11 Preliminary Assessment Template

*Introduction: This document presents a template for the Preliminary Assessment (PA) that ESCOs are required to conduct in an ESPC project under the Energy Department’s (DOEs) ESPC IDIQ contract. This PA template was developed based on an actual PA from an actual ESPC project. Various names, locations, and details of the project have been altered so as not to reveal any proprietary information about the agency or the ESCO.*

*Instructions: This template is provided to give ESCOs an example of how to prepare a document that meets the DOE-stated goal of less than 20 pages (not including cover page, table of contents, and TO Schedules), while still meeting all of the goals and requirements of a PA. The template below can also be used by agencies as an example of how PAs can stay within the 20-page goal and still provide the information needed for you to make a (Go/No-Go) decision about the ESPC project at your site.*

*\*\*\*DISCLAIMER: THIS Template IS PROVIDED ONLY TO STIMULATE IDEAS. tHE STRUCTURE AND CONTENT ARE NOT INTENDED TO CONVEY ANY DETAIL OF COMPLETENESS OR PREFERENCE ON THE PART OF THE GOVERNMENT.\*\*\**

*If you need any assistance with the requirements of the Preliminary Assessment, please consult the agency’s Contracting Officer (CO). If you are an agency who needs assistance drafting the requirements for the PA, or reviewing the PA(s) submitted to you by the ESCO(s), please consult your Project Facilitator (PF).*

**(The PA Template begins on page 2 of this document. The remainder of this page is intentionally left blank.)**

**TEMPLATE**

**ABC Corporation**

**Fort Raup**

**Energy Savings Performance Contract**

**Preliminary Assessment**

**Submitted by ABC Corporation**

**Under Department of Energy**

 **Contract No. DE-AM36-09G0290XX**

**June 21, 2012**

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**Executive Summary**

ABC Corporation (ABC) is pleased to submit this Preliminary Assessment (PA) in response to the requirements stated in the Fort Raup’s Notice to Opportunity (NOO) letter dated April 6, 2012. ABC considered the site’s objectives as expressed in the NOO, and has developed a conceptual project that would install $7.5 million in energy conservation measures (ECMs), resulting in savings of approximately 76,400 million Btu annually, including over 10 million kWh of electrical energy. In addition, more than 35 million gallons of water would be saved every year. The improvements would be paid for over a 16 year period through guaranteed cost savings.

The conceptual project provides Fort Raup with significant and sustainable environmental benefits such as the reduction of more than 16 million pounds of greenhouse gases (CO2) annually, reduced waste water emissions into the surrounding streams, and better stewardship of the regional aquifer.

As defined in the NOO, Fort Raup’s objectives for this project included the following:

1. Develop a base-wide Energy Management Control System (EMCS) utilizing current United Facilities Guide Specifications (UFGS) that can connect to all buildings and subsystems. Include demand-side controls such as metering, tenant accounting modules, and load shedding automation to further reduce utility costs, improve billing accuracy, and streamline invoicing procedures.
2. Recommission buildings to ensure that HVAC and EMCS are operating as designed. Expand the recommissioning process to include envelope and roofing improvements and tenant energy awareness education.
3. Investigate any opportunities for lighting upgrades, water conservation, and cooperative utility agreements with external partners such as energy providers and neighboring municipal governments.

ABC’s recommend project addresses each one of these goals. Energy savings are achieved primarily through a major upgrade of the existing EMCS system, and through lighting upgrades. Water savings are achieved through a combination of measures designed to reduce the consumption of domestic and process water. The recommended ECMs included in this PA are as follows:

**RECOMMENDED Energy Conservation Measures**

**Technology Category 3, ECM 3.1 - Energy Management Control System (EMCS) Improvements**

This ECM will upgrade the existing EMCS to provice close efficient control of heating, ventilating and air-condition (HVAC) equipment. Existing control systems will be replaced with a LON-based EMCS. This ECM willl also integrate the various control systems in each facility and allow monitoring from a central location. Energy savings will be realized by optimizing the operation of the HVAC systems using control strategies through the EMCS.

**Technology Category 5, ECM 5.1 - Energy Efficient Lighting Upgrades**

This ECM will upgrade existing lighting systems in selected buildings at Fort Raup using a combination of energy efficient lamps, high-efficiency ballasts, reflectors, and in some cases, fixture replacements. Existing T-12 fluorescent lighting fixtures will be retrofitted with super T-8 systems. Where appropriate, incadescent lamps, HID lighting, and mercury vapor lighting systems will be replaced. Where cost effective, motion sensors will be installed. These improvements will result in energy savings and operations and maintenance costs.

**Technology Category 13, ECM 13.1 Domestic Water Conservation**

This ECM will upgrade existing plumbing fixtures and kitchen equipment to reduce annual water consumtion. Flow control systems be installed to comply with manufacturer’s specifications and reduce waste. High traffic bathrooms in the cantonment area will be targeted for improvements utalizing lower gpf fixtures.

**Technology Category 13, ECM 13.2 – Bearing Cooling Water Flow Control**

This ECM will provide flow control to the induced-draft (ID) fan bearings to reduce water consumption. The discharge water temperature was observed to be lower than the manufacture’s specifications, indicating that the water flow through the bearings is higher than required. Water savings will result from a reduction in the amount of water used to cool the bearings.

**Technology Category 13, ECM 13.3 – Leak Repairs**

This ECM will replace or repair leaking domestic water and high-temperature hot water valves at Fort Raup. Fourteen leaking values with leak flow rates (gpm) of .04 to 2.60 are recommended for repair in this PA.

**Technology Category 13, ECM 13.4 – Recirculation of Wash Rack Sediment Basin Water**

This ECM will install a water recirculation system on two Building 1630 sediment basins to achieve the necessary agitation without wasting fresh water. Recirculating water to agitate the sump pump only 15 minutes every 12 hours instead of the entire day will result in water savings.

**Technology Category 13, ECM 13.5 – Kitchen Water Conservation**

This ECM will instal flow control systems on selected existing dish machines, garbage disposers and vegetable peelers. Water savings will result by limiting water use to within manufacturer specifications.

**POTENTIAL Energy CONSERVATION MEASURES**

Initial assessment of renewable opportunities indicate a potential to add a solar ECM. When project economics were considered this ECM was classified as a potential ECM to be evaluated more precisely during the developoment of the proposal.

Fort Raup is the U.S. Army’s premier combat training site and the solutions presented in the PA will help it achieve this mission by providing an efficient and comfortable working, learning, and living environment for its soldiers and support staff. The recommended project provides Fort Raup with a clear and achievable roadmap for Executive Order 13423 compliance by 2015.

**conceptual COST SAVINGS AND FINANCIAL SUMMARY**

In the first year of the post-acceptance performance period, we project that Fort Raup will realize energy, water and energy-related cost savings of $827,911. ABC would guarantee $794,795 of the conceptual annual cost savings, giving the project a simple payback of 9.1 years. Fort Raup would pay the amount of the guaranteed savings to ABC on a monthly basis to cover its performance period operating expenses, and the debt service on the loan that ABC will secure to finance purchase and installation of the ECMs. Total payments of $16,208,583 over the contract term will be made from guaranteed savings of $16,280,564. Given an estimated project interest rate of 6.0%, the length of the post acceptance performance period is expected to be 16 years. With a construction period of 14 months, the total contacts term comes to 17 years, 2 months.

**table of energy and water savings**

The table below summarizes recommended energy conservation measures as well as the; conceptual energy (MBtu) savings and water (kgal) savings, conceptual energy and water cost savings, and conceptual energy-related (O&M) savings. Further detail on the ECMs is included in the body of the preliminary assessment and in the attached Task Order schedules.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ECM** | **Estimated****Implementa-tion Price** | **Conceptual****Annual Energy & Water Savings** | **Conceptual****Annual Cost Savings ($/yr) \*** | **Simple Payback years** |
| **Total Energy Savings (MBtu/yr)** | **Water Savings (kgal/yr)** | **Total Energy Savings** | **O&M Cost Savings** | **Water Savings** | **Total Cost Savings** |
| 3.1 Energy Management Control System Upgrade | $2,837,850  | 53,200 | 0 | $280,742  | $37,300  | $0  | $318,042  | 8.9  |
| 5.1 Energy-Efficient Lighting Upgrade | $3,108,000  | 17,907 | 0 | $313,094  | $25,650  | $0  | $338,744  | 9.2  |
| 13.1 Domestic Water Conservation | $1,418,925 | 5,348 | 24,303 | $11,125  | $0  | $100,000  | $111,125  | 12.8  |
| 13.5 Water Conservation-Induced Draft Fan | $13,513  | 0 | 4,686 | $0  | $0  | $10,000  | $10,000  | 1.4  |
| 13.8 Water Conservation-leak repairs | $27,025  | 0 | 6,290 | $0  | $0  | $10,000  | $10,000  | 2.7  |
| 13.9 Water Conservation-Wash Rack Sediment Basin | $54,050  | 0 | 0 | $0  | $0  | $25,000  | $25,000  | 2.2  |
| 13.10 Water Conservation-Kitchen Water Conservation | $40,537  | 0 | 0 | $0  | $0  | $15,000  | $15,000  | 2.7  |
| Totals – Simple Payback Weighted Average | $7,500,000  | 76,455 | 35,279 | $604,961  | $62,950  | $160,000 | $827,911  | 9.1  |

The figures stated here are preliminary in nature. Should Fort Raup authorize ABC to proceed with an Investment Grade Audit, ABC will refine the project design and update the costs of the ECMs and the cost savings they will generate. ABC will also solicit competitive bids for financing, and will select the financing offer that provides best value for Fort Raup.

