

## STATEMENT OF WORK

### US EMBASSY SOFIA, BULGARIA POWER SYSTEMS – MODIFICATION/REPAIR/SERVICE POWER SYSTEMS SUPPORT PROGRAM, OVERSEAS BUILDING OPERATIONS

1.0 INTRODUCTION. This is a firm fixed price contract for onsite services at the US Embassy in Sofia, Bulgaria. All proposal packages must be accompanied with a work plan and projected site visit dates for all listed tasks within this work statement. All scope work must be completed no later than March 31, 2015 to include after visit reports. Please review section 3.0 for qualification requirements. Site location and specific equipment details are listed below:

US Embassy – Sofia, Bulgaria: (a.k.a. Embassy or Post):

- |    |                  |         |
|----|------------------|---------|
| 1. | SWB-1: Siemens   | QTY (1) |
| 2. | ATS#1: ASCO 7000 | QTY (1) |
| 3. | ATS#2: ASCO 7000 | QTY (1) |
| 4. | SWB-2: Siemens   | QTY (1) |

2.0 SCOPE OF WORK. The intent of this scope is to make the necessary repairs and modifications to obtain a fully automated and operational power transfer system. This includes control modifications to achieve a new electrical switchgear sequence of operation, and modifications to the Automatic Transfer Switch's (ATS) control features. The awarded contractor is responsible for all parts, equipment, accessories, and general wiring material necessary to complete all aspects of this work statement. Proposal packages must include a work intent summary and work plan outlining the corrective repair and actions necessary to meet the requirements of this work scope.

#### POWER SYSTEMS – MODIFICATION/REPAIR/SERVICE REQUIREMENTS:

1. Visit Post Sofia and coordinate all work efforts with the site Facilities Manager and OBO/FAC representative to minimize the impact on normal business operations at the embassy. Electrical transfer testing may be limited to after business hours and weekends. Provide the FM with a complete work and testing schedule, to include outages and transfers, for approval. Perform Lock-out/Tag-out and all necessary safety precautions outlined in the 2009 NFPA-70e, for electrical workplace safety.
2. LV-ATS: Modify the existing switchgear controls so that each ATS has full operational control over its generator. Reroute wiring as necessary and reprogram the ATS controls so that all generator start signaling, retransfer delay times, and generator cool down time is controlled by the respective ATS system.

3. LV-ATS: Follow the ATS settings guide included in Attachment D to program the ATS for proper drop out/pick-up voltages and frequency to provide a tighter protection window against under/over voltage sags and swells. Modifications to these settings may be required. This is acceptable with onsite OBO approval.
4. LV-ATS's: Research, troubleshoot, and make any required changes to ensure proper night and weekend (peak/nonpeak) operation to reflect the intent of the sequence of operation in attachment C. Provide a laminated detailed schematic wiring diagram and place it inside each ATS and in the main controls compartments of SWG2. Schematic can be hand drawn.
5. LV-SWG1: Ensure the existing Basler 27/59 relays remain connected with the existing pre-set over/under voltage settings designed to protect and control CBM.
6. LV-SWG1: Ensure corrections meet the operational intent of the new switchgear Sequence of Operation provided in section 3.2, attachment A. Conduct an operational witness test for Post and OBO representatives to validate functionality.
7. LV-SWG2: Correct deficiencies and modify control wiring to meet the operational intent of the new switchgear Sequence of Operation provided in section 3.2, attachment A. Conduct operational witness test for Post and OBO representatives to validate functionality.
8. As applicable, correct any additional minor deficiencies found in the course of this site work that can be easily corrected using post material and/or post labor assistance.
9. Upon completion of repairs, corrective actions, and sequence modifications, provide a Short Circuit Coordination Study, and Arc Flash Hazard analysis for the demark, MV-AVRs, MV-transformer, SWG1, ATS 1&2, and SWG2 distribution equipment. Install appropriate labels accordingly.
10. Provide and replace all Breaker internal backup batteries, PLC backup batteries in SWG1 and SWG2. Return the old batteries to the FM for proper disposal.
11. Conduct a full system cleaning and visual inspection of SWG1 and 2 and ATS-1 and 2.
12. Post the new Sequence of Operation (SOP) on each piece of effected Low Voltage switchgear.
13. Label with P-touch (white label with black letters 1/2" 12mm size or larger) the outside of the equipment to indicate the date maintenance and modifications were performed. For example: PM performed by (company name) via OBO/CFSM/FAC/MS on (date). For service contact OBO Power Systems Support – [PowerSupport@State.gov](mailto:PowerSupport@State.gov)
14. In addition to the final witness and acceptance test, conduct onsite operational and maintenance training for the Locally Employed Staff (LES) covering the sequence of operation, programmed settings, electrical safety concerns, and switchgear maintenance requirements. The training should be classroom and hands-on, not to exceed 3-hours.
15. In the final report provide a complete inventory and record nameplate data from the entire front end electrical system from the MV transformer to the main switchgear in the utility building. Include the generators, ATS, and any other distribution equipment as applicable. Refer to section 4.2 for executive summary requirements and report format.
16. Prior to departure provide an email summary to Chris Wojtas and Neil Goudy at [WojtasCT@state.gov](mailto:WojtasCT@state.gov); [GoudyN@state.gov](mailto:GoudyN@state.gov); [PowerSupport@state.gov](mailto:PowerSupport@state.gov) noting work completion and post's present operational status. For example: New sequence of operation installed, full system in Auto.
17. Out-brief with the Facilities Manager and OBO representative to cover operational status, outstanding items, or required follow-up action.

