REACHING NEW DEPTHS
HOW A HOSPITAL MODERNIZED A SUBSURFACE DISTRICT ENERGY PLANT
IDEA Campus Energy 2019 Pittsburgh, PA | Presented by Dave Ohler, PE
SUNY DOWNSTATE MEDICAL CENTER

Fourth largest employer in Brooklyn.

Officially chartered by the state in 1858 as the Long Island College Hospital of the City of Brooklyn.

Downstate has over 100 volunteer service projects.

One of only four colleges of nursing in the State to offer degrees in all advanced nursing specialties.
EXISTING CAMPUS UTILITIES

2 Electric Service Vaults from CON ED, 1 Natural Gas Feed from National Grid

Central Steam Boiler Plant
Maintains 24 hour 140 PSIG saturated steam supply to Campus.
Steam Demand from 20,000 PPH to 100,000 PPH

De-Centralized Chiller Plants
Interconnected De-Centralized Chiller Plants
(Absorbers and Electric Chillers)
STEAM GENERATION

CENTRAL BOILER FEEDS

Basic Sciences Building (BSB)
University Hospital Building (UHB)
Temporary Boiler Plant
Health Sciences Education Building (HSEB)
South Campus
PROJECT SCOPE

Replace all five boilers
Abate existing boiler plant
Provide new 480 vac electrical system
Replace pressure reducing stations
Replace deaerator
Replace feedwater pumps
Replace fuel oil pumping system
Replace makeup water system
Replace domestic water heaters
Convert fuel oil tanks from No. 6 to No. 2
Provide chimney repairs
Replace sanitary ejector pit
Provide new control system

Maintain continuity of service to end customer in a plant 2 stories below grade, with no access.
STEA M CAPAC ITY NEEDS

› N+2 reliability goal.

› Unreliable smaller existing boilers.

› Existing: Five boilers, each with nameplate capacity of 30,000 pph.
BOILER PLANT ORIGINALLY BUILT IN 1950'S
OVERALL PROJECT PHASING

GENERALLY BROKEN INTO 4 PHASES

1. Temporary boiler plant & access
2. Replace boiler 4 & 5
3. Replace boilers 1, 2, 3 & auxiliaries
4. Controls integration
PHASE 1 TEMPORARY BOILER PLANT
PHASE 1 TEMPORARY BOILER PLANT
PHASE 1 AREAWAY
PHASE 1 AREAWAY
PHASE 1 CHIMNEY REPAIR
PHASE 2 NEW FUEL OIL TANKS
PHASE 3 DEAERATOR & MAKEUP WATER TANK
PHASE 3 BOILER INSTALLATION
PHASE 3 BOILER INSTALLATION
PHASE 3  BOILER INSTALLATION
PHASE 4 CONTROLS INTEGRATION
PROJECT RESULTS

Before
"Our Boilers are Hard to Start"
"We don’t run our boilers above 60% firing rate"
"We trip on sudden load changes"
"We have 600 degree flue gas"

After
✓ Now they start easily from 70 PSIG with mud drum heating coils.
✓ Boilers can now be operated at full firing rate.
✓ Boilers can ride through sudden load changes with large diameter steam drum and three element drum control.
✓ Flue gas temperature of 300 DEG downstream of economizer.
✓ Confidence to run on No. 2 fuel oil.
QUESTIONS?

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RMF Engineering
Reliability. Efficiency. Integrity.