**Project Development and Implementation Schedule**

The envisioned schedule for Project Development and Implementation is as follows.

**Activity/Milestone Duration Start Finish**

Preliminary Assessment Submitted to Fort Raup, DOE 45 days 5/6/12 6/21/12

Preliminary Assessment Presentation, Government Review, 45 days 6/21/12 8/6/12

 Government Comments and ABC Responses to Comments

Notice of Intent to Award and TO-Request for Proposal (RFP) Issued 30 days 8/7/12 9/6/12

 (after Fort Raup obtains approvals to proceed)

Investment Grade Audit Complete 75 days 9/7/10 11/21/12

Technical & Price Proposal Developed and Submitted 15 days 11/22/12 12/6/12

Proposal Presentation, Government Review, 60 days 12/7/12 2/6/130

 Government Comments to ABC and ABC Responses to Comments

Revised Proposal as Applicable, Fort Raup Obtains Approvals 30 days 3/7/13 3/6/13

 to Negotiate, Final Negotiations Complete

Task Order Award 30 days 3/7/13 4/6/13

 (after Fort Raup obtains approvals to award)

Project Design & Construction 14 months 4/7/13 6/6/14

 (Including Commissioning and Post Installation M&V Report)

Complete Project Acceptance 1 month 5/7/14 6/6/14

Post-acceptance Performance Phase 16 years 6/7/14 6/6/30

Annual Measurement & Verification Reports 16 years 6/7/14 6/6/30

Invoices to Government & Government Payments 16 years 6/7/14 6/6/30

**ECM Descriptions – Technical Approach**

**ECM 3.1: ENERGY MANAGEMENT CONTROL SYSTEM IMPROVEMENTS**

This ECM will upgrade the existing energy management control system (EMCS) to provide adequate control of heating, ventilating and air-conditioning (HVAC) equipment. This ECM will also integrate the various control systems in each facility and allow monitoring from a central location. Energy savings will be realized by optimizing the operation of the HVAC systems using control strategies through the EMCS.

**Existing Conditions**

A preliminary facility audit was conducted for 120 facilities across the Fort Raup post. Numerous control systems with components provided by several manufacturers are installed throughout the post. The majority of facilities either have no intelligent control system or utilize a Williams DDC system that is outdated and does not support goals established by CERL and the ACE for a LON-based EMCS. Facilities with no centralized EMCS contain a combination of manual and programmable thermostats.

The level of control is space temperature and the entire system is not optimally controlled. Buildings containing EMCS do have some degree of control for associated air-handling units, chillers, boilers, DX unit, heat exchanger, pumps, and motors. The level of control depended on the age and functionality of the installed equipment. A survey of the front end and discussion with maintenance personnel indicated that HVAC schedules have been overridden in many facilities so systems run 24 hours per day, 7 days per week. Temperatures are not optimized for the operation.

**Recommended Upgrades**

This ECM includes replacement of existing control systems with a LON-based EMCS. Recommended upgrades include comprehensive controls solutions in each of the buildings included in this ECM:

* Complete installation of LON field controllers for all HVAC systems as well as field devices associated with these systems.
* Integrate the EMCS to real-time-pricing signals from Tallahassee Power. This will allow Fort Raup to change the load shape by resetting temperatures and controlling HVAC systems during periods of high energy cost.
* Install the equipment necessary to connect the buildings to the LAN. Fort Raup will be responsible for providing two active ports on their existing switch. In the cases where the LAN does not exist in the building, ABC will install the EMCS as a stand-alone LON system fully prepared for a switch with active ports.

All of the building EMCS systems will be tied into the existing Metasys Extended Architecture® front-end control system. Recommended upgrades include implementing HVAC equipment schedules and control strategies. The strategies employed will vary by facility. Typical strategies to be implemented include:

* Unoccupied temperature setback and fan shutdown
* Optimal start/stop
* Demand controlled ventilation
* Use of outside air economizers (free cooling)
* Supply air temperature (hot deck and cold deck) reset
* Boilers, chillers, and associated pumps disabled in response to outdoor air temperature

Hot water supply temperature and chilled water supply temperature set point dynamic reset in response to outdoor air temperature variations. A typical reset strategy will continually reset hot water on a linear schedule based on outdoor temperatures, from 180ºF on a winter design day to 85°F (user defined) at a predefined outdoor temperature.

O&M Savings result from installation of new controls reducing the preventive maintenance and repairs associated with the existing ageing systems. The estimated O&M savings are equal to the cost to the government of having ABC maintain the new systems, in lieu of having the existing O&M contractor maintain the systems.

**ECM 5.1: ENERGY-EFFICIENT LIGHTING UPGRADE**

This ECM will upgrade existing lighting systems in an estimated 100 buildings at Fort Raup using a combination of energy-efficient lamps, high-efficiency ballasts, reflectors, and in some cases, fixture replacements.

**Existing Conditions**

Lighting systems within the buildings consist of numerous fixture types varying in age and condition. Some buildings or areas within buildings utilize energy-efficient lighting technology. However, many facilities have standard T-12 fluorescent lighting fixtures with magnetic ballasts, compact fluorescent lamps, incandescent lamps, and HID fixtures. Existing exit signs included a mixture of incandescent lamps and LED fixtures.

**Recommended Upgrades**

Buildings with standard T-12 fluorescent lighting fixtures will be retrofitted with super T-8 systems (including lamps and electronic ballasts). The retrofit involves the removal and disposal of existing lamps and ballasts, fixture cleaning, and the installation of the new T-8 lamps and electronic ballasts. Where appropriate, incandescent lamps will be replaced with compact fluorescent lamps, super T8 systems, or metal halide fixtures. Some HID lighting will be replaced with more efficient HID systems or super T8 systems. Mercury vapor lighting systems will be replaced with efficient metal halide or super T8 systems. Motion sensors will be installed in areas where cost-effective.

Wherever possible, four-lamp fixtures will be de-lamped to two-lamp fixtures with reflectors to maintain the required light levels. The new lamps will have a high color-rendering index (CRI) rating for consistent high-quality lighting. Lighting maintenance will be considered when selecting lighting material to minimize the lighting inventory variety. Ballast life and replacement costs will be considered as well. The Investment-Grade Audit (IGA) will include a room-by-room count of the lighting fixtures. The specific retrofit of each fixture will be selected to meet the lighting requirements for each room. Light level readings will be taken during the IGA to verify the existing and post-installation light levels (foot-candles). Opportunities for the installation of lighting occupancy sensors will be investigated.

The O&M savings for this measure are based upon the average expected time between replacements, the annual burn hours, and the expected replacement costs.

**ECM 13.1: DOMESTIC WATER CONSERVATION**

This ECM will upgrade existing plumbing fixtures and kitchen equipment to reduce annual water consumption.

**Kitchen Systems**

*Dish Machine Flow Control System: Buildings 207, 512, 642, and 726*

**Existing Conditions:** Four kitchen wash areas are included in this preliminary assessment. Kitchen wash areas in Buildings 512, 642, and 726 have the same types and quantities of equipment. Four dish machines run for six hours per day (two hours per meal), seven days per week. Three are rated to use city water at 5.2 gpm and 180°F, and one is rated at 3.7 gpm and 180°F. Because the final rinse nozzles are worn (due to the unit’s age and apparent lack of recent service), the water flow to the unit is currently operating well above the manufacturer’s recommended flow rate. Water flow at each unit is estimated at 9 gpm.

**Recommended Upgrades:** To eliminate the excessive use of water, flow control systems will be installed on the final rinse supply line to meet the manufacturer’s specifications. Energy savings are based on the reduction of 180° F final rinse water. The flow control system will consist of the installation of an inline flow meter, valves and a replacement of final rinse nozzles.

