Project Challenges when Extending Chilled Water/Steam Distribution on Multi-Ownership Medical Campus

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CampusEnergy2018 Conference Thermal Distribution Workshop
AGENDA

- MRMC Introduction
- Project & Design Philosophy
- Pre-Construction Activities
- Layout & Mobilization
- Construction
- Unforeseen Conditions and/or Issues
Introduction – MRMC Members

Blood Center of Wisconsin
Children’s Hospital of Wisconsin
Curative Care

Froedtert & the Medical College of Wisconsin
Medical College of Wisconsin
Milwaukee County Behavioral Health
Introduction – MRMC Members

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Milwaukee County Behavioral Health
Introduction – MRMC Members

- 7,500,000 square foot of conditioned space
- 22 buildings from 5 customers
- Approximately 2 miles of steam and chilled water lines
- Approximately 2,500 feet of tunnel
- Peak chilled water demand – 18,000 tons
- Peak steam demand - 205,000 lbs/hr.
- Largest chilled water line = 42” HDPE and 36” PCCP
- Largest steam line = 24” 15 psi and 12” 135 psi
Introduction - MRMC Thermal District

Thermal Plant Site

MRMC Campus Energy District
Introduction - MRMC Thermal District

MRMC Campus Energy District
Aspirations for a Steam and Chilled Water Future

**Redundancy**
A second plant to provide continuous supply of critical thermal service with geographic source diversity and on site alternate fuel backup

**Reliability**
Investment in plant and distribution infrastructure to enhance uninterrupted, consistent source of thermal service

**Environmental**
Reduce noxious emissions through elimination of coal

**Growth**
Creating capacity for growth - including and beyond the new Center for Advanced Care at Froedtert & The Medical College of Wisconsin POB

**Transparency and Control**
Engaging member organizations in decision-making - from the source to the user - to align clinical, economic, & accreditation values in decision making

**Rate**
Reduced rates for steam and chilled water
Redundancy & Reliability

- Geographic production diversity (two sources of steam and chilled water)
- Capable of meeting critical load demand with one plant out of service
- Looped distribution piping (bi-directional supply)
- Addition of critical isolation valves to maintain system delivery
- Addition of looped distribution piping provides future capacity
Pre-Construction Activities

- Easements
  - Milwaukee County Land Ownership
  - MRMC Members Leasing all Land rights

- Right of Entry Permits
  - Duo leases
  - County streets and utilities
  - City streets and utilities

- Site Documentation
  - Preconstruction videos of all surfaces
  - Vibration monitoring for possible affected buildings
  - Tree Survey

- Design Options
  - Open cut verses boring (Chilled Water)
  - Tunnel / Box Conduit / Direct Buried (Seam)
Pre-Construction Activities – Budget

Construction Cost – Distribution

CURRENT GAP = $4,100,000

TARGET COST = $38,020,000
• Develop segregated laydown and soil areas.

• Understanding of permanent versus temporary easements.

• Disruption avoidance.

• Site and traffic signage.

• Traffic control: 6-9am and 3-6pm.
COMMUNICATIONS:

- MRMC Public Relations Director
- Individual Members PR Groups
- Website Postings
- Weekly emails for updates
- Signage Boards in Facilities
- Signage at active areas for road and sidewalk closures
**SCOPE:** Extend steam/condensate and chilled water lines at various locations on campus to increase reliability or create better hydraulic flows. Improvements included:

- 3,350 feet of chilled water lines
- 2,300 feet of steam and condensate lines
- 10 new vaults and 2 vault additions
- Largest chilled water line = 42”
- Largest steam line = 12”

**BUDGET:** $38,020,000

**SCHEDULE:** Started summer of 2016 with projected completion summer of 2018
Chilled Water Distribution – Pre-Project
Chilled Water Distribution – Post Project

2017/18

2017

2018
Chilled Water Distribution – Stinger Loop
Construction – Chilled Water – Stinger Loop
Construction – Chilled Water – Stinger Loop
Construction – Chilled Water – Stinger Loop
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Construction – Chilled Water – Watertown Plank Crossing

Chilled Water Distribution – Watertown Plank Crossing
Construction – Chilled Water – Watertown Plank Crossing
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Construction – Chilled Water – Watertown Plank Crossing

Boring Pit

Receiving Pit
Construction – Chilled Water – Watertown Plank Crossing
Construction – Chilled Water – Watertown Plank Crossing
Construction – Chilled Water – Watertown Plank Crossing
Steam Distribution – Pre-Project
Steam Distribution – Post Project
Steam Distribution – Stinger Loop
Construction – Steam – Box Conduit
Construction – Steam – Box Conduit
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Unforeseen Conditions and/or Issues

- PCCP Pipe
- Winter Conditions
- Memorial Gardens
- Sink Hole
- Potter’s Field – Human Remains
Unforeseen Conditions and/or Issues
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Thank You Team

- OWNER: MRMC Thermal
- ENGINEER: Burns & McDonnell
- OWNERS ENGINEER: NV5(aka Sebesta)
- OWNERS REP: Ric Miller LLC
- FACILITY OPERATIONS: Ever-Green
- CONSTRUCTION MANAGER: Boldt
- MECH TRADE PARTNER: Grunau/Jamar
- ELECTRICAL TRADE PARTNER: Staff
- CONTROLS TRADE PARTNER: Novaspect
- BORING CONTRACTOR: RJ Underground