

METROPOLITAN EXPOSITION-RECREATION COMMISSION

RESOLUTION NO. 10 - 13

Accepting Glumac as the lowest responsive and responsible bidder for professional services needed for the Retro-Commissioning project at the Oregon Convention Center and authorize the Interim General Manager to execute a personal service contract with Glumac, in an amount not to exceed \$258,744.

WHEREAS, in the public interest, for the purpose of retro commissioning the Oregon Convention Center to systematically optimize the building and ancillary systems so that they operate efficiently and effectively in accordance with all designed system specifications and in accordance with ASRAE and LEED standards and requirements; and

WHEREAS, the approved Capital Budget includes provisions for the Oregon Convention Center Retro-Commissioning Project; and

WHEREAS, staff completed a formal solicitation of bids culminating with a bid opening on February 24, 2010; and

WHEREAS, MERC staff has evaluated the bids and the lowest responsive and responsible Bidder was Glumac with a bid of \$258,744 with terms over three (3) years; and

WHEREAS, Section 2(B) allows the Commission to exempt contracts from the Contracting and Purchasing Rules on a case by case basis; and


WHEREAS, this bid is within the project budget previously set.

BE IT THEREFORE RESOLVED that the Metropolitan Exposition Recreation Commission:

1. Exempts this contract from the requirement of competitive sealed proposals under MERC Contracting and Purchasing Rules Section 5(D) because it was subject to competitive bidding;
2. Accepts the bid of Glumac for the Retro-Commissioning Project at the Oregon Convention Center.
3. Authorizes the MERC Interim General Manager to execute the contract in substantially the same form as attached as Exhibit "A" to this Resolution, with Glumac in an amount not to exceed \$258,744.00 for the performance of work in accordance with the Bid Documents. The term of the contract shall be over Five (5) years as further specified in the contract documents.

Passed by the Commission on June 2, 2010.

Approved as to form:
Daniel B. Cooper, Metro Attorney

By: 
Nathan A. Schwartz Sykes, Senior Attorney


Chair


Secretary/Treasurer

Personal Services Agreement



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

For Personal Service Agreements \$50,000 & Up

Contract # _____

THIS AGREEMENT is between Metropolitan Exposition-Recreation Commission ("MERC"), located at 777 N.E. Martin Luther King, Jr. Blvd., Portland, OR 97232-2736, and Glumac referred to herein as "Contractor," located at 320 SW Washington, #200 Portland OR 97204.

In exchange for the promises and other consideration set forth below, the parties agree as follows:

1. **Duration.** This personal services agreement shall be effective June 15, 2010 and shall remain in effect until and including June 30, 2013 unless terminated or extended as provided in this Agreement.
2. **Scope of Work.** Contractor shall provide all services and materials specified in the attached "Exhibit A -- Scope of Work," which is incorporated into this Agreement by reference. All services and materials shall be provided by Contractor in accordance with the Scope of Work, in a competent and professional manner. To the extent that the Scope of Work contains additional contract provisions or waives any provision in the body of this Agreement, the Scope of Work shall control.
3. **Payment.** MERC shall pay Contractor for services performed and materials delivered in the amount(s), manner and at the time(s) specified in the Scope of Work for a maximum sum not to exceed Two Hundred Fifty Eight Thousand Seven Hundred Forty Four Dollars and No Cents (\$258,744.00) as follows:
 - Year 1 – June 15, 2010 through June 30, 2011, total billing not to exceed \$130,000.00**
 - Year 2 – July 1, 2011 through June 30, 2012, total billing not to exceed \$65,000.00**
 - Year 3 – July 1, 2012 through June 30, 2013, total billing not to exceed \$63,744.00**
4. **Insurance.**
 - a. Contractor shall purchase and maintain at the Contractor's expense, the following types of insurance, covering the Contractor, its employees, and agents:
 - (1) Broad form comprehensive general liability insurance covering bodily injury and property damage, with automatic coverage for premises, operations, and product liability, shall be a minimum of \$1,000,000 per occurrence. The policy must be endorsed with contractual liability coverage; and
 - (2) automobile bodily injury and property damage liability insurance coverage shall be a minimum of 1,000,000 per occurrence.
 - b. MERC, its elected officials, departments, employees, and agents shall be named as ADDITIONAL INSURED. Notice of any material change or policy cancellation shall be provided to MERC 30 days prior to the change or cancellation.
 - c. Contractor, its subcontractors, if any, and all employers working under this Agreement that are subject employers under the Oregon Workers' Compensation Law shall comply with ORS 656.017, which requires them to provide Workers' Compensation coverage for all their subject workers. Contractor shall provide MERC with certification of Workers' Compensation insurance including employer's liability. If Contractor has no employees and will perform the work without the assistance of others, a certificate to that effect may be attached, as Exhibit B, in lieu of the certificate showing current Workers' Compensation.
 - d. If required by the Scope of Work, Contractor shall maintain for the duration of this Agreement professional liability insurance covering personal injury and property damage arising from errors, omissions, or malpractice. Coverage shall be in the minimum amount of \$500,000. Contractor shall provide to MERC a certificate of this insurance, and 30 days' advance notice of material change or cancellation.