*Pulper Flow Control System: Buildings 512 and 642*

**Existing Conditions:** The Somat Model SPC-75S pulpers in the Building 512 and 642 Dining Commons Kitchen and Cafeteria run for six hours per day, seven days per week. Pulpers typically use more water than the manufacturer’s rating. In this case, while the manufacturer’s required flow rate is 2 gpm, the actual current makeup flow rate is estimated at 5 gpm into the pulper and 6 gpm into the pulping food trough.

**Recommended Upgrades:** As designed, the manufacturer provides an integral circulating pump for this system that is used to supply recirculated water to the front end of the pulper from the pulper sump. In this installation, however, fresh water is currently being used to provide makeup to the pulper. To eliminate the excessive use of city water, this ECM installs a flow control system to reduce the amount of makeup to the pulper.

*Food Waste Disposal Trough Flow Control System:* Buildings 207, 512, 642, and 726

**Existing Conditions:** The food waste disposal troughs in the above locations operate for six hours per day, seven days per week. Six food waste disposal troughs are configured with multiple nozzles: flow to each trough estimated at 15 gpm. Flow from each nozzle propels waste down the trough into the inlet of an integral garbage disposal where it is macerated and disposed in a garbage bin. The required flow rate for trough water is generally equal to the required garbage disposal flow rate.

**Recommended Upgrades:** To eliminate the excessive use of water, flow controls will be installed to meet the manufacturer’s specification, which is approximately 14 gpm.

*Potato Peeler Flow Control System: Buildings 207, 512, 642, and 726*

**Existing Conditions:** The Insinger Model 50BP-2 potato peelers in the Building 207, 512, 642, and 726 Dining Commons kitchens run for one hour per day, seven days per week, and are rated to use water at 4 gpm, though the water flow to the units is currently well above the manufacturer’s recommended flow rate: estimated at 6 gpm.

**Recommended Upgrades:** To eliminate the excessive use of water in the potato peelers, a flow control system on the water supply line to each unit will be installed. The flow control system consists of a flow restriction device and ancillary piping and fittings.

**Domestic Water Systems**

Domestic System Water Conservation: High-traffic bathrooms throughout Fort Raup

**Existing Conditions:** During the preliminary assessment, several of the existing bathrooms were surveyed. It was observed that a high percentage of existing toilets, urinals, and sinks are older models with high flow rates: 3.5 gallons per flush (gpf) for toilets, 1.5 gpf for urinals, and 2.0 gpm for sinks. The toilets in newer or remodeled bathrooms are ultra low flush 1.6 gpf fixtures that do not warrant replacement and are not included in this analysis. Based on demographic information, an estimate of water, energy, and cost savings associated with fixture retrofits in high-traffic bathrooms has been assessed.

**Recommended Upgrades:** The recommended retrofit will target high-traffic bathrooms in the cantonment area. The existing high-flow toilets are manufactured by American Standard, Eljer, and Kohler, and will be replaced like for like with new 1.28 gpf fixtures. Urinals will be retrofitted with new 0.5 gpf flushometer kits. Sink faucets will be retrofitted with faucet flow restrictors rated at 1.0 gpm. Fort Raup has undergone a successful trial installation of waterless urinals. During the IGA, waterless urinals will be evaluated and included in the analysis.

**ECM 13.2: BEARING COOLING WATER FLOW CONTROL**

This ECM will provide flow control to the induced-draft (ID) fan bearings to reduce water consumption.

**Existing Conditions**

The wood-fired boiler at the Central Energy Plant uses an induced draft to maintain negative pressure in the boiler system. Due to the high flue gas temperatures, the operating temperature of the ID fan bearings approaches the upper design limit. Therefore, the water is used for single-pass cooling of these bearings. During the walkthrough survey, water flow was observed to be approximately 20 gpm. The discharged water is piped over to a nearby sump, where it is then sent to the Industrial WWTP for treatment. The manufacturer’s specification for each bearing (two bearings per fan) is 4 gpm water flow, with inlet water temperature of 55°F and a discharge temperature of 110°F. The discharge water temperature was observed to be approximately 60°F, indicating that the water flow through the bearings is higher than required.

**Recommended Upgrades**

A flow control system will be installed to regulate the amount of water used to cool the bearings. This system will regulate flow based on the discharge temperature at the outlet of the bearings, which will be limited to 110°F. Based on manufacturer specifications, the total required flow to the fan bearings is 8 gpm.

**ECM 13.3: LEAK REPAIRS**

This ECM will replace leaking domestic water and high-temperature hot water valves at Fort Raup.

**Existing Conditions**

Fourteen leaking valves were identified during the Fort Raup PA. Domestic water (hot and cold) and high-temperature hot water systems are affected. Table 1 summarizes PA initial walk through assumptions:

**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Valve Number** | **Building Number** | **Location** | **Estimate Leak Flowrate (gpm)** | **Water Temp. (°F)** |
| 1 | 638 | Mech. Room | 0.10 | 325 |
| 2 | 1840 | Wash Rack | 0.41 | City Water Temp. |
| 3 | 1810 | Women's Restroom  | 0.06 | 120 |
| 4 | 1810 | Wash Rack | 0.37 | City Water Temp. |
| 5 | 1620 | Wash Rack | 0.09 | City Water Temp. |
| 6 | 1201 | Wash Rack | 0.22 | City Water Temp. |
| 7 | 1201 | Wash Rack | 0.10 | City Water Temp. |
| 8 | 1170 | Maintenance Pad | 0.33 | City Water Temp. |
| 9 | 1170 | Wash Rack | 0.20 | City Water Temp. |
| 10 | 726 | Mech. Room | 0.30 | 120 |
| 11 | 726 | Mech. Room | 0.04 | 180 |
| 12 | 1237 | Wash Rack | 2.60 | City Water Temp. |

**Recommended Upgrades**

The leaking valves will be repaired or replaced, as appropriate.

**ECM 13.4: RECIRCULATION OF WASH RACK SEDIMENT BASIN WATER**

This ECM will install a water recirculation system each of the two Building 1630 sediment basins to achieve the necessary agitation without wasting fresh water.

**Existing Conditions**

Runoff from the Building 1630 and Building 1620 wash racks is collected in two sediment basins located behind Building 1630. These basins share a Water Maze CL-600D water clarification system that treats the oily runoff before it is discharged to sanitary drain. Wastewater is directed to the first sediment basin and then flows over a single steel grating that acts as a weir and into the second basin. The second basin contains the drainage area and all of the piping going to and from the water clarification system. The water clarification system takes its water from a float-actuated sump pump, which is placed in a pit between two weirs separating the sediment basin from the drain. The water that the system clarifies is piped to drain.

This water clarification system was installed approximately seven years ago and treats water at a rate of 30 gpm. Since the flow rate of the wash rack hose bibs is higher than the water treatment rate of the Water Maze system, water constantly crests over the weirs, bypasses the treatment system and goes straight to drain. The performance of the Water Maze system is also impaired because the system draws water from the bottom of the pit between the two weirs (since water has a higher density than oil). A large quantity of oil floats to the surface, where it is not removed from the effluent. Therefore, whenever the wash racks are used a single faucet is left running into the basins at Building 1630 for the entire day, for the purpose of agitating the water enough so that the sump pump will take up a proportional amount of oil with the water that it treats.

**Recommended Upgrades**

A water recirculation system will be installed in each of the two Building 1630 sediment basins to achieve the necessary agitation without wasting fresh water. Each system comprises a sump pump that is placed at the bottom of the basin and piped to spray nozzles that are located around the basin perimeter and agitate the surface of the water. The sump pump will recirculate at least 5% of the water in the basin per minute, which is the volume of water that must be recirculated so that the Water Maze sump pump works optimally (i.e., takes up a proportional amount of oil with the water it treats). The water recirculation system will run for 15 minutes every 12 hours.

**ECM 13.5: KITCHEN WATER CONSERVATION**

This ECM will install flow control systems on the selected existing dish machines, garbage disposers and vegetable peelers.

Dish Machines:Buildings 207 & 642

**Existing Conditions:** The dish machines in the Building 207 and 642 kitchens use fresh water, including a high temperature final rinse. In the dish machine cascading design, the fresh water used for final rinse is reused as makeup water in the pre-wash and wash zones before being drained to the sanitary sewer system.

**Recommended Upgrades:** A flow control system will be installed on the existing final rinse water supply line to each dish machine. The system will set the flow rate of the final rinse water to the manufacturer specifications. Even though the system will include the capability to adjust water flow, such adjustment is not required. The flow control system will not decertify, void warranties, or alter the performance of the dish machine. A short length (less than one foot) of existing linear piping must be removed to make room for the control system.

Garbage Disposers**:** Buildings 207, 642, and 7097

**Existing Conditions:** The kitchen in each of the buildings has a garbage disposer. Fresh water is supplied to the garbage disposer by spray nozzles (located in the basin or trough that feeds into the disposer). Fresh water is also directly piped into the disposer. The combined flow of the two water streams needs to meet manufacturer specifications in order to adequately lubricate the disposer and allow the wastewater to discharge via sanitary drain without obstructing the piping system.

**Recommended Upgrades:** A flow control system will be installed on the Building 642 and 7097 disposers to limit water use to within the manufacturer’s specifications. The flow control system will not decertify, void warranties, or alter the performance of the garbage disposer. A short length (less than one foot) of existing linear piping must be removed to make room for the control system. The existing disposer in the Building 207 kitchen will be replaced with a new disposer that uses 7 gpm of water. Retrofit with a flow control system would save significantly less water than the recommended replacement, because the manufacturer specified flow rate for the existing unit is very high (9 gpm).

Vegetable Peeler: Buildings 207,512, and 642

**Existing Conditions:** The kitchen in each of the buildings has a vegetable peeler. Fresh water is supplied to the peeler by spray nozzles (located in the basin that feeds into the peeler). Fresh water is also directly piped into the peeler. The combined flow of the two water streams needs to meet manufacturer specifications in order to adequately lubricate the peeler and allow the wastewater to discharge via sanitary drain without obstructing the piping system.

**Recommended Upgrades:** A flow control system will be installed on each of the vegetables peelers to limit water use to within the manufacturer specifications. The flow control system will not decertify, void warranties, or alter the performance of the peelers. A short length (less than one foot) of existing linear piping must be removed to make room for the control system.

**POTENTIAL ENERGY CONSERVATION MEASURES**

A Photovoltaic (PV) ECM was looked at and may be implementable if utility rebates, tax incentives, land availability and utility purchase are favorable. The implementability will be evaluated in conjunction with Fort Raup personnel during the proposal development period. It appears that a PV array could be installed in the southeast corner of the facility that could produce 100kw with an annual reduction of 100,000 kwh from the utility.

**Project Management**

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**Management Process And Organization**

ABC Corporation has developed an effective approach to project management based upon our experience on more than 1500 successful performance contracts. We have established an experienced and qualified team consisting of ABC employees and subcontractors. The Project Manager, supported by the Project Designer will be responsible for preparation of the IGA and Task Order Proposal. After task order award, the Project Manager will retain overall responsibility for implementation of the recommended ECMs; however, the Construction Manager will have primary responsibility for construction efforts. After project acceptance, the Project Manager will be responsible for ensuring performance and M&V reporting.

**Organizational Chart and Team Background and Experience**

The ABC team organization chart, shown below, is composed of highly qualified individuals from ABC, as well as competitively selected subcontractors to ensure that a quality project is delivered to Fort Raup.

**Performance Contracting Project Management System**

**Fort RAUP ESPC Team Organizational Chart**

ABC Head Office

Fort Raup POCs

Project Manager

Name: xxxxx

Admin Supt

Cost Control

Purchasing

Contracting

Commissioning Team

M&V Team

O&M Team

Construction Manager

Name: xxxxx

Quality Assurance

Project Designer/ Engineer

Name: xxxxxt

Safety Officer

Material & Logistics Management

Skilled Labor Management

Subcontract Management

**Project Management Responsibilities**

**Project Manager**

The ABC Project Manager, name, will manage the definition and implementation of the project scope with complete authority concerning the approval, allocation, and control of resources; and assigned subcontractors. He will be the primary point of contact during the proposal development phase and will coordinate the technical and design efforts during this time. Responsibilities include:

* Planning, organizing, and controlling the ABC technical team to ensure successful fulfillment of the project,
* Establish and maintain effective working level interfaces with ABC, subcontractors, and Government staff,
* Ensuring that all contractual obligations are executed according to applicable ABC and Government policies and procedures,
* Advising branch and area management of projected deviations from explicit or implicit contract performance requirements,
* Ensuring that all contract deliverables are provided on schedule with a high level of customer satisfaction,
* Establishing and overseeing a comprehensive change control system and ensuring that change orders are negotiated with the government

**Construction Manager**

The Construction Manager, name, has over xx years experience in the field with a proven track record of success. He is responsible for the oversight of all construction efforts at Fort Raup. He ensures that construction occurs according to contract, schedule and budgetary requirements without sacrificing quality. In order to accomplish this objective he is responsible for:

* Maintaining good communications between ABC company representatives, Fort Raup representatives, subcontractors, inspectors and others to discuss and resolve schedules, work procedures, complaints and construction problems. This includes conducting formal weekly meetings during construction with Fort Raup representatives to discuss schedule, and resolve problems.
* Management of master schedules, project time lines and milestones. This includes scheduling the project in logical steps and budgeting time required to meet deadlines and then monitoring for adherence to deadlines.
* Managing site labor requirements. Directs and supervises workers. Determines labor requirements, dispatches workers to construction sites. Ensures project time sheets for all on-site personnel are completed to meet required timekeeping submittals.
* Managing site material requirements. Overseeing the requisition of supplies and materials to ensure that materials are received timely, and are inventoried and stored as required.
* Ensuring that construction projects comply with, or are completed in accordance with, federal, state, local, and industry specifications and standards, including ensuring the acquisition of all required permits. Ensuring compliance with environmental, safety and health, quality assurance, and Occupational Safety and Health Act requirements.
* Managing construction activity in accordance with approved contract documents, established engineering practices, and construction industry standards.

**Project Engineer/Designer**

The Project Engineer/Designer, name, has experience and knowledge of building system operation, maintenance and controls including HVAC, lighting and water. She is responsible for overseeing all design efforts related to the project and managing the engineering aspects effectively. She will participate in all design aspects of the project from inception to final acceptance including the site survey and investment grade audit. Will be responsible for coordinating and directing the integration of technical activities into the project. Will confer with ABC management, construction, and/or Fort Raup staff to discuss project specifications and technical procedures. She will ensure that drawings are developed consistent with Fort Raup’s specifications and requirements, and federal, state and industry regulations and standards. The engineer will perform ABC’s final review of drawings and other design submittals.

**O&M Team**

Review equipment specifications and best practices to develop operations and maintenance requirements for installed ECMs. Provide operations manuals and training to Fort Raup, as specified in the contract, on the operation and maintenance of installed ECMs. Where it is agreed that ABC will perform the operation and maintenance, perform the required O&M to ensure that equipment is performing as specified. Where ABC is not performing O&M, review Fort Raup maintenance records to determine if required functions are performed and report on the results of review.

**M&V Team**

Works with Fort Raup representatives to determine responsibility for equipment maintenance, performance, and operational factors so as to develop an M&V plan that assures accurate determination of energy savings throughout the performance period. Assists in monitoring the execution & achievement of energy savings measures to ensure that savings are consistent with guarantees identified in the contract. Is proactive in supporting the project team in taking necessary actions to limit risk and ensure high-level customer satisfaction. Identifies opportunities for additional energy savings. After project acceptance, responsible for the annual measurement & verification reports.

**Quality Assurance**

Responsible for implementing a system of actions, procedures and methods to ensure that the desired project will be achieved. This includes the monitoring of processes to determine if procedures are carried out and associated feedback to reduce errors. It involves continued evaluation of the activities of planning, design, construction, and maintenance, and the interactions of these activities. It must be kept current with the actual construction taking place in the field and include procedures for incorporating design changes into the construction plans be well developed and fully utilized.

**Commissioning Team**

The team is responsible for verifying that all the ECMs have been installed properly, are performing as specified and achieve the project requirements as specified in the contract.

**Health & Safety Officer**

The officer will develop, the implementation and maintenance of a comprehensive health and safety program designed to prevent accidents and injury. They will establish and implement safety training objectives and conduct or provide for safety/health related training. They will conduct facility and site inspections, job hazards analyses, and other evaluations to identify hazards and potential risks, and make recommendations as required. In cases of on- site injuries, they make sure that the sufferers get first aid and then examine the reasons behind the accident

**Subcontract Management**

Effective subcontract management starts with selecting the best value company for the project. ABC will consider the use of qualified subcontracts for the project as the need is identified and when it will be more advantageous. All subcontractors are thoroughly vetted prior to selection based on relevant experience, past performance, safety record, ability to obtain insurance and bonding, and cost.

**Labor, Material & Logistics Management**

The project will be planned and monitored to ensure efficient utilization of labor, material and equipment.

**Admin Support Team**

Provides the day to day administrative support including; contracting, purchasing, cost control, labor compliance reporting and other functions necessary to ensure a successful project.

