Pump End User's Inside Perspective



Dave Shea – Maintenance Manager,

Massachusetts Water Resources Authority, Deer Island Treatment Plant, Boston

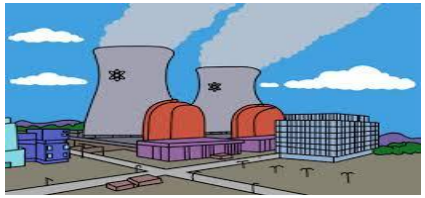
Dave Shea – Who am I? How did I get here?

- 30 years of operations/maintenance experience

- 1982 Massachusetts Maritime Academy

- Merchant Marine: Engineering Officer
- Manufacturing:
  - Peacekeeper missile, Tooling Engineer
  - Corrugated box factory, Maintenance Supervisor

- Submarine Overhaul: Planning/QC
- Power Plant: Maintenance Supervisor



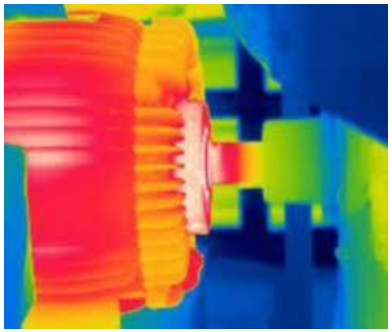
MWRA

- **Massachusetts Water Resources Authority**
- Deer Island Waste Water Treatment Plant

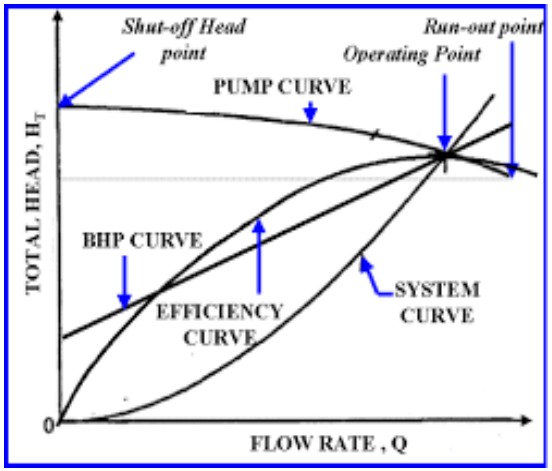
- Built in the 1990s. Federal Court order.
- Cost $3.7 billion
- Second largest WWT plant in the country
- Primary & Secondary Treatment
- Max flow: 1.25 BGD, Average: 360 MGD

Deer Island Maintenance Department

- 130 staff
- Annual budget of $14 million (parts/materials/services)
- Strive to be “World Class”
- Incorporate “Best Practices”
  - Condition based pump maintenance using vibration analysis, oil analysis, ultrasonics, infra-red, laser alignment, etc.



New Initiative



- **Pump System Optimization**

- Measure Actual Pump Efficiency VS. BEP (Best Efficiency Point)
  - Look at the system not just the pump
  - Energy savings $$/kwh
  - Improved equipment availability/reliability
  - Reduced maintenance material & labor costs
  - Create Intelligent Pump Systems

Time to Optimize

- I was invited to attended a HI one-day training session on Pump System Optimization in June 2015
- Took along a Mechanical Engineer and Energy Manager
- Deer Island is starting a Pump Optimization program. Spearhead – Dave Shea
- Coordinated to bring the HI training to the MWRA. Two one-day classes. 50 attendees. Scheduled 11/3 & 11/5.

Time to Optimize (cont.)

- Deer Island worked with A.W Chesterton to perform pump performance testing (PSO) on a few pump systems.
- Test results were eye-opening.

- Found pump efficiencies from 80% to as low as 7%

Time to Optimize (cont.)

- MWRA working with Eversource & NGID for energy savings funding to rebuild/improve pumps/systems.
- Rebuilds to include epoxy coating impellers and volutes.

- Pre-overhaul versus post-overhaul data
- This approach will continue to be used to evaluate all other pump systems

Pump End-User Challenges

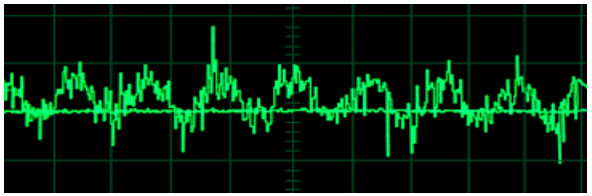
- Inherited pumping systems from Engineering
- Operate pumps properly
- Operable measurement devices
  - (flow meters, pressure gauges)
- Skilled/talented workforce is aging
- Stay ahead of pump life expectancy
- Monitor performance

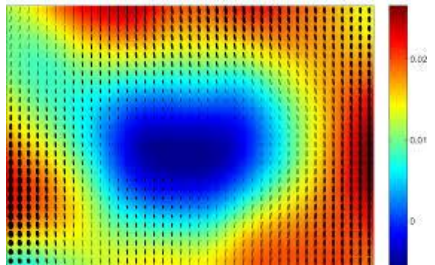
Pump End-User Challenges (Cont.)

- Maintenance, Operation, Engineering and Vendors/OEMs need to work together
- Need to map out pump sustainment program
- Create biddable specifications to meet stringent acceptance for pumps/parts/service
- Look into more outsourcing to overhaul pumps

Doctor your equipment

- Have a personal connection with equipment
  - Have a professional connection with co-workers
- Know and monitor the vitals (pressures, temperatures, vibrations)
- Take advantage of technology to become wiser
- The trick is to get wise before you get old. – an Iowa Farmer
- Walk through your plant every day. Look, listen, smell, feel, (taste optional)





Success

- The credit belongs to those who are actually in the arena, who strive valiantly; who know the great enthusiasm, the great devotions, and spend themselves in a worthy cause; who at the best, know the triumph of high achievement; and who, at the worst, if they fail, fail while doing greatly, so that their place shall never be with those cold and timid souls who know neither victory nor defeat.
  – *Theodore Roosevelt*