Personal Services Agreement



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

e. Contractor shall provide MERC with a Certificate of Insurance complying with this article, and naming MERC as an additional insured within fifteen (15) days of execution of this contract, or twenty-four (24) hours before services under this contract commence, whichever date is earlier.

5. Indemnification. Contractor shall indemnify and hold MERC, its agents, employees and elected officials harmless from any and all claims, demands, damages, actions, losses and expenses, including attorney's fees, arising out of or in any way connected with its performance of this Agreement, or with any patent infringement or copyright claims arising out of the use of Contractor's designs or other materials by MERC and for any claims or disputes involving subcontractors.

6. Ownership of Documents and Maintenance of Records. Unless otherwise provided herein, all documents, instruments and media of any nature produced by Contractor pursuant to this agreement are Work Products and are the property of MERC, including but not limited to: drawings, specifications, reports, scientific or theoretical modeling, electronic media, computer software created or altered specifically for the purpose of completing the Scope of Work, works of art and photographs. Unless otherwise provided herein, upon MERC request, Contractor shall promptly provide MERC with an electronic version of all Work Products that have been produced or recorded in electronic media. MERC and Contractor agree that all work Products are works made for hire and Contractor hereby conveys, transfers, and grants to MERC all rights of reproduction and the copyright to all such Work Products.

a. Contractor and subcontractors shall maintain all fiscal records relating to such contracts in accordance with generally accepted accounting principles. In addition, Contractor and subcontractors shall maintain any other records necessary to clearly document:

- (1) The performance of the contractor, including but not limited to the contractor's compliance with contract plans and specifications, compliance with fair contracting and employment programs, compliance with Oregon law on the payment of wages and accelerated payment provisions; and compliance with any and all requirements imposed on the contractor or subcontractor under the terms of the contract or subcontract;
- (2) Any claims arising from or relating to the performance of the contractor or subcontractor under a public contract;
- (3) Any cost and pricing data relating to the contract; and
- (4) Payments made to all suppliers and subcontractors.

b. Contractor and subcontractors shall maintain records for the longer period of (a.) six years from the date of final completion of the contract to which the records relate or (b.) until the conclusion of any audit, controversy or litigation arising out of or related to the contract.

c. Contractor and subcontractors shall make records available to MERC and its authorized representatives, including but not limited to the staff of any MERC department and the staff of the MERC Auditor, within the boundaries of the MERC region, at reasonable times and places regardless of whether litigation has been filed on any claims. If the records are not made available within the boundaries of MERC, the Contractor or subcontractor agrees to bear all of the costs for MERC employees, and any necessary consultants hired by MERC, including but not limited to the costs of travel, per diem sums, salary, and any other expenses that MERC incurs, in sending its employees or consultants to examine, audit, inspect, and copy those records. If the Contractor elects to have such records outside these boundaries, the costs paid by the Contractor to MERC for inspection, auditing, examining and copying those records shall not be recoverable costs in any legal proceeding.

d. Contractor and subcontractors authorize and permit MERC and its authorized representatives, including but not limited to the staff of any MERC department and the staff of the MERC Auditor, to inspect, examine, copy and audit the books and records of Contractor or subcontractor, including tax returns, financial statements, other financial documents and any documents that may be placed in escrow according to any contract requirements. MERC shall keep any such documents confidential to the extent permitted by Oregon law, subject to the provisions of section E.

