



Water and Energy Efficiency at M Health Fairview

Thomas Stocking
MnTAP Advisor: Laura Sevcik
Company Supervisor: Gabby Appel



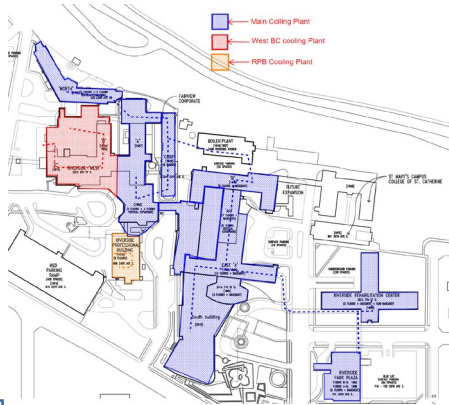
UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Company Background



M Health Fairview

- ❖ 6,400 Employees
- ❖ Full Health Services



West Bank

- ❖ 1.7 Million Square Feet
- ❖ 11 Buildings on Campus
- ❖ Hospital Open 24/7



Incentive to Change

- Technology Accessibility
- Environmental Concern
- Financial Savings



Steam on UMMC West Bank

Usages

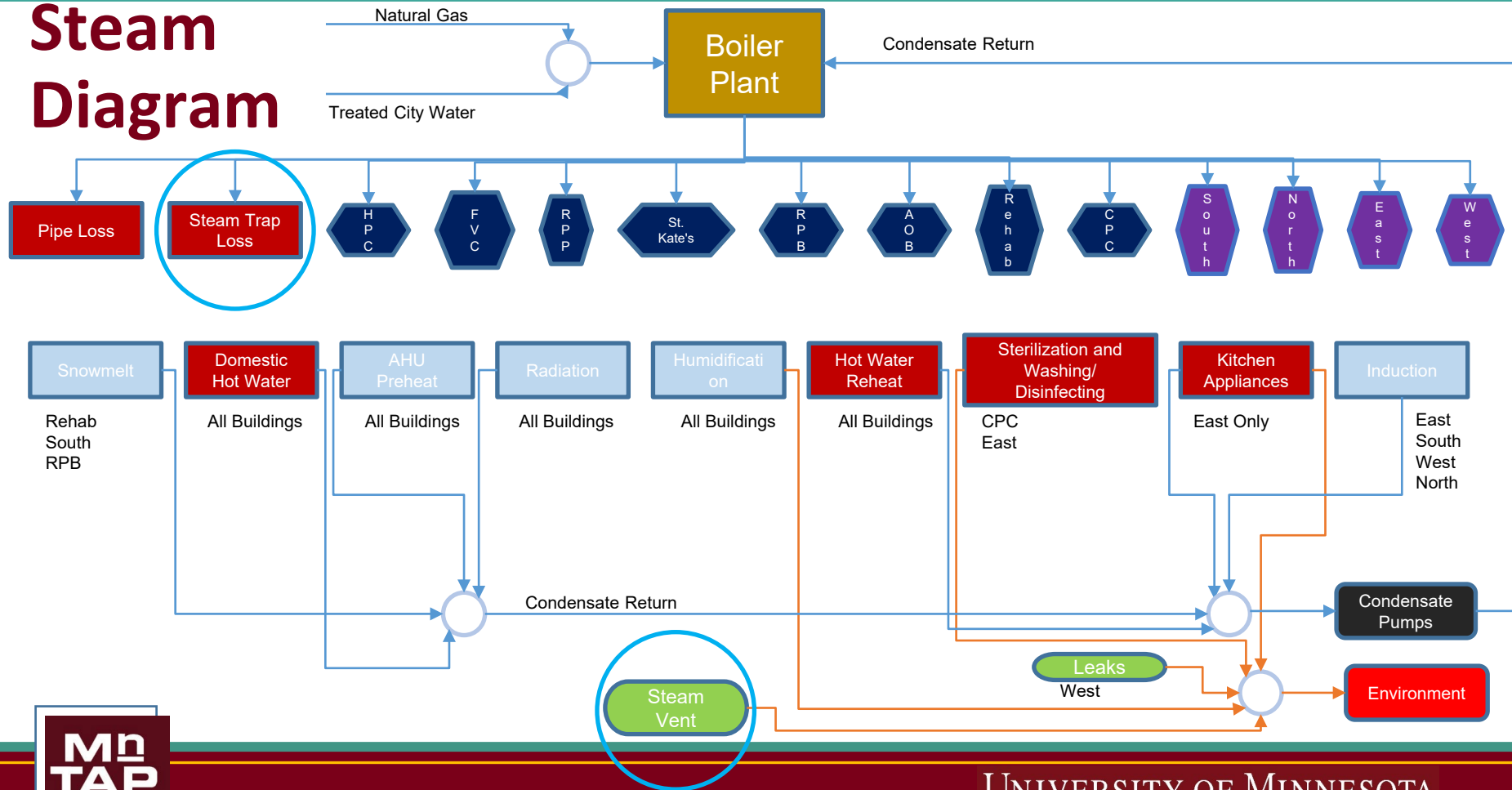
- Air Heating
- Hot Water
- Humidification
- Sterilization

Production

- Boiler Plant
- Natural Gas
- City Water
- Water Softening
- Condensate



Steam Diagram



Steam Traps

Use and Design

- Valve between steam and condensate
- Water accumulation prevented
- Float trap
- Inverted bucket trap

When Failed

- Trap failed open or closed
- Steam loss
- Water hammer damage



Steam Trap Survey

- Ultrasonic leak detector
- Personal protective equipment
- Traps tested at orifice
- Cycle testing
- Trap activity
- Basis for untested traps
- Trap quality checks



Steam Trap Survey Results

1. Location and tag number
2. Description of trap sound
3. Determination of trap status
4. Steam trap list

Steam Trap Survey Trends

1. High pressure traps
2. Hard to reach traps
3. Trap size to orifice size

- **760 Traps on campus**
- **173 checked; 35 not calling**
- **27 failed open**
 - **19% that tested failed**
 - **14 high pressure traps**
 - **1 high condensate load trap**

Solutions

| Recommendation | Annual reduction | Total cost | Annual savings | Payback period | Status |
|---|---|------------|----------------|----------------|-----------------------------|
| Replace failed steam traps | 14,000 MMBTU and 1,550,000 gallons of water | \$22,500 | \$190,000 | 2 months | Recommended |
| Recommence yearly steam trap surveys | 15,000 MMBTU and 1,650,000 gallons of water | \$85,000 | \$240,000 | 5 months | Recommended |
| Install variable frequency drives | 2250 MWh | \$150,000 | \$260,000 | 7 months | Recommended |
| Optimize water softener settings | 3,000 lbs of salt and 20,000 gallons of water | \$0 | \$7,000 | 0 months | Recommended |
| Tie in single pass cooled AHUs to chilled water | 458,000 gallons of water | \$20,000 | \$5,500 | 43 months | Recommended |
| Flash high pressure condensate before venting | - | - | - | - | Needs further investigation |

Personal Benefits

Highlights:

- Experience the mechanical work of buildings
- Contribute to patient care and environmental care
- Work with wonderful Supervisors and Engineers

