Milton S. Hershey Medical Center
Co-Generation Plant Commissioning

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About RMF

• Headquarters Baltimore, MD
• Established 1983 (36 Years)
• 300+ Personnel
• 13 Production Offices
• Our Services
  – Commissioning
  – Infrastructure Engineering
  – Building MEP Engineering
  – High Performance Design
  – Master Planning
  – Assessment Technology
  – Energy Assessment
  – Civil Engineering
  – Structural Engineering
Milton S. Hershey Medical Center

- Hershey, PA
- Established 1963
- 550-Acre Campus
- Academic Medical Center
- Hospital
  - 548 Licensed Beds
  - Level 1 Trauma Center; Adult & Pediatric
- College of Medicine
  - Medical Students (150 Students/Class)
  - Physicians Assistants
  - Graduate Degrees in Medical Research
  - $100-Million in External Research Support
CUP (Central Utility Plant) Background

• Distributed Heating and Cooling Systems

• CUP Equipment
  – Twelve Chillers
  – Three Boilers

• CHP Equipment
  – One Rentech HRSG
  – One Solar Turbines CTG
  – One JJ Crewe & Son Natural Gas High Pressure Compressor
NEW CHP Plant Background

• CHP – Combined Heat & Power Plant
• Solar Turbines Taurus 70, 7.5MW, Natural Gas, Combustion Gas Turbine Generator
• JJ Crewe & Son Natural Gas Rotary Screw Type Compressor
• Rentech HRSG with Natural Gas Duct Burner Supplying 80,000-lb/hr Steam
• Construction Completed in 2018
• Expectations
  – Supply 60% Campus Power
  – Supply 96% Campus Steam Usage
Project Motivation

• Vulnerability of Aging Infrastructure

• Co-Generation Adds:
  1. Energy Efficiencies and Savings
  2. Another Level of Utilities Protection
  3. Campus Safeguards
  4. Resiliency and Flexibility
  5. Reduced Emissions

• Commonwealth of Pennsylvania Grant plus PPL Rebates & Grants

• Avoidance of Pending Boiler Replacements, Extend Existing Boiler Life

• Impact HMC commitment to reduce carbon emissions

• Lower operational costs
ELECTRIC DEMAND

- DAILY MAX / MIN
HOURLY STEAM LOAD PROFILE 2015

Notes:
1. Total Boiler Steam Production is based on hourly boiler steam flow data for Boilers 1, 2, and 3.
2. Steam supplied to campus is based on typical estimated deaerator steam consumption of 7.5%.
CHP LOAD MANAGEMENT SYSTEM
HMC Approach to Commissioning

• On-Site, Hands-on, ‘Beyond the Checklist’ Commissioning

• Collaboration
  – HMC’s priority on selecting the right team for teamwork
  – HMC Project Management and Central Utility Plant Staff
  – CHP Design and Construction Personnel
  – Equipment OEM Field Service Technicians
  – HMC Hospital and College of Medicine Staff

• Holistic Thinking
  – CUP provided utility services affect Hospital, Patients, and College of Medicine
Commissioning Process

**Design Cx Planning**
- Review System Design
- Meet OPR; BoD; EOR Specifications; SOO
- Cx Specifications
- Review Equipment Submissions
- Preliminary Site Survey
- Detailed Cx Plan

**Construction Cx Development**
- On-Site Survey
- Develop & Review PFCs
- Develop FPTs
- Cx Schedule Integration
- Contractor PFC Completion
- OEM Startup & Testing
- Contractor Pre-FPT Testing
- Cx Issues Log

**Implementation and Turnover Cx Performance**
- Detailed Testing Plan
- Support Contractor in Cx Effort
- Conduct & Witness FPTs
- Witness OEM Commissioning
- Witness Emissions Testing
- Witness Operator Training
- Submit Final Cx Report

**Review Systems & Operations**
- Develop Cx Testing Procedures
- Witness Cx Testing
- Final Cx Report
Unexpected Results

• Equipment Start-Up and Testing Issues
• Control and Protection Software Revisions
• Various Equipment Control Wiring Coordination
• Unexpected Minor Component Failures Affecting Operations
• Coordination and Interaction with the Local Utility
• USGBC in Central PA 2018 Climate Champion Award
  – Reduction of campus carbon emissions by 46,000 tons; Equivalent to taking 7,551 cars off the road
  – Traditional heat & power at approximately 45% efficiency to a CHP at approximately 80% efficiency
Lessons Learned

- Coordinating Cx Activities between Owner, Campus, & Contractor
- Defining Cx Testing Schedule with Contractor
- Coordinating the Performance of Cx Testing Activities
- Single-Source Equipment Responsibility
- Coordination of Utility Shutdowns and Equipment Testing Schedules
- Critical Shutdowns
  - Maintaining utility services to the Hospital, Critical Care Facilities
  - College of Medicine operations