Chiller Plant Design Improves Capacity; Saves Time Without New Development

Richard Duane, PE, PMP – Austin Energy
Jesse Cabrera, PE, PMP – Stanley Consultants, Inc.
Agenda

Chiller Plant Design

• Austin Energy District Cooling Program
• Downtown District Cooling Program
• Project Drivers
• Challenges
• Solution for DCP4
• Design-Build Schedule
• Summary
District Cooling Program

Background

• Assets
  • 7 District Cooling Plants (3 in Construction)
  • 58,000 Tons
  • 130,000 Ton-hrs of Thermal Storage

• District Cooling Program has 70 Connected Customers
• Over 30 Million Square Feet of Facilities
• Summer of 2019 Provided 24MW Thermal Shift
District Cooling Program Plant Locations

Future ACC Plant – 4.5MW

DCP-1 – 4MW

Mueller Energy Center – 2MW

Future DCP-4

Domain – 4MW
Project Drivers

• Demand for Chilled Water

• Fast Track Solution

• Site Development

• Project Delivery
DCP4 | Development Phase

- Modular Chilled Water Plant
- On Top of Austin Convention Center
- Design-Build Process
DCP4 | Development Phase

Challenges

• Validate Design Criteria Manual
• Mechanical – System Pressurization
• Electrical – Limitation of Existing Infrastructure
• Structural – Limitation of Existing Roof
• Noise – City Ordinance
DCP4 | Mechanical

Solution

• Relocate Chilled Water Pumps

• Pressure Sustaining Valve
DCP4 | Electrical

Solution

• Found a spare bus tap

• Two independent electrical feeds

• Separate the electrical distribution of DCP4 vs. ACC

• 4000 amp Bus Tap to DCP4
DCP4 | Structural

Solution

- Detailed Analytical Model to Determine Reserve Capacity in the Structure
- Columns of the Supporting Platforms to Only Load Existing Concrete Columns That Had Reserve Capacity
- Intricate Steel Framing Layout
DCP4 | Noise

Solution

• Isolation of Cooling Tower and Plant Equipment

• Increased Wall Thickness of Plant

• Acoustical Louvers Around Chilled Water Pumps

• Acoustical Louvers at Cooling Tower
DCP4

- 3,000 Tons of Cooling
- 3 x 1,000 Ton Trane Chillers
- 3 x Vertical In-line CHW Pumps
- 3 x HSC Condenser Water Pumps
- 4 x 1,000 Tons Cooling Tower Cells
DCP4 | Modular Chilled Water Plant

Benefits

• Reduced field labor
• Reliable factory quality control practices
• Repeatable factory processes
• Factory controls testing and commissioning
• Performance testing
• Guaranteed on-time delivery
• Fastest lead time from design to completion
• Built in parallel with other construction
• Single source responsibility
DCP 4 Timeline: 16 Months

Design
- February 2019: NTP Design
- March 2019: Plant Specification
- April 2019: Balance of Plant
- May 2019: Thermal Distribution

Fabrication
- June 2019: GMP Modular Plant
- July 2019: Modular Plant Assembly
- August 2019: Modular Plant Assembly
- September 2019: Modular Plant Assembly

Construction
- October 2019: NTP Construction
- November 2019: Structural Framework
- December 2019: Onsite Plant Assembly
- January 2020: Underground

Startup
- February 2020: Energize DCP4
- March 2020: Flush & Passivate
- April 2020: Hot Tap
- May 2020: Startup
Timeline: 16 Months
DCP4

Summary

• Mission Accomplished!
• DCP4 Will Be Operational by May 2020
• Thermal Shift toward Austin Energy’s Resource, Generation and Climate Protection Goal of 30 MW of Thermal Energy Storage by 2027
• Future Plans
Questions?
Thank You for Your Time

Richard Duane, PE, PMP – Austin Energy
Power System Engineer Sr.
512-482-5435
Richard.Duane@austinenergy.com

Jesse Cabrera, PE, PMP – Stanley Consultants, Inc.
Business Development Manager
512-427-3616
CabreraJesse@stanleygroup.com