Personal Services Agreement



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

e. Contractor and subcontractors agree to disclose the records requested by MERC and agree to the admission of such records as evidence in any proceeding between MERC and the Contractor or subcontractor, including, but not limited to, a court proceeding, arbitration, mediation or other alternative dispute resolution process.

f. Contractor and subcontractors agree that in the event such records disclose that MERC is owed any sum of money or establish that any portion of any claim made against MERC is not warranted, the Contractor or subcontractor shall pay all costs incurred by MERC in conducting the audit and inspection. Such costs may be withheld from any sum that is due or that becomes due from MERC.

g. Failure of the Contractor or subcontractor to keep or disclose records as required by this document or any solicitation document may result in debarment as a bidder or proposer for future MERC contracts as provided in ORS 279B.130 and MERC Code Section 2.04.070(c), or may result in a finding that the Contractor or subcontractor is not a responsible bidder or proposer as provided in ORS 279B.110 and MERC Code Section 2.04.052.

7. Project Information. Contractor shall share all project information and fully cooperate with MERC, informing MERC of all aspects of the project including actual or potential problems or defects. Contractor shall abstain from releasing any information or project news without the prior and specific written approval of MERC.

8. Independent Contractor Status. Contractor shall be an independent contractor for all purposes and shall be entitled only to the compensation provided for in this Agreement. Under no circumstances shall Contractor be considered an employee of MERC. Contractor shall provide all tools or equipment necessary to carry out this Agreement, and shall exercise complete control in achieving the results specified in the Scope of Work. Contractor is solely responsible for its performance under this Agreement and the quality of its work; for obtaining and maintaining all licenses and certifications necessary to carry out this Agreement; for payment of any fees, taxes, royalties, or other expenses necessary to complete the work except as otherwise specified in the Scope of Work; and for meeting all other requirements of law in carrying out this Agreement. Contractor shall identify and certify tax status and identification number through execution of IRS form W-9 prior to submitting any request for payment to MERC.

9. Right to Withhold Payments. MERC shall have the right to withhold from payments due to Contractor such sums as necessary, in MERC's sole opinion, to protect MERC against any loss, damage, or claim which may result from Contractor's performance or failure to perform under this Agreement or the failure of Contractor to make proper payment to any suppliers or subcontractors.

10. State and Federal Law Constraints. Both parties shall comply with the public contracting provisions of ORS chapters 279A, 279B and 279C, and the recycling provisions of ORS 279B.025 to the extent those provisions apply to this Agreement. All such provisions required to be included in this Agreement are incorporated herein by reference. Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations including those of the Americans with Disabilities Act.

11. Situs. The situs of this Agreement is Portland, Oregon. Any litigation over this agreement shall be governed by the laws of the State of Oregon and shall be conducted in the Circuit Court of the state of Oregon for Multnomah County, or, if jurisdiction is proper, in the U.S. District Court for the District of Oregon.

12. Assignment. This Agreement is binding on each party, its successors, assigns, and legal representatives and may not, under any circumstance, be assigned or transferred by either party.

13. Termination. This Agreement may be terminated by mutual consent of the parties. In addition, MERC may terminate this Agreement by giving Contractor seven days prior written notice of intent to terminate, without waiving any claims or remedies it may have against Contractor. Termination shall not excuse payment for expenses properly incurred prior to notice of termination, but neither party shall be liable for indirect or consequential damages arising from termination under this section.

Personal Services Agreement



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

14. No Waiver of Claims. The failure to enforce any provision of this Agreement shall not constitute a waiver by MERC of that or any other provision.

15. Modification. Notwithstanding and succeeding any and all prior agreement(s) or practice(s), this Agreement constitutes the entire Agreement between the parties, and may only be expressly modified in writing(s), signed by both parties.

MERC

By _____

By _____

Title _____

Title _____

Date _____

Date _____



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

Scope Of Work — Attachment A

MERC Contract No. _____

1. Description of the Scope of Work

The contract contemplated consists of the following:

The retro-commissioning effort for this building will include the observation of the various building systems' conditions, operating strategies, and practices for the purpose of finding and implementing cost-effective improvements. The investigation will include testing individual pieces of equipment (as needed) and testing for how well equipment and systems are integrated with each other. The project does not include implementing capital improvements. However, in the course of the investigation, any energy efficiency capital improvements that are thought to be effective will be offered as recommendations to the MERC. The investigation will also bring to the MERC's attention any problems that might jeopardize the building's indoor environmental quality. The project does not include implementation of solutions for any indoor environmental quality problems.

The Contractor will also be expected to interface with the Oregon Dept. of Energy and the Energy Trust of Oregon, including filling out necessary forms and applications to apply for available tax credits or incentives that may be applicable as a result of this effort.

The Contractor shall commission:

1. Air handling systems (inc. terminal devices & associated exhaust systems)
2. Heat pumps
3. Chilled water system (inc. chillers, pumps, etc...)
4. Condensing water system (inc. cooling towers, pumps, etc...)
5. Heating water system (inc. boilers, pumps, etc...)
6. Building Automation System (BAS)

Project Phasing

MERC will phase this project over three (3) years (as further outlined in the contract and contract payment terms). Contractor shall complete the work as set forth in the Retro-Commissioning Services Bid, dated February 24, 2010, and attached to this Scope of Work as Attachment 1. Contractor shall revise the originally submitted five (5)-year plan to match the new contract terms of three (3) years. The revision shall only shorten the timeline, not remove any scope of work or tasks as bid.

Description of Systems to be part of the Retro-commissioning Project:

Contractor was provided as part of the RFB, an equipment list, with locations representing OCC's current records, but not inclusive of all system components. Contractor is responsible for identifying and completing an inventory of all equipment.

Objectives

The purpose of the retro-commissioning effort includes the following:

- Ensure compliance with ASHRAE 62.1 ventilation requirements for indoor air quality
- Enhanced documentation of the operational and maintenance (O&M) requirements for equipment and systems
- Reduce energy costs
- Ensure systems are operating as intended



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

Scope Of Work – Attachment A

- Optimize control systems through calibration of critical sensors, review metered data and trend logs, and functional equipment testing
- Identify operational and maintenance enhancements that result in improvements in energy efficiency, occupant comfort, or indoor air quality
- Identify O&M staff training needs
- Provide MERC with re-commissioning report and manual

Project Steps:

- Identify and review documentation, drawings, data, energy usage and other required information
- Develop a building-specific retro-commissioning plan
- Develop agendas and facilitate all commissioning meetings
- Perform a detailed on-site assessment of the present maintenance practices and operating strategies, noting all possible deficiencies and improvements
- Develop monitoring and testing plans
- Perform short-term diagnostic monitoring, using BAS trend-logging where appropriate
- Develop, oversee, and document functional test procedures as needed
- Develop master lists of deficiencies and improvements
- Recommend system or energy-efficient capital improvements for further investigation.
- Prioritize the most cost-effective improvements for implementation for existing systems
- Supervise the implementation of the selected improvements
- Calculate the estimated energy savings based on the before-and-after short-term energy measurements
- Submit a final report and all specified deliverables
- Update building documentation
- Develop a Systems manual
- Develop a comprehensive training plan for the facility staff

Scope of Work

Planning Phase:

- Review and update building documentation as required for commissioned equipment.
- Develop the retro-commissioning plan with input from the facilities staff. The plan shall at a minimum contain the following sections:
 - General building information and contacts (name, address, phone numbers etc.)
 - Project objectives
 - Building description (brief)
 - Project scope
 - Roles and responsibilities
 - Schedule (for primary tasks)
 - Documentation
 - Investigation scope and methods
 - Implementation phase
 - Project handoff
- Conduct a scoping meeting to review, discuss, and agree to the retro-commissioning plan.
- Deliverables:
 - Retro-commissioning plan
 - Minutes of scoping meeting

Investigation Phase:

- Perform a site assessment to gain an in-depth understanding of how the building systems and equipment are currently operated and maintained, why they are operated in that way, and what the facility staff



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

Scope Of Work – Attachment A

considers to be the most significant problems. The site assessment shall address the following major issues:

- Overall building energy use and demand, and areas of highest energy use and demand
- Current design and operational intent and actual control sequences for each piece of equipment included in the project
- Equipment nameplate information and equipment condition issues
- Current schedules (setpoint, time-of-day, holiday, etc.)
- The most severe control and operational problems
- Location of the most comfort problems or trouble spots in the buildings
- Current O&M practices
- Prepare a master list of deficiencies and potential improvements. At a minimum, the list should include the name of the system or piece of equipment, a description of the deficiency or problem, and a suggested solution. These deficiencies shall be categorized into four primary categories: maintenance, operation, design, or installation.
- Develop and implement a diagnostic monitoring and test plan to compile data on how systems are operating by the use of BAS trend logging, portable data logging or functional performance tests.
- Work with the MERC to select the most cost-effective opportunities for implementation.
- Deliverables:
 - Short-term diagnostic monitoring and functional test plans
 - The master list of deficiencies and potential improvements
 - Completed site-assessment forms (optional)
 - Completed functional tests
 - A list of selected improvements for immediate implementation, including estimated costs and simple payback periods

Implementation Phase:

MERC will implement major cost effective improvements at MERC's discretion. Contractor shall:

- Retest and re-monitor to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging
- Review the Operation and Maintenance Manual to assure documentation is current
- Develop a Systems Manual
- Develop a training plan as necessary for the facility operating staff
- Deliverables:
 - Completed repairs and improvements
 - Final estimated energy savings calculations for completed or anticipated energy saving improvements
 - Systems Manual
 - Training plan
 - O&M manual recommendations

Project Turnover Phase:

- Seasonal testing if required
- Prepare and submit the final report including:
 - Executive summary
 - Analysis of major findings and results
 - Building and systems descriptions
 - Scope of the commissioning project
 - Master list of improvements, including training needs and maintenance recommendations
 - Detailed description of improvements that were implemented, with cost and savings information
 - List of recommended capital improvements for further investigation
 - Original and updated commissioning plan



777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232
503-731-7800

Scope Of Work – Attachment A

- EMCS trending plan and logger diagnostic, monitoring plan and results
- All completed functional tests and results
- Develop a re-commissioning plan and schedule

2. **Payment and Billing**

Contractor shall perform the above work for a maximum price as set forth in Section 3 of the Agreement.

The maximum price includes all fees, costs and expenses of whatever nature. Each of MERC's payments to Contractor shall equal the percentage of the work Contractor accomplished during the billing period. Contractor's billing statements will include an itemized statement of work done and expenses incurred during the billing period, will not be submitted more frequently than once a month, and will be sent to MERC, attention: Heather Peck, 777 N.E. Martin Luther King, Jr. Blvd., Portland, OR 97232-2736. MERC will pay Contractor within 30 days after invoice date or within 15 days after invoice approval.

**Oregon Convention Center
 Retro - Commissioning Services Bid
 Description of Work**

Phase 1 March 2010 through February 2011

Planning Tasks

- Conduct and document kick-off meeting with project participants.
- Review and update available building documentation for commissioned equipment.
 - Original commissioning documentation
 - As-built drawings
 - Equipment O&M's
 - Building maintenance management protocols and software outputs
 - Controls O&M's
 - Single line drawings
 - DDC graphics / Points list
 - Sequence of operations
- Review utility bills and develop gross opportunity (ASHRAE Level 1) assessment based on energy utilization comparison with similar facilities.
- Develop draft Retro-Cx Plan with building staff to document goals and approach based on existing conditions and Owner preferences.

Investigation Tasks

- Develop and implement a diagnostic monitoring and test plan to compile data on how systems are operating by the use of BAS trend logging.
- Develop, oversee, and document functional test procedures as needed based on confirmed sequences of operations.
- Develop a DOE-2 model baseline to assess building energy use for the various systems (ASHRAE Level 2), and areas of highest energy use and demand.
- Report results to MERC representatives and determine baseline for future improvement tracking, including appropriate baseline adjustments to be considered as improvements are implemented and operational characteristics are modified.
- Update Retro-commissioning Plan to reflect additional information and Owner input.

Deliverables:

- Retro-Cx Plan
- Meeting minutes
- DOE-2 baseline document with preliminary energy analysis
- Draft Systems Manual
- Draft Training Plan

Phase 2 March 2011 through February 2012

Investigation Tasks

- Conduct a detailed on-site assessment of the design and operational intent, current condition, present maintenance practices and actual operating characteristics and control sequences for the following equipment / systems:
 - Terminal Units
 - VAV units

- Air Handling Unit fans and temperature control functions
- Fan coil units
- Exhaust fans
- Supply fans
- BAS system

This will include verifying equipment nameplate information and equipment condition issues, current schedules (setpoint, time-of-day, holiday, etc.), control and operational problems, location of comfort problems or trouble spots in the buildings and current O&M practices.

Diagnostic techniques will include calibration of temperature, pressure and flow sensors, confirmation of damper and valve actuator operation, instantaneous flow measurements, energy profiles for variable speed equipment over full operating ranges, trending and logging utilizing BAS as appropriate.

- Prepare a master list of deficiencies and potential improvements for these systems, including low-/no-cost measures for rapid implementation, as well as a preliminary list of possible capital improvements to be further investigated. This will include maintenance, operation, design, and installation categories, including estimated costs and simple payback periods, as well as determination of available funding for measures through EnergyTrust of Oregon.

Implementation Tasks

- Retest and re-monitor appropriate equipment and systems for measures implemented by MERC to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging.
- Report results to EnergyTrust and MERC representatives and revisit energy model for tracking effectiveness of recommended measures, including appropriate baseline adjustments to be considered as improvements are implemented and operational characteristics are modified.
- Update Retro-commissioning Plan, System Manual and Training Plan to reflect changes.
- Deliverables:
 - Short-term diagnostic monitoring and functional test plans
 - Master list of deficiencies and potential improvements with cost and savings estimates
 - Completed site-assessment forms
 - Completed functional tests
 - O&M Manual recommendations
 - Updated Systems Manual
 - Updated Training Plan
 - Final estimated energy savings calculations for completed or anticipated energy saving improvements for subject systems

Phase 3 March 2012 through February 2013

Investigation Tasks

- Continue detailed on-site assessment of the design and operational intent, current condition, present maintenance practices and actual operating characteristics and control sequences for the following equipment / systems:
 - AHU hydronic coils
 - Central chilled water system components including
 - Chillers
 - Cooling towers
 - CHW and CW pumps
 - Process loop pumps
 - Water treatment systems for chilled and condenser water
 - BAS system

This will include verifying equipment nameplate information and equipment condition issues, current schedules (setpoint, time-of-day, holiday, etc.), control and operational problems, location of the most comfort problems or trouble spots in the buildings and current O&M practices.

Diagnostic techniques will include calibration of temperature, pressure and flow sensors, instantaneous flow measurements, energy profiles for variable speed equipment over full operating ranges, trending and logging utilizing BAS and portable equipment as appropriate.

- Prepare a master list of deficiencies and potential improvements for these systems, including low-/no-cost measures for rapid implementation, as well as a preliminary list of possible capital improvements to be further investigated. This will include maintenance, operation, design, and installation categories, including estimated costs and simple payback periods, as well as determination of available funding for measures through EnergyTrust of Oregon.

Implementation Tasks

- Retest and re-monitor appropriate equipment and systems for measures implemented by MERC to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging.
- Report results to EnergyTrust and MERC representatives and revisit energy model for tracking effectiveness of recommended measures, including appropriate baseline adjustments to be considered as improvements are implemented and operational characteristics are modified.
- Update Retro-commissioning Plan, System Manual and Training Plan to reflect changes.
- Deliverables:
 - Short-term diagnostic monitoring and functional test plans
 - Master list of deficiencies and potential improvements with cost and savings estimates
 - Completed site-assessment forms

- Completed functional tests
- O&M Manual recommendations
- Updated Systems Manual
- Updated Training Plan
- Final estimated energy savings calculations for completed or anticipated energy saving improvements for subject systems

Phase 4 March 2013 through February 2014

Investigation Tasks

- Continue detailed on-site assessment of the design and operational intent, current condition, present maintenance practices and actual operating characteristics and control sequences for the following equipment / systems:
 - Central hot water system components including
 - Heating and Kitchen Boilers
 - Water heaters
 - Pumps
 - Hot water pumps
 - Process loop pumps
 - Compressors
 - Water treatment systems for heating water system
 - BAS system

This will include verifying equipment nameplate information and equipment condition issues, current schedules (setpoint, time-of-day, holiday, etc.), control and operational problems, location of the most comfort problems or trouble spots in the buildings and current O&M practices.

Diagnostic techniques will include calibration of temperature, pressure and flow sensors, instantaneous flow measurements, energy profiles for variable speed equipment over full operating ranges, trending and logging utilizing BAS and portable equipment as appropriate.

- Prepare a master list of deficiencies and potential improvements for these systems, including low-/no-cost measures for rapid implementation, as well as a preliminary list of possible capital improvements to be further investigated. This will include maintenance, operation, design, and installation categories, including estimated costs and simple payback periods, as well as determination of available funding for measures through EnergyTrust of Oregon.

Implementation Tasks

- Retest and re-monitor appropriate equipment and systems for measures implemented by MERC to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging.
- Report results to EnergyTrust and MERC representatives and revisit energy model for tracking effectiveness of recommended measures, including appropriate baseline

adjustments to be considered as improvements are implemented and operational characteristics are modified.

- Update Retro-commissioning Plan, System Manual and Training Plan to reflect changes.
- Finalize recommended system or energy-efficient capital improvements for further investigation with MERC representatives and prioritize the most cost-effective improvements for implementation.
- Retest and re-monitor appropriate equipment and systems for measures implemented by MERC to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging.
- Calculate the estimated energy savings based on the before-and-after short-term energy measurements
- Deliverables:
 - Short-term diagnostic monitoring and functional test plans
 - Master list of deficiencies and potential improvements with cost and savings estimates
 - Completed site-assessment forms
 - Completed functional tests
 - O&M Manual recommendations
 - Updated Systems Manual
 - Updated Training Plan
 - Final estimated energy savings calculations for completed or anticipated energy saving improvements

Phase 5 March 2014 through February 2015

Implementation Tasks

- Retest and re-monitor appropriate equipment and systems for measures implemented by MERC as needed to confirm that the affected equipment is operating properly by BAS trending, manual testing, or data logging.
- Report results to EnergyTrust and MERC representatives and revisit energy model for tracking effectiveness of recommended measures, including appropriate baseline adjustments to be considered as improvements are implemented and operational characteristics are modified.
- Update Retro-commissioning Plan, System Manual and Training Plan to reflect changes.
- Finalize recommended system or energy-efficient capital improvements for further investigation with MERC representatives and prioritize the most cost-effective improvements for implementation.

- Calculate the estimated energy savings based on the before-and-after short-term energy measurements
- Deliverables:
 - Short-term diagnostic monitoring and functional test plans
 - Master list of deficiencies and potential improvements with cost and savings estimates
 - Completed site-assessment forms
 - Completed functional tests
 - O&M Manual recommendations
 - Final Systems Manual
 - Final Training Plan
 - Final estimated energy savings calculations for completed or anticipated energy saving improvements

Project Turnover Tasks

- Review the Operation and Maintenance Manual to assure documentation is current
- Develop a Systems Manual
- Develop a training plan as necessary for the facility operating staff
- Submit a final report and all specified deliverables as follows:
 - Executive summary
 - Analysis of major findings and results
 - Building and systems descriptions
 - Scope of the commissioning project
 - Master list of improvements, including training needs and maintenance recommendations
 - Detailed description of improvements that were implemented, with cost and savings information
 - List of recommended capital improvements for further investigation
 - Original and updated commissioning plan
 - EMCS trending plan and logger diagnostic, monitoring plan and results
 - All completed functional tests and results
- Deliverables:
 - List of completed repairs and improvements
 - Summary of energy savings calculations for completed or anticipated energy saving improvements
 - Systems Manual
 - Training plan
 - O&M manual recommendations
 - Final Report