### 3.0 WORK STANDARDS AND QUALIFICATIONS.

The contractor **MUST** provide a valid copy of their **Electrical Contractor's License, Electrical Masters Licenses** (or state equivalent that provides signing authority for permits acquired by the electrical contractor), and any **Electrical Journeyman Licenses** for the personnel performing the work on site. These licenses are only accepted if they are issued by a state or municipal licensing authority in which the contractor's business operates, or if accepted by that state's licensing authority. Licenses will be verified through the state's website via [www.contractors-license.org](http://www.contractors-license.org) prior to acceptance of a proposal. A qualified electrical Journeyman or above is required to perform switchgear inspections, function testing, and system operations in accordance with this work statement, and must be on site at all times.

The contractor must provide copies of training certificates in the Fundamentals of Electrical Safety for all proposed onsite personnel. The NFPA 70E defines a qualified person as one who has skills and knowledge related to the construction and operation of the electrical equipment and installations, and has received safety training to recognize and avoid all hazards involved. All performing technicians and engineers must be formally trained to comply with NFPA-70E guidelines. The contractor shall furnish all tools, test equipment, arc-flash PPE, and electrical safety PPE required by the NFPA 70E to comply with this statement of work. The contractor will properly supervise all site personnel who are trained and qualified to work on medium voltage systems. Working voltages for the equipment under this statement of work are up to 35kV, line to line.

It is understood that personnel changes may be necessary during the duration of the project. If the awarded contractor must make personnel changes or substitutions, the new members will be required to meet all terms stated in section 3.0 as stated above. The notification of changes must be made to the Power Systems Support Program (PSSP) Specialists Chris Wojtas, [Wojtasct@state.gov](mailto:Wojtasct@state.gov), or Neil Goudy, [GoudyN@state.gov](mailto:GoudyN@state.gov). Approval must be granted by PSSP prior to any travel arrangements being made. Failure to receive approval will result in the unauthorized individual(s) being removed from post at the contractor's expense.

3.1 PRODUCTS USED/SHIPPING: The awarded contractor is responsible for all parts, equipment, accessories, and general wiring material necessary to complete all aspects of this work statement. The required material includes, but is not limited to, the following:

- A) Provide ten (10) of each size control fuses. Confirm fuse sizes and amounts with the Post facilities manager.
- B) Provide ten (10) total new "Danger High Voltage" signs to replace existing MV-AVR signs.
- C) Provide four (4) new breaker closing solenoids
- D) Provide three (3) new breaker control circuit boards
- E) Provide all required internal back up batteries for SWG1 and SWG2.