**Risk, responsibility, and performance Matrix**

*\*\*\*disclaimer: THIS SECTION IS PROVIDED ONLY TO STIMULATE IDEAS. tHE CONTENT IS NOT INTENDED TO CONVEY ANY PREFERENCE ON THE PART OF THE GOVERNMENT.\*\*\**

| **RESPONSIBILITY/DESCRIPTION** | **CONTRACTOR-PROPOSED APPROACH** |
| --- | --- |
| **1. Financial** |  |
| a. Interest rates: Neither the contractor nor the agency has significant control over prevailing interest rates. Higher interest rates will increase project cost, financing/project term, or both. The timing of the TO signing may impact the available interest rate and project cost. | After completion of the IGA, a competitive process will be used to select the financier offering the best value for the Government. The interest rate will be locked at the time of Task Order signing. This is a fixed rate over the term of the contract. The rate used in the PA is a representative rate of what could be obtained, and is subject to change prior to award. |
| **b. Construction costs**: The contractor is responsible for determining construction costs and defining a budget.. In a fixed-price design/build contract, the agency assumes little responsibility for cost overruns. However, if construction estimates are significantly greater than originally assumed, the contractor may find that the project or measure is no longer viable and drop it before TO award. In any design/build contract, the agency loses some design control. **Clarify design standards and the design approval process (including changes) and how costs will be reviewed.** | PA pricing is based on limited design detail using parametric estimates and past experience. We believe the costs are reasonably close to those expected for the proposal. Proposal costs will incorporate competitive subcontractor quotes and be calculated into a fixed price proposal. Design standards will be incorporated into the task order award. Change orders to increase or decrease price will only occur through a formal change process in concurrence with Fort Raup.  |
| **c. M&V confidence**: The agency assumes the responsibility to determine the confidence that it desires to have in the M&V program and energy savings determinations. The desired confidence will be reflected in the resources required for the M&V program, that the ESCO must consider the requirement prior to submittal of the final proposal**. Clarify how project savings are being verified (e.g., equipment performance, operational factors, energy use) and the impact on M&V costs.** | The final M&V plan will be developed with Fort Raup to determine responsibility for equipment maintenance, equipment performance and operational factors, so as to develop an M&V plan that assures accurate determination of energy savings throughout the performance period. The final M&V plan will be developed mutually with Fort Raup.  |
| **d. Energy Related Cost Savings**: The agency and the contractor may agree that the project will include savings from *recurring* and/or *one-time* costs. This may include one-time savings from avoided expenditures for projects that were appropriated but will no longer be necessary. Including one-time cost savings before the money has been appropriated may involve some risk to the agency. Recurring savings generally result from reduced O&M expenses or reduced water consumption. These O&M and water savings must be based on actual spending reductions. **Clarify sources of non-energy cost savings and how they will be verified.** | The O&M and R&R responsibilities assigned to ABC for ECM 3.1 will be funded from recurring savings resulting from a reduction in the government’s responsibilities. ECM 5.1 savings will result from a reduction in replacement costs. A one-time avoided cost savings has been included based on communications with Fort Raup. This will be researched and refined during the proposal development phase.  |
| **e. Delays**: Both the contractor and the agency can cause delays. Failure to implement a viable project in a timely manner costs the agency in the form of lost savings, and can add cost to the project (e.g., construction interest, re-mobilization). **Clarify schedule and how delays will be handled.** | ABC will maintain a critical path methodology project schedule and inform Fort Raup when delays are suspected and work to mitigate overall project schedule impacts. The project schedule will be reviewed during weekly job site meetings.  |
| **f. Major changes in facility**: The agency (or Congress) controls major changes in facility use, including closure. **Clarify responsibilities in the event of a premature facility closure, loss of funding, or other major change.** | In the event that the Fort Raup (or Congress) closes a facility, then Fort Raup will be able to buy out the remaining portion of the contract (presented on Schedule TO-5 of the Price Proposal section included in the Proposal). Other changes may require a contract adjustment to the guaranteed savings, M&V and/or payments.  |
| **2. Operational** |  |
| **a. Operating hours**: The agency generally has control over operating hours. Increases and decreases in operating hours can show up as increases or decreases in “savings” depending on the M&V method (e.g., operating hours multiplied by improved efficiency of equipment vs. whole-building/utility bill analysis). **Clarify whether operating hours are to be measured or stipulated and what the impact will be if they change.** If the operating hours are stipulated, the baseline should be carefully documented and agreed to by both parties. | Operating hours will be specified to determine savings and will remain unchanged for guarantee purposes. Fort Raup will maintain adequate and necessary records which will be made available to ABC Corporation during the annual M&V review. Any changes and the associated loss or gain in savings are a Fort Raup risk. |
| **b. Load**: Equipment loads can change over time. The agency generally has control over hours of operation, conditioned floor area, intensity of use (e.g., changes in occupancy or level of automation). Changes in load can show up as increases or decreases in “savings” depending on the M&V method. **Clarify whether equipment loads are to be measured or stipulated and what the impact will be if they change.** If the equipment loads are stipulated, the baseline should be carefully documented and agreed to by both parties. | Equipment loads will remain unchanged for the purpose of M&V and ABC associated guarantee. Fort Raup will maintain adequate and necessary records which will be made available to ABC Corporation during the annual M&V review. However, any changes and the associated loss or gain in savings are a Fort Raup risk. |
| **c. Weather**: A number of energy efficiency measures are affected by weather. Neither the contractor nor the agency has control over the weather. Should the agency agree to accept risk for weather fluctuations, it shall be contingent upon aggregate payments not exceeding aggregate savings. **Clearly specify how weather corrections will be performed.** | ABC will use a 30-year weather database in building models. Since weather factors typically average out over the term of an ESPC contract, weather is not a significant factor in the achievement of savings. The weather conditions will be specified in the proposal. |
| **d. User participation**: Many energy conservation measures require user participation to generate savings (e.g., control settings). The savings can be variable and the contractor may be unwilling to invest in these measures. **Clarify what degree of user participation is needed and utilize monitoring and training to mitigate risk.** If performance is stipulated, document and review assumptions carefully and consider M&V to confirm the capacity to save (e.g., confirm that the controls are functioning properly). | The proposal will include the recommended specifications for the equipment recommended. When user participation is required to generate savings, one of these scenarios will occur:• ABC will provide on-site staff, or• Fort Raup has trained people on staff to participate appropriately; or• ABC will train the Fort Raup personnel to participate appropriately; or• If Fort Raup requests, ABC can perform the required participation as part of a separate service agreement.  |
| **3. Performance** |  |
| **a. Equipment performance**: The contractor has control over the selection of equipment and is responsible for its proper installation, commissioning, and performance. The contractor has responsibility to demonstrate that the new improvements meet expected performance levels, including specified equipment capacity, standards of service, and efficiency. **Clarify who is responsible for initial and long-term performance, how it will be verified, and what will be done if performance does not meet expectations.** | The proposal will include the specifications for the equipment recommended. Equipment performance will be verified during commissioning and, as necessary, ABC will make corrections. Equipment will not be considered performing until Fort Raup representatives agree. Equipment design, equipment selection, and installation of the equipment are the responsibility of ABC.  |
| **b. Operations**: Performance of the day-to-day operations activities is negotiable and can impact performance. However, the contractor bears the ultimate risk regardless of which party performs the activity. **Clarify which party will perform equipment operations, the implications of equipment control, how changes in operating procedures will be handled, and how proper operations will be assured.** | Fort Raup will perform all operations, although ABC will provide operational support to ECM 3.1 through a part time technician for the term of the contract. ABC will provide manuals and train Fort Raup personnel in the proper operation of newly installed equipment. Proper operation of ECMs will be verified through the performance period M&V. |
| **c. Preventive Maintenance**: Performance of day-to-day maintenance activities is negotiable and can impact performance. However, the contractor bears the ultimate risk regardless of which party performs the activity. **Clarify how long-term preventive maintenance will be assured, especially if the party responsible for long-term performance is not responsible for maintenance (e.g., contractor provides maintenance checklist and reporting frequency). Clarify who is responsible for performing long-term preventive maintenance to maintain operational performance throughout the contract term. Clarify what will be done if inadequate preventive maintenance impacts performance.** | Fort Raup will perform maintenance of the installed ECMs. ABC will train Fort Raup personnel in the proper preventive maintenance of newly installed equipment. ABC will also provide maintenance oversight to ensure that all scheduled maintenance is performed properly and assist as appropriate. When required preventive maintenance has not been performed, ABC will not be responsible for performance. |
| **d. Equipment Repair and Replacement**: Performance of day-to-day repair and replacement of contractor-installed equipment is negotiable, however it is often tied to project performance. The contractor bears the ultimate risk regardless of which party performs the activity. **Clarify who is responsible for performing replacement of failed components or equipment replacement throughout the term of the contract.** Specifically address potential impacts on performance due to equipment failure. Specify expected equipment life and warranties for all installed equipment. Discuss replacement responsibility when equipment life is shorter than the term of the contract. | Unless otherwise specified in the ECM Description, all equipment installed will have either the full manufacturer’s warranty or a one-year warranty (whichever is longer). An extended warranty period may be negotiated. Fort Raup will perform all equipment replacement after the warranty period. ABC will provide a technology refresh of up to $30,000 in year one (escalated annually) to upgrade ECM 3. ABC will provide training for the proper equipment repair and replacement of ESPC installed equipment. Most ECMs have equipment with useful lives longer than the PA term. In the event of a shorter term, ABC can include replacement costs if desired by Fort Raup, but this will extend the term or reduce the project size. |

