Borough of Hanover

The Case Study of a Phased, Complete System Upgrade

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May 12, 2016
System Description

• **Area Served by Hanover Water:**
  – York and Adams County, PA - Conewago Twp., Hanover Borough, McSherrystown Borough, Penn Twp.

• **Approximately 40,000 individuals served**

• **Over 50% of water is used for commercial and industrial**

• **Source Water:**
  – Primary – South Branch Conewago Creek (Sheppard Myers Dam, Lawrence Baker Sheppard Dam)
  – Secondary – Slagles Run
System Description (con’t)

• **Pre-Sedimentation:**
  – Clear Lake Reservoir – 66 MG man-made lake

• **Water Treatment Plant**
  – Two parallel conventional treatment process trains, “Old Plant” and “New Plant”

• **Distribution System and Storage**
  – 202 miles of piping from 4” to 20”
  – Two elevated storage tanks (750,000 gallons total)
  – Parr’s Hill reservoirs (13 MG storage)
  – Parr’s Hill Pump Station (Max 1,230 gpm to high service zone)
Initial Evaluations/Permitting

• **Water Allocation Permit**
  – Renewal of 1990 permit submitted in 2013

• **Dam Inspections**
  – Completed for all 3 dams annually beginning in 2012
  – Numerous “red flags” noted during inspections

• **Water Treatment Plant Evaluation**
  – Completed in mid-2013