### 3.2 ATTACHMENTS:

- A) Proposed Sequence of Operation for SWG1
- B) Proposed Sequence of Operation for SWG2
- C) Proposed Operation for ATS-1, ATS-2, and night & weekend feature
- D) ATS Settings Guide
- E) Existing site One-Line drawing

3.3 COMMENCEMENT OF TRAVEL TO SITE AND WORK. All site visits and scope work must be completed no later than March 31, 2014. This includes subsequent paperwork and reporting. In conjunction with the work plan and price proposal provide a calendar of proposed visit and travel dates, noting off days. Provide the performing technician's names and credentials if not already on file. The contractor's work plan must provide an overview schedule of all required scope work, power transfers and outages for site coordination and approval. The contractor shall under no circumstances incur any travel or other costs, or begin the travel to the site or work at site until a signed purchase order is issued and a cable granting country clearance is received. Once awarded the contractor will be asked to furnish the COR the traveling technicians flight itinerary and security information.

3.4 SERVICE INTERRUPTIONS. The contractor shall plan, coordinate, and schedule all site work with the Facility Manager. Notification of this planned outage must be made to the Management Officer (Admin) and Information Management Officer. Notification shall include the loads within the facility to be affected by the outage and the hours and dates of interruptions. The contractor must schedule work to maintain flexibility since interruptions may not be granted on the date(s) requested. Electrical shutdowns and operation of electrical breakers, to include bypass transfer, shall be accomplished only by qualified personnel and upon advance approval of the Facility Manager. Where fire protection, detection, or evacuation alarms are affected, advance written approval of the Facility Manager shall be obtained. The implementation plan should be focused on minimizing any interruptions. Proper lock out/tag out procedures shall be followed to maximize safety; the contractor shall supply lock out/tag out materials. Power shall be maintained to all operational loads during normal working hours and maintained to all critical loads at all times except for planned and approved short duration switchovers or outages. Contractor is to expect night and weekend outages.

3.5 SITE RESTORATION. The contractor shall ensure that all facilities receiving this work shall be left in a condition acceptable to the OBO Representative, Facilities Manager, and the COR.

3.6 DISPOSAL OF MATERIALS REMOVED. The contractor shall be responsible for the disposal of all trash created while performing this work statement. The contractor shall transport all materials to be disposed of from the point of removal to the designated disposal storage site, and shall ensure that all items removed through this work are disposed of properly.

4.0 TRAINING. As stated in section 2.0, provide systems operation and safety training to site staff. This training should be a combination hands-on and classroom. Training must cover the building power transfer scheme, sequence of operation, programmed settings, electrical safety concerns, and switchgear maintenance requirements, not to exceed 4-hours. If an unsafe or hazardous condition is created training must be suspended and the area corded off with cones or caution tape to allow only qualified personnel within the four foot approach boundary.

4.1 SAFETY. Safety is the highest priority on this and all OBO/CFM/FM projects. The contractor shall direct all of those under his charge to work safely. Regular safety meetings shall be held among on-site contractor personnel, and safety concerns shall be brought to the attention of the Post Safety and Health Officer (PSHO) and the COR.

4.2 REQUIREMENTS AND DELIVERABLES. All travel and scope work must be completed no later than April 31, 2014, to include the after visit final report. The final summary report must outline site work completed, final equipment condition and operational sequences; along with any outstanding discrepancies, or safety concerns. The contractor shall provide one typed summary report, written in the English language. Deliver the final report electronically to the Power Systems Support Program at [PowerSupport@state.gov](mailto:PowerSupport@state.gov). The report is required to be in PDF format, with tabbed sections, and cannot exceed 5 MB in total size. To meet the size restriction the report can be broken down into multiple sections as necessary, and emailed separately. The report format should follow the guidelines listed below:

1. Provide a one page Executive Summary narrative overview of site conditions and work performed.
2. Provide a detailed narrative report encompassing each section of gear listed in section 1.0. Note the general condition of the equipment, nameplate data, findings & corrective measures. Provide both recommended and required follow-up items as applicable. Include power readings, photos, operational sequence.
3. Provide one Bill of Materials (BOM) stating any additional required repair material outside of this work scope. Note material name, part number, retail price and suggested source.
4. Provide one BOM for any additional recommended spare parts, tools, or safety equipment that post does not presently have onsite.
5. Provide a section noting the training given, and the names of the site personnel that attended.
6. Provide a copy of the site electrical one-line drawing. Note necessary changes in RED ink.
7. Label all modified equipment with the new Sequence of Operation.
8. Provide a complete Short Circuit Coordination Study report.
9. Provide and install the required Arc-Flash labels based on the Arc Flash analysis.

4.3 SECURITY REQUIREMENTS. All team members must hold a SECRET clearance or above.

5.0 PROJECT COSTS AND TRAVEL. This section provides the basis for payment of the contractor, and defines those activities related to the project that will be paid directly by OBO and the Embassy. The agreed upon cost of this work shall be a fixed price inclusive of all labor, equipment, materials, shipping, travel, and per diem costs.

5.1 ALLOWANCE FOR MISCELLANEOUS TIME REQUIREMENTS. The contractor's price proposal must allow for time delays that may be encountered in coordination of a planned testing. This includes delayed access to certain building spaces, meetings and report writing. No additional funds will be provided to compensate for additional time requirements or delays that could have been reasonably anticipated.

5.2 TRAVEL AND PER DIEM. It is the contractor's responsibility to understand Department of State travel rules and guidelines for contractors prior to incurring any costs. Costs incurred in violation of established travel rules and guidelines of the Department of State shall not be paid. If a visa is required for any location it is the contractor's responsibility to have a valid passport and obtain a visa. Refer to Para. 3.3 of this work statement for further travel details.

5.3 PROJECT COMMENCEMENT. The contractor shall provide a travel schedule and work plan in conjunction with cost proposal.

6.0 POINTS OF CONTACT:

Embassy Contact: On-site point of contact for this contract is Facilities Manager, Kevin Sessink. Phone and email will be provided upon contract award.

Washington D.C. Based Points of Contact:

Chris Wojtas  
OBO/CFMS/FAC/MS Power Systems Support Program Manager  
[WojtasCT@state.gov](mailto:WojtasCT@state.gov)  
703-516-1542

Neil Goudy  
OBO/CFMS/FAC/MS Power Systems Specialist  
[Goudyn@state.gov](mailto:Goudyn@state.gov)  
703-875-6190

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## Attachment-A

Sequence of Operation: SWG1, Main service gear:

SWG1: The intent is to have the Basler relays strictly protect the control system of the switch gear by opening the corresponding CBM breaker for SWG1. A loss of power, over / under frequency, or over / under voltage, will open the CBM breaker. Once power is stabilized the relays will close the CBM breaker starting the timer for the ATS's. If CBM is opened for any reason, the loss of voltage will be sensed at the corresponding ATS or ATS's which will start the associated generator and transfer to the emergency source. If an ATS feeder breaker is opened for any reason the corresponding ATS will sense the loss of power and start the corresponding generator and transfer to the emergency source.

For proper coordination, Basler over/under drop-out settings must be slightly wider than the ATS UV/OV drop-out settings. The intent is to have the ATS initiate a generator start whenever voltage/frequency sags and swells go outside of normal operating range as per the Attachment-C.

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## Attachment-B

Sequence of Operation: SWG2, Main-Tie-Main:

SWG2: The intent is to have the Basler relays strictly protect the control system of the switch gear by opening the corresponding CB1 and CB3 breakers in SWG2. A loss of power to either side of the tie breaker, for more than 30 seconds, will activate a time delay on the tie breaker that will open the effected main breaker and close the tie breaker (30second time delay). The intent is to allow the generator to function and provide power to the effected side first. This is due to having no remote monitoring of the tie breaker operation other than visual indication; therefore the desire for the diesel generator to be the primary back-up, and the tie breaker closing the tertiary. On restoration of utility power provide a 3-5 second delay for the opening of the tie and the re-closing of the main breaker. Ensure a break before make sequence.

Sequence of Operation: CB4:

It is our intent that CB4 only operate in the manual mode, and should not open automatically during night and weekend operations, or if a loss of power occurs on CB1 or CB3. At present

CB4 will auto-open for load-shedding during tie breaker operation. This feature is presently field wired into the ATS's.

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#### Attachment-C

Sequence of Operation: ATS 1 and ATS2:

ATS1: Is to be programmed to reflect the OBO standard settings in the Attachment D. At a loss of power, over / under frequency, or over / under voltage the ATS is to start the timing sequence and initiate the start of Gen-1 and transfer power to the emergency source within the set parameters. Upon restoration of stabilized power the ATS will retransfer to the preferred source.

ATS2: Is to be programmed to reflect the OBO standard settings in the Attachment D. At a loss of power, over / under frequency, or over / under voltage the ATS is to start the timing sequence and initiate the start of Gen-2 and transfer power to the emergency source within the set parameters. Upon restoration of stabilized power the ATS will retransfer to the preferred source.

Sequence of Operation: Night and weekend/Peak:

The existing installation has a night and weekend/Peak function field wired into the ATS's and a time clock located in SWG2. Upon loss of stable power, only one generator is called upon to start. At this time the system has been disabled by the staff so that both generators come online.

Our intent is to enable the night and weekend feature so that only one generator will start and feed SWG2; followed by the main-tie-main function to operate in accordance with the standard operational sequence as per attachment B for SWG2 main-tie-main.

When the night and weekend program is activated, the main-tie-main operation is to function in the auto mode with no changes. If an ATS calls for stable power only the generator selected will start and the corresponding ATS will transfer to the emergency source supplying power to only one side of the main-tie-main in SWB2. The main breaker that is affected by the outage will start the time out process (30 seconds) and open the effected main breaker and close the tie breaker.

When utility power is restored, the tie breaker will open and the affected side main breaker will close returning the system to the normal automatic function. This transfer should take no longer than 5 seconds, and not shorter than 3 seconds, following a break before make sequence.

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Attachment-D

AUTOMATIC TRANSFER SWITCH SETTINGS

A) Standard Specifications for all installed Automatic Transfer Switches (ATS). Also applies to PLC controlled breaker transfer configurations:

B) Standard Settings to be programmed for all non-CAA generator ATS units. These settings apply to all NEC/NCC facilities presently under construction, and existing facilities already online. For all systems already commissioned and functioning please make programming changes as applicable. Whenever programming a site specific setting, which differs from this document, ensure that a label is placed on the ATS or Switchgear to identify the site specific setting. This label must include the OBO office that authorized the site specific programmed setting.

Standard Settings to be programmed for all non-CAA generator Automatic Transfer Switches:

1. The starting time delay for AC failure should be set within 03 to 05 seconds delay prior to initiating a start signal. The intent is to minimize unnecessary start-ups from power flickers.
2. Program a transfer delay to 03 seconds to allow for the generator to reach 90% nominal voltage and frequency. Also known as emergency source pick-up, program at 90%. Total time from loss of Source-1 to ATS transfer to Source 2 should not exceed 20 seconds.
3. Set the voltage drop out, under-voltage, to 90% of nominal. (Opens if voltage goes 10% above or below nominal).
4. Set the frequency drop out settings to 97% of nominal, or to release if frequency fluctuates 3% above or below the desired frequency.
5. Set the normal source recovery voltage to 95% nominal, or 5% from nominal.
6. Set recovery frequency to 99% nominal or +/- 1% from nominal.
7. Set the normal source recovery voltage to 95% nominal, or 5% from nominal.
8. Enable in-phase monitoring so that transfers occur at the zero crossing. Or program a time-delay neutral of 3-seconds when transferring Emergency (S2) to Normal (S1) to allow for all fields to collapse, also known as phase synchronization.
9. Program a 10-minute delay Emergency to Normal, to allow for utility stabilization.

10. Program a 10-minute Generator cool down time at either the ATS or the Generator, but not both.

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Attachment-E

Existing one-line drawing, see attached PDF.