**Training**

Training is a critical part of an ESPC because the personnel who will be operating the new equipment need to understand operating procedures and the associated requirements of the new equipment. ABC will provide O&M manuals for each of the installed ECMs. We will also provide hands-on training to designated Fort Raup employees who will be operating any of the new equipment. This training will occur concurrently with the start-up of the new equipment or during the customer acceptance phase of a particular ECM. With the exception of ECM 3.1: EMCS / Building Automation, training for ECMs will consist of one or two days on site. The training for ECM 3.1 will be a combination of on-the-job training as well as formal classroom training. The formal classroom training will be a 40-hour class for 10 people to be held on base in a suitable classroom.

**Measurement and Verification Overview**

The Measurement and Verification (M&V) methodology to be employed for this project is consistent with the FEMP document titled M&V Guidelines: Measurement and Verification for Federal Energy Projects, Version 3.0. The FEMP protocol provides the general approach to M&V for typical ECMs. The specific measurement and verification approach for recommended ECMs at any site is significantly influenced by the availability of site utility data, utility billing histories, sub-metering data, and amount of savings projected.

**RECOMMENDED Site-Specific M&V Plan**

A detailed M&V plan will be jointly developed by Fort Raup and ABC and submitted with the proposal. The recommended M&V approach for each ECM is selected based on ECM complexity, conceptual savings, cost of the M&V procedure, and other factors identified by Fort Raup and ABC. The methods recommended for the ECMs in this project scope are presented in Table 1.

**Table 1: Recommended M&V Methodology by ECM**

| **ECM** | **Technology** | **M&V Methodology** |
| --- | --- | --- |
| 3.1 | Energy Management Control System (EMCS) Improvement | **FEMP Option D:** Calibrated simulations will be created for the affected facilities utilizing detailed survey data and extensive mechanical equipment metering to determine baseline and potential post installation energy consumption. EMCS operating characteristics recorded during the commissioning of the system will be applied to calibrated simulation models to determine actual post installation energy use and energy savings. Trend reports and alarm reports generated by the EMCS will be reviewed on a quarterly basis to ensure that the EMCS setpoints and control algorithms are operating as specified in the proposal. EMCS hardware will be visually inspected at least annually.  |
| 5.1 | Energy-Efficient Lighting Upgrade | **FEMP Option A:** Pre- and post-installation spot measurement of lighting fixture kW for a sample of lighting fixtures within each electrically significant fixture configuration will be used to calculate the baseline and post-installation energy demand (kW). Lighting burn hours will be determined during the proposal development phase through detailed interviews with building managers. The lighting burn hours will be the same for pre- and post-installation conditions. The lighting savings will be the difference between the pre- and post-installation energy consumption and demand. The energy savings will be calculated one time and reported in the Post-Installation M&V report. Lighting systems in a sample of buildings will be visually inspected annually to ensure that energy efficient equipment is still in use.  |
| 13.1 | Domestic Water Conservation | **FEMP Option A:** Pre- and post-installation water usage will be determined for a sample of replaced fixtures.This will be a one-time measurement. The water reduction per fixture will be applied to a mutually agreed upon hours of use, flushes per day, etc. |
| 13.2 | Fan Bearing Cooling Water Control | **FEMP Option A:**  Pre- and post-installation water usage will be determined for the bearing units. This will be a one-time measurement. Hours of water flow will be mutually agreed on to be 8,760 hours per year. No ongoing M&V activities are required. |
| 13.3 | Water: Leak Repairs | **FEMP Option A:**  The pre-retrofit water consumption per leak will be measured. Water savings for this measure equal the existing water use. The leak will be verified that it has been repaired. No ongoing M&V activities are required. |
| 13.4 | Water: Wash Rack Sediment Basin | **FEMP Option A:**  Water flow through Building 1630 faucet that provides water to the sediment basins is to be measured. The water savings are based on the water flow measured and the number of hours per year water is used for agitation. The pump system energy usage is based on the kW draw and the number of hours per year that it will operate. The power draw for the agitation pumps will be measured and used to determine the energy increase due to the installation of pumps. The savings for this measure are based upon mutually agreed upon hours of agitation for the sediment basins.  |
| 13.5 | Kitchen Water Conservation | **FEMP Option A:**  The pre- and post-retrofit water flow will be measured for each piece of equipment. Annual visual inspections will occur to insure that the flow control is still in place and operating properly.  |

**Intentionally LEFT BLANK FOR ESCO TO ADD ADDITIONAL INFORMAtion AS NEEDED.**

**TO Schedules**

 Schedule Date: June 21, 2012

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| SCHEDULE TO-1 (Preliminary Assessment – PA)PROPOSED GUARANTEED COST SAVINGS AND CONTRACTOR PAYMENTS**IMPORTANT INFORMATION**(1) This schedule is not to be altered or changed in any way. Please note any clarifications in the comments/explanations area below.(2) {Reserved}(3) The guaranteed annual cost savings are based on the general description of M&V plan proposed for the project.(4) The total of annual contractor payments represents the TO price and should be supported by information submitted.(5) If applicable, prior to the post-acceptance performance period, implementation period allowable payments and energy savings are one-time amounts only.(6) The proposed guaranteed cost savings during the implementation period and post-acceptance performance period must exceed the contractor payments. (7) If applicable, submit escalation rates applied to initial estimated annual cost savings in column (a) as follows: a) energy rates \_3\_% per year (specify for each energy type; b) energy-related O&M savings (including water and sewer): \_3\_% per year. (8) If selected, the contractor shall complete the installation of all proposed ECMs not later than \_14\_\_ months after task award. |
| Task Order No: | Contractor Name: ABC | Project Site: Fort Raup |
|  | **(a)Estimated Cost Savings ($)** | **(b)Proposed Guaranteed Cost Savings ($)** | **(c)Contractor Payments ($)** |
| **Implementation Period** | $ 260,000 | $ 260,000 | $ $ 250,000  |
| **Post-Acceptance Performance Period Year** | **(d)Estimated Annual Cost Savings ($)** | **(e)Proposed Guaranteed Annual Cost Savings ($)** | **(f)Annual Contractor Payments ($)** |
| One |  $ 827,911  |  $ 794,795  |  $ 794,794  |
| Two |  $ 852,748  |  $ 818,638  |  $ 818,637  |
| Three |  $ 878,330  |  $ 843,197  |  $ 843,196  |
| Four |  $ 904,680  |  $ 868,493  |  $ 868,492  |
| Five |  $ 931,820  |  $ 894,547  |  $ 894,546  |
| Six |  $ 959,775  |  $ 921,384  |  $ 921,383  |
| Seven |  $ 988,568  |  $ 949,025  |  $ 949,024  |
| Eight |  $ 1,018,225  |  $ 977,496  |  $ 977,495  |
| Nine |  $ 1,048,772  |  $ 1,006,821  |  $ 1,006,820  |
| Ten |  $ 1,080,235  |  $ 1,037,026  |  $ 1,037,025  |
| Eleven |  $ 1,112,642  |  $ 1,068,136  |  $ 1,068,135  |
| Twelve |  $ 1,146,021  |  $ 1,100,180  |  $ 1,100,179  |
| Thirteen |  $ 1,180,402  |  $ 1,133,186  | $ 1,133,185  |
| Fourteen |  $ 1,215,814  |  $ 1,167,181  |  $ 1,167,180  |
| Fifteen |  $ 1,252,288  |  $ 1,202,196  |  $ 1,202,195  |
| Sixteen |  $ 1,289,857  |  $ 1,238,263  |  $ 1,176,297  |
| Total Post Acceptance |  **$ 16,688,088**  |  **$ 16,020,564**  | **$ 15,958,583**  |
| Total Implementation Period & Post Acceptance | **Total Guaranteed Cost Savings (b+e)** | **Total Contractor Payments (c+f)** |
| **$ 16,280,564**  | **$ 16,208,583**  |

Explanations/Comments:

1. Payments will be made monthly over the 16 year payment period.
2. Implementation Period includes $260,000 of estimated utility rebates. These will be researched further during the proposal development phase.

