the Chief Financial Officer (CFO). Submission of a quote shall constitute a waiver of any challenge or dispute of the review process as well as the choice of methodology set forth on the score sheets. The awards will be made ASAP in accordance with the evaluation criteria set forth herein.

**MODIFICATIONS TO SCOPE OF WORK:**

A. ASPA must approve in writing any deviations to the project specifications prior to implementation.

B. The contractor may be required to remove any unapproved modifications to the installation in the event that ASPA does not approve the modifications.

C. The contractor shall contact ASPA for approval of any portions of the specification that require clarification or further details regarding design intent or implementation.

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## ATTACHMENT A

## QUOTE FORM

RFP NO. ASPA14.1144.ESD.SCADA

OFFEROR: _____

DATE: _____, 2013

Gentlemen/Ladies:

The undersigned, (hereafter called a "Offeror") _____(Corporation, Partnership or Individual), hereby proposes and agrees to furnish all the necessary information in accordance with the Scope of Work, Notice to Offerors, and other procurement requirements specified in these documents for the prices stated in the itemized quote form(s) attached hereto, plus any and all sums to be added and/or deducted resulting from all extra and/or omitted work in accordance with the unit and/or lump sum prices stated in the itemized quote form attached hereto.

The undersigned has read and understands the quote requirements, and is familiar with and knowledgeable of the local conditions at the place where the work is to be performed. We have read the Invitation for Quote Instructions and General Terms and Conditions to ascertain that all requirements are submitted at the date and time of quote opening.

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## ATTACHMENT B

## QUOTE TRANSMITTAL FORM

Date: _____

AMERICAN SAMOA POWER AUTHORITY

American Samoa Government

Gentlemen:

The undersigned (hereafter called an Offeror), hereby proposes and agrees to furnish all the necessary information to

RFP NO. ASPA14.1144.ESD.SCADA

in accordance with the General Terms and Conditions and other procurement requirements specified in this document for the prices stated in the itemized quote form(s) attached hereto, plus any and all sums to be added and/or deducted resulting from all extra and/or omitted work in accordance with the unit and/or lump sum prices stated in the itemized quote form attached hereto.

The undersigned has read and understands the quote requirements, and is familiar with and knowledgeable of the local conditions at the place where the work is to be performed. We have read the RFP Instructions attached to ascertain that all of the requirements are submitted in the quote at the date and time for opening.

_____
Signed

_____
Date

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## ATTACHMENT C

## SCADA UPGRADE

## PROPOSAL TRANSMITTAL FORM

## (On Respondent Letterhead)

Date: _____

AMERICAN SAMOA POWER AUTHORITY

American Samoa Government

To Whom It Concerns:

The undersigned (hereafter referred to as the Respondent) hereby proposes and agrees to furnish all of the requested submittal and proposal information pertaining to:

**RFP NO. ASPA14.1144.ESD.SCADA SCADA UPGRADE**

in accordance with the Scope of Work, General Terms and Conditions, and other procurement requirements specified in this document for the prices stated in the itemized proposal form(s) attached hereto, plus any and all sums to be added and/or deducted resulting from all extra and/or omitted work in accordance with the unit and/or lump sum prices stated in the itemized proposal form attached hereto.

The undersigned has read and understands the proposal requirements, and is familiar with and knowledgeable of the local conditions where the work is to be performed. The Respondent has read the RFP Instructions and General Terms and Conditions attached to ascertain that all of the requirements of the cost proposal are submitted in the proposal envelope, with five copies, at the date and time for proposal opening. (See Page Nine (9) of this document, "SUBMITTALS" to verify what the Respondent shall submit as requirements). The undersigned understands and accepts the terms of the proposal and ASPA requirements.

_____

Signed Seal

_____

Date

**AMERICAN SAMOA POWER AUTHORITY**
**Materials Management Office**

## ATTACHMENT D

## OFFEROR QUALIFICATIONS FORM

1. Name of Organization: _____

2. Business Address: _____

   _____

   _____

3. Telephone: (Home Office) _____

   Business Telephone: _____

   Email Address: _____

   Fax Number: _____

   Tax Identification Number:_

4. Contact Person: _____

5. Type of Business (please check one):

   Corporation____Partnership_____Proprietorship_____Joint Venture_____Other

   _____

   *Note: For Corporations – Articles of Incorporation Certification must be on record with the Treasurer of American Samoa. Copies of partnership agreements and articles of incorporation must be submitted to the Revenue Branch with application form and relevant documents. Aliens cannot operate sole ownership enterprises and partnerships with aliens are subject to immigration board review.*

6. Place of Organization or State of Incorporation:_

7. Owner's Names and Addresses (if not a Corporation):

   _____

   _____

8. For Corporations: Names and Addresses of Directors, Officers, and Stockholders with 20% or greater interest in the company.

_____

_____

9. List U.S. States and Territories where company is registered as a foreign corporation.

_____

_____

10. List all projects of similar scope and extent which the Respondent has conducted within the past five-years; provide the dollar value contract amount for each project, and list project owner contact information for reference inquiries.

==========

Location and Date of Project:

Nature and scope of contract (provide a brief project description): _____

_____

Name and address of awarding agency or owner for which work was performed:

_____

_____

Name, address, and phone number of Contact Person for the agency

_____

_____

_____

Contract Amount_____Date of Completion_____

If not completed, why?

_____

Was contract performed under joint venture, and if so with whom and under what arrangement?

_____

_____

Location and Date of Project:

Nature and scope of contract (provide a brief project description): _____

_____

Name and address of awarding agency or owner for which work was performed:

_____

_____

Name, address, and phone number of Contact Person for the agency

_____

_____

Contract Amount_____

Date of Completion_____

If not completed, why?

_____

Was contract performed under joint venture, and if so with whom and under what arrangement?

_____

_____

Location and Date of Project:_____

Nature and scope of contract (provide a brief project description): _____

Name, address, and phone number of Contact Person for the agency

Contract Amount_____ Date of Completion_____

If not completed, why?

Was contract performed under joint venture, and if so with whom and under what arrangement?

11. List the name or names of supervisory personnel proposed to be employed on the work under this Contract, including the qualifications and experience record for each. Personnel resumes may be included within the Respondent's proposal submittal.

| Name | Qualifications/Experience |
|---|---|
| | |
| | |
| | |

11. List the names and addresses of at least three (3) references, one of which should be a bank or other lending institution, governmental agency, or bonding company.

| Name of Reference | Address and Contact Information |
|---|---|
| | |
| | |
| | |

Current layout