

IDEA Campus Energy 2018

Panel Discussion: Control of CHW Thermal Energy Storage Tanks

Moderator: Daniel R. Pyewell

Panelists: John Andrepont - The Cool Solutions Company

Bryan Bagley - Affiliated Engineers

Juan Ontiveros - The University of Texas at Austin

Mike Burns - Ever-Green Energy



Moderator – Daniel R. Pyewell

- Senior Design Engineer for CB&I
- Over 15 yrs. Experience in design of various steel plate structures and support for large EPC projects
- Over 10 yrs. Experience in the Structural and Process Design of above-ground welded steel chilled water TES Tanks
- Active Committee Member of ASHRAE and AWWA, and new member of IDEA
- Licensed PE in States of Texas, North Carolina, New York, and Colorado

Multi-tank TES Experience – John Andrepont

- General Motors – Pontiac, MI (2 x 8,500 Ton-hours)
- Chrysler Motors – Auburn Hills, MI (2 x 34,000 T-hrs)
- Los Angeles Dep't of Water & Power – Sun Valley, CA (2 x 6,500 T-hrs)
- Nat'l High Mag Field Lab – FSU, Tallahassee, FL (16,000 & 39,209 T-hrs)
- State Farm Insurance – Bloomington, IL (2 x 44,800 T-hrs)
- District Cooling St. Paul – St. Paul, MN (28,000 & 37,400 T-hrs)
- U of Texas – Austin, TX (30,000 & 39,000 T-hrs)
- U of Texas Medical Branch – Galveston, TX (2 x 16,000 T-hrs)
- Stanford U – Palo Alto, CA (2 x 45,000 T-hrs, plus 1 HW TES)
- Various TES – UAE and Qatar

Multi-tank TES Example – John Andrepont

- North Carolina Department of Administration – Raleigh, NC
- 1988 - 7,100 T-hrs (0.74 Mgals), below grade
- 2007 - 26,270 T-hrs (2.7 Mgals), above grade



Multi-tank TES Example – Bryan Bagley

- University of Texas Medical Branch – Galveston, TX
- 2016 – 16,000 T-hrs (2.1 Mgals), above grade
- 2016 – 16,000 T-hrs (2.1 Mgals), above grade



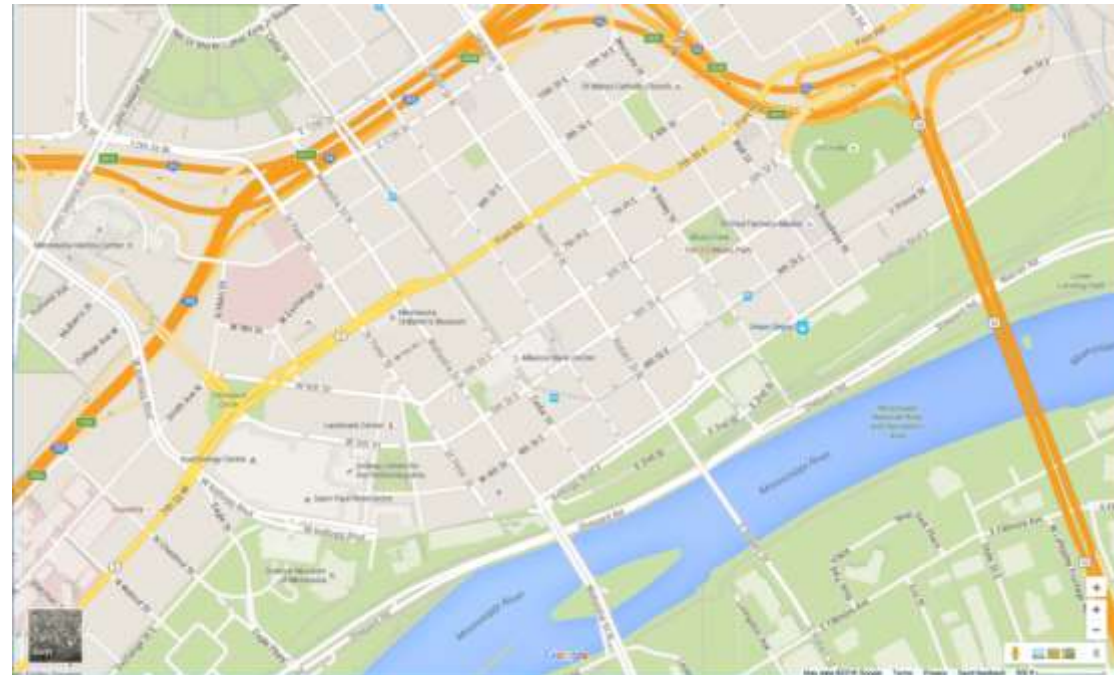
Multi-tank TES Example – Juan Ontiveros

- University of Texas at Austin
- 2011 – 32,000 T-hrs (3.6 Mgals), above grade
- 2016 – 59,000 T-hrs (5.7 Mgals), above grade



Multi-tank TES Example – Mike Burns

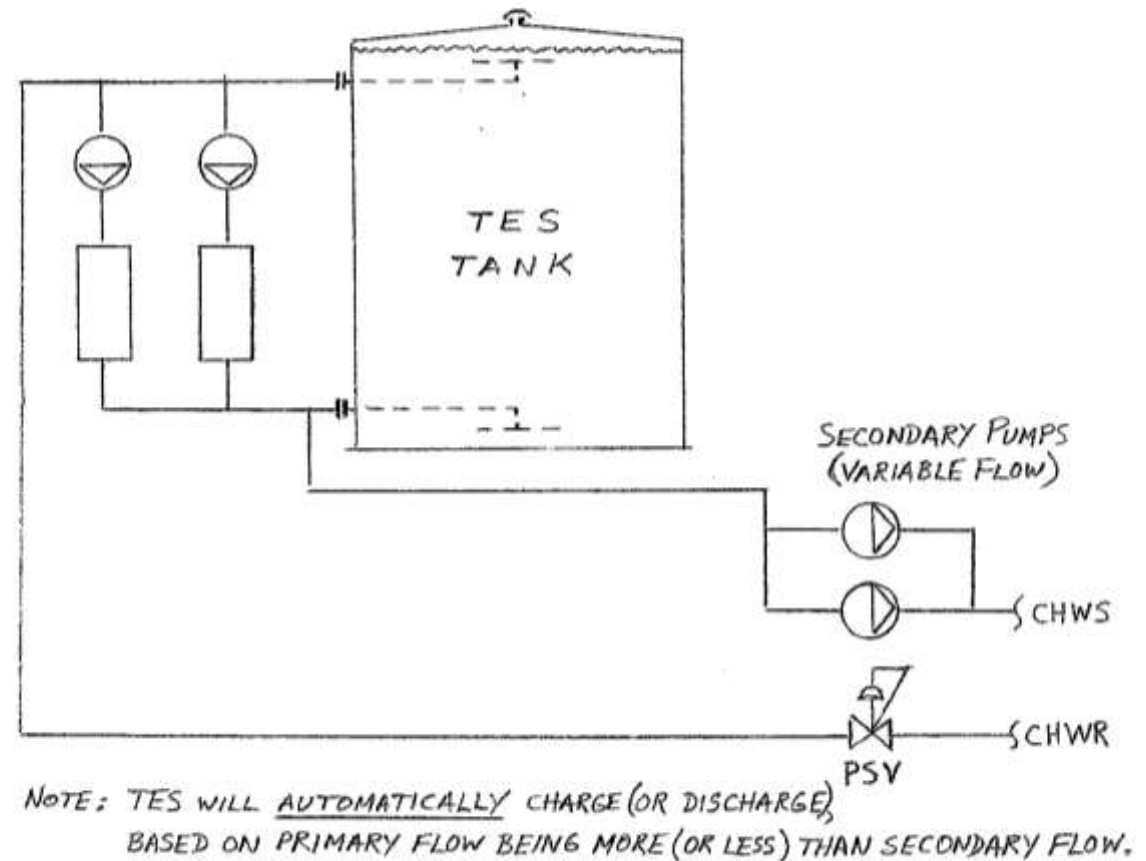
- District Cooling St. Paul – St. Paul, MN
- 1994 - 28,000 T-hrs (2.6 Mgals),
above grade
- 2003 - 37,400 T-hrs (4.3 Mgals),
above grade



Typical TES Hydraulics

1 of 2

- TES at or near chiller plant
- Primary-Secondary pumping
- TES in “bridge”
- TES charge/discharge based on primary-secondary flow imbalance
- No HX
- PSV used (if needed)
- TES charged by local chillers only



Typical TES Hydraulics

2 of 2

- TES near or far from chillers
- Uses dedicated TES pumps
- Six 2-position valves cycled for charge vs. discharge modes
- No HX
- PSVs used (if needed)
- TES charged by any chillers on the CHW network