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| SCHEDULE TO-2IMPLEMENTATION PRICE BY ENERGY CONSERVATION MEASURE**IMPORTANT INFORMATION:** 1) This schedule is not to be altered or changed in any way. Please note any clarifications in the comments/explanations area below.2) Implementation expense shall include only direct costs for each ECM and no post-acceptance performance period expenses. Indirect expenses and profit will be applied to the sum of direct expenses for all ECMs and project development to calculate total implementation price (d) for the project. 3) Contractor shall attach adequate supporting information detailing total implementation expenses.4) Contractor shall propose bonded amount representing the basis of establishing performance and payment bonds per Section H of the contract, as required.5) Attached supporting information shall be presented to identify portions of ECM or project expenses included in proposed bonded amount.6) Proposed bonded amount is assumed to include indirect expenses and profit applied to implementation expenses above, unless otherwise specified by contractor.7) For the following ECMs, enter the *total installed capacity of new equipment* in the units specified (e.g., chillers-150); chillers and packaged units in tons, VFDs in hp, boilers and furnaces in input Btu/hr, BAS/EMCS in number of points, transformers in kVA, generators in kW. For lighting ECMs, specify baseline kW treated.8) M&V expense shall not include any performance-period expenses. |
| Project Site: Fort Raup | Task Order No: 1 | Contractor Name: ABC |
| Tech Category(TC) | ECM No. | Equipment Description – Title | ECM Size | M&V Expense ($) | Implementation Expense | (c)Profit($) | (d) Implementation Price ($):(a) +(b)+(c)=(d) |
| (a)Direct ($) | (b)Indirect ($) |
| n/a | n/a | Project Development | n/a |  n/a  |  $ 450,000  |  |  |  |
| 3 | 3.1 | Energy management control system improvements | 1.0 M SF, 3000 points |  $ 70,000  |  $ 2,100,000  |  |  |  |
| 5 | 5.1 | Lighting improvements | 1.5 M SF |  $ 20,000  |  $ 2,300,000  |  |  |  |
| 13 | 13.1 | Domestic water conservation | 2.85 M SF |  $ 5,000  |  $ 1,050,000  |  |  |  |
| 13 | 13.2 | Induced draft fan bearings – cooling water flow control | 8 GPM |  $ 1,500  |  $ 10,000  |  |  |  |
| 13 | 13.3 | Leak repairs | 2 MG/yr |  $ 1,500  |  $ 20,000  |  |  |  |
| 13 | 13.4 | Recirculation of wash rack sediment basin water | 5 MG/yr |  $ 1,500  |  $ 40,000  |  |  |  |
| 13 | 13.5 | Kitchen water conservation | 6 MG/yr |  $ 1,500  |  $ 30,000  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| TOTALS |  |  |  |  $ 101,000  |  $ 6,000,000  |  $ 1,020,000  | $ 480,000  |  $ 7,500,000  |
| Bonded Amount ($): 7,500,000 |  |  |  |  |  |  |

Explanations/Comments:

1. Indirect expense are 17% of direct expense and profit is 8% of direct expenses
2. M&V Expense includes only direct costs

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| SCHEDULE TO-3 – POST-ACCEPTANCE PERFORMANCE PERIOD CASH FLOW (page 1) |
| IMPORTANT INFORMATION: This schedule is not to be altered or changed in any way. |
| Project Site: Fort Raup | Task Order No: 1 | Contractor Name: ABC |
| **Project Capitalization** |  | Applicable Financial Index: U.S. Treasury Note | Issue Date: 6/14/12 |
| Total Implementation Price (from TO-2 Total) |  $ 7,500,000  | Term (Years): 16 | Source: www. xxxxxxx |
| Plus Financing Procurement Price ($) |  $ 500,000  | Index Rate: 4.00% | Effective Through: TBD at award |
| Less Implementation Period Payments (from TO-1 (final) (c)) *(If proposed, must be fully documented)* | ($250,000) | Added Premium (adjusted for tax incentives): 2.00% |  |  |
| Total Amount Financed (Principal) |  $7,750,000  | Project Interest Rate: 6.00% |  |  |
|  |
| Term (year)  | 1 | 2 | 3 | 4 | 5 | 6 |
| **Annual Cash Flow (Post-Acceptance Performance Period)** |  |  |  |  |  |  |
|  Debt Service |  |  |  |  |  |  |
|  Principal Repayment | $ 126,999  | $ 181,957  | $ 214,637  | $ 250,016  | $ 288,276  | $ 329,624  |
|  Less incentives (i.e., REC, White Tag, etc.) |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
|  Net principal repayment before interest | $ 126,999  | $ 181,957  | $ 214,637  | $ 250,016  | $ 288,276  | $ 329,624  |
|  Interest ($) |  $ 461,545  |  $ 452,430  |  $ 440,624  |  $ 426,783  |  $ 410,742  |  $ 392,320  |
| Total Debt Service (a) |  $ 588,544  |  $ 634,387  |  $ 655,261  |  $ 676,799  |  $ 699,018  |  $ 721,944  |
| **Post-Acceptance Performance Period Expenses** |  |  |  |  |  |  |
| Management/Administration |  $ 15,000  |  $ 15,300  |  $ 15,606  |  $ 15,918  |  $ 16,236  |  $ 16,561  |
| Operation |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Maintenance |  $ 75,000  |  $ 76,500  |  $ 78,030  |  $ 79,591  |  $ 81,183  |  $ 82,807  |
| Repair and Replacement |  $ 30,000  |  $ 30,600  |  $ 31,212  |  $ 31,836  |  $ 32,473  |  $ 33,122  |
| Measurement and Verification |  $ 45,000  |  $ 25,000  |  $ 25,500  |  $ 26,010  |  $ 26,530  |  $ 27,061  |
| Permits and Licenses  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Insurance  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Property Taxes  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Other – Describe and Explain |  |  |  |  |  |  |
| Other – Describe and Explain |  |  |  |  |  |  |
|  SUBTOTAL Before Application of Indirect Rates |  $ 165,000  |  $ 147,400  |  $ 150,348  |  $ 153,355  |  $ 156,422  |  $ 159,551  |
| Indirect Cost Rate (%) | 17.0% | 17.0% | 17.0% | 17.0% | 17.0% | 17.0% |
| Indirect Cost Applied ($) |  $ 28,050  |  $ 25,058  |  $ 25,559  |  $ 26,070  |  $ 26,592  |  $ 27,124  |
|  SUBTOTAL Post-Acceptance Performance Period Expense | $ 193,050  | $ 172,458  | $ 175,907  | $ 179,425  | $ 183,014  | $ 186,675  |
| Post-Acceptance Performance Period Profit (%) | $ 13,200  | $ 11,792  | $ 12,028  | $ 12,268  | $ 12,514  | $ 12,764  |
| Post-Acceptance Performance Period Profit ($) | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% |
|  TOTAL Post-Acceptance Performance Period Expenses (b) |  $ 206,250  |  $ 184,250  |  $ 187,935  |  $ 191,693  |  $ 195,528  |  $ 199,439  |
| TOTAL - ANNUAL CONTRACTOR PAYMENTS (a)+(b) |  $ 794,794  | $ 818,637  | $ 843,196  | $ 868,492  | $ 894,546  | $ 921,383  |

Schedule TO-3, Page 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Term (year)  | 7 | 8 | 9 | 10 | 11 | 12 |
| **Annual Cash Flow (Post-Acceptance Performance Period)** |  |  |  |  |  |  |
|  **Debt Service** |  |  |  |  |  |  |
|  Principal Repayment | $ 374,270  | $ 422,438  | $ 474,372  | $ 530,328  | $ 590,577  | $ 655,415  |
|  Less incentives (i.e., REC, White Tag, etc.) |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
|  Net principal repayment before interest | $ 324,270  | $ 422,438  | $ 474,372  | $ 530,328  | $ 590,577  | $ 655,415  |
|  Interest ($) |  $ 371,328  |  $ 347,562  |  $ 320,803  |  $ 290,818  |  $ 257,360  |  $ 220,161  |
| TOTAL Debt Service (a) |  $ 745,598  |  $ 770,000  |  $ 795,175  |  $ 821,146  |  $ 847,937  |  $ 875,576  |
| **Post-Acceptance Performance Period Expenses** |  |  |  |  |  |  |
| Management/Administration |  $ 16,892  |  $ 17,230  |  $ 17,575  |  $ 17,927  |  $ 18,286  |  $ 18,652  |
| Operation |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Maintenance |  $ 84,463  |  $ 86,152  |  $ 87,875  |  $ 89,633  |  $ 91,426  |  $ 93,255  |
| Repair and Replacement |  $ 33,784  |  $ 34,460  |  $ 35,149  |  $ 35,852  |  $ 36,569  |  $ 37,300  |
| Measurement and Verification |  $ 27,602  |  $ 28,154  |  $ 28,717  |  $ 29,291  |  $ 29,877  |  $ 30,475  |
| Permits and Licenses  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Insurance  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Property Taxes  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Other – Describe and Explain |  |  |  |  |  |  |
| Other – Describe and Explain |  |  |  |  |  |  |
|  SUBTOTAL Before Application of Indirect Rates |  $ 162,741  |  $ 165,996  |  $ 169,316  |  $ 172,703  |  $ 176,158  |  $ 179,682  |
| Indirect Cost Rate (%) | 17.0% | 17.0% | 17.0% | 17.0% | 17.0% | 17.0% |
| Indirect Cost Applied ($) |  $ 27,666  |  $ 28,219  |  $ 28,784  |  $ 29,360  |  $ 29,947  |  $ 30,546  |
|  SUBTOTAL Post-Acceptance Performance Period Expense | $ 190,407  | $ 194,215  | $ 198,100  | $ 202,063  | $ 206,105  | $ 210,228  |
| Post-Acceptance Performance Period Profit (%) | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% |
| Post-Acceptance Performance Period Profit ($) | $ 13,019  | $ 13,280  | $ 13,545  | $ 13,816  | $ 14,093  | $ 14,375  |
|  TOTAL Post-Acceptance Performance Period Expenses (b) |  $ 203,426  |  $ 207,495  |  $ 211,645  |  $ 215,879  |  $ 220,198  |  $ 224,603  |
| TOTAL - ANNUAL CONTRACTOR PAYMENTS (a)+(b) | $ 949,024  | $ 977,495  | $1,006,820  | $1,037,025  | $1,068,135  | $1,100,179  |

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Term (year)  | 13 | 14 | 15 | 16 | Totals |
| **Annual Cash Flow (Post-Acceptance Performance Period)** |  |  |  |  |  |
|  **Debt Service** |  |  |  |  |  |
|  Principal Repayment | $ 725,151  | $ 800,112  | $ 880,651  | $ 905,177  |  $ 7,750,000  |
|  Less incentives (i.e., REC, White Tag, etc.) |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
|  Net principal repayment before interest | $ 725,151  | $ 800,112  | $ 880,651  | $ 905,177  |  $ 7,750,000  |
|  Interest ($) |  $ 178,939  |  $ 133,391  |  $ 83,194  |  $ 28,002  |  $ 4,816,002  |
| TOTAL Debt Service (a) |  $ 904,090  |  $ 933,503  |  $ 963,845  |  $ 933,179  |  $ 12,566,002  |
| **Post-Acceptance Performance Period Expenses** |  |  |  |  |  |
| Management/Administration |  $ 19,025  |  $ 19,406  |  $ 19,794  |  $ 20,190  |  $ 279,598  |
| Operation |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Maintenance |  $ 95,120  |  $ 97,022  |  $ 98,962  |  $ 100,941  |  $ 1,397,960  |
| Repair and Replacement |  $ 38,046  |  $ 38,807  |  $ 39,583  |  $ 40,375  |  $ 559,168  |
| Measurement and Verification |  $ 31,085  |  $ 31,707  |  $ 32,341  |  $ 32,988  |  $ 477,338  |
| Permits and Licenses  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Insurance  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Property Taxes  |  $ -  |  $ -  |  $ -  |  $ -  |  $ -  |
| Other – Describe and Explain |  |  |  |  |  |
| Other – Describe and Explain |  |  |  |  |  |
|  SUBTOTAL Before Application of Indirect Rates |  $ 183,276  |  $ 186,942  |  $ 190,680  |  $ 194,494  |  $ 2,714,064  |
| Indirect Cost Rate (%) | 17.0% | 17.0% | 17.0% | 17.0% | 17.0% |
| Indirect Cost Applied ($) |  $ 31,157  |  $ 31,780  |  $ 32,416  |  $ 33,064  |  $ 461,392  |
|  SUBTOTAL Post-Acceptance Performance Period Expense | $ 214,433  | $ 218,722  | $ 223,096  | $ 227,558  | $ 3,175,456  |
| Post-Acceptance Performance Period Profit (%) | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% |
| Post-Acceptance Performance Period Profit ($) | $ 14,662  | $ 14,955  | $ 15,254  | $ 15,560  | $ 217,125  |
|  TOTAL Post-Acceptance Performance Period Expenses (b) |  $ 229,095  |  $ 233,677  |  $ 238,350  |  $ 243,118  |  $ 3,392,581  |
| TOTAL - ANNUAL CONTRACTOR PAYMENTS (a)+(b) | $1,133,185 | $ 1,167,180 | $ 1,202,195 | $ 1,176,297 | $15,958,583 |

Explanations/Comments:

1. A 3% escalation rate has been applied to performance period expenses.
2. The implementation period payment will be applied to reduce the principle repayment.
3. The finance procurement price includes construction finance expenses of $450,000, administrative expenses of $15,000, and bonding expense of $35,000.
4. The stated interest rate is the estimated rate that can be achieved. The final interest rate will be based on market conditions at the time of award. The rate will locked at time of award and will be fixed over the post acceptance period of performance.

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| --- |
| SCHEDULE TO-4Task Order Performance Period First Year Estimated Annual Cost Savings, by Energy Conservation Measure and Technology Category |
| **IMPORTANT INFORMATION:**1) Project Square Footage (in 1000 SF) - Include only building square footage affected by installed ECMs in project.2) For column (a) insert estimated energy baseline by ECM and total project in MBtu based on IGA, and proposal data.3) For column (c1), annual electric demand savings (kW/yr) is the sum of the monthly demand savings4) Energy conversion factors for MBtu: MBtu=106 Btu; Electricity — 0.003413 MBtu/kWh; Natural Gas — 0.1 MBtu/therm ; #2 Oil — 0.128 MBtu/gal.5) Specify "Other" energy savings in (e)(1) and (e)(2) as applicable. Include energy type \_\_\_\_; energy units \_\_\_\_\_\_; and MBtu conversion factor \_\_\_\_\_ MBtu/ \_\_\_\_\_ (unit)6) This schedule is not to be altered or adapted in any way. Please note any clarifications in the comments/explanations area below.  |
| Project Site: | Task Order #: | Contractor: | Project Square Footage (KSF): |
| TCNo.Att 2 | ECMNo. | a.ECM energy baseline(MBtu/yr) | b1.Electric energy savings(kWh/yr) | b2.Electric energy savings($/yr) | c1.Electric demand savings(kW/yr) | c2.Electric demand savings($/yr) | d1.Natural gas savings(MBtu/yr) | d2.Natural gas savings($/yr) | e1.Other savings(MBtu/yr) | e2.Other savings($/yr) | f.b1+d1+e1Total energy savings(MBtu/yr) | g. b2+c2+d2+e2Total energy cost savings($/yr) | h.Other energy-related and O&M cost savings($/yr) | i.Water savings(1000 gal/yr) | j.Water savings($/yr) | k=g+h+-jEstimated annual cost savings($yr) | l.Implement-ation price($) | m=l/kSimplePayback(yrs.) |
| 3 | 3.1 |  121,966  |  5,038,347  | $205,565  |  -  |  -  |  -  |  -  |  36,004  | $75,177  |  53,200  | $280,742  | $ 37,300 |  -  |  -  | $318,042 | $2,837,850 | 8.9 |
| 5 | 5.1 |  34,495  | 5,246,838  | $313,094  |  -  |  -  |  -  |  -  |  -  |  -  |  17,907  | $313,094  | $ 25,650 |  -  |  -  | $338,744 |  $3,108,100 | 9.2 |
| 13 |  13.1 |  11,852  |  -  |  -  |  -  |  -  |  -  |  -  |  5,348  | $11,125  |  5,348  | $11,125  | $0 |  24,303  | $ 100,000 | $111,125 | $1,418,925 | 12.8 |
| 13 | 13.2 |  10,042  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  4,686  | $ 10,000 | $ 10,000 | $ 13,513 | 1.4 |
| 13 | 13.3 |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  6,290  | $ 10,000 | $ 10,000 | $ 27,025 | 2.7 |
| 13 | 13.4 |   |   |  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  | $ 25,000 | $ 25,000 | $ 54,050 | 2.2 |
| 13 | 13.5 |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  |  -  | -  | $ 15,000 | $ 15,000 | $ 40,537 | 2.7 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **TOTAL** |   | 178,355 | 10,285,185 | $518,659  |  -  |  -  |  -  |  -  | 41,352 | $86,302  | 76,455  | $604,961  | $ 62,950  | 35,279  | $ 160,000  | $ 827,911 | $7,500,000 | 9.1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Explanations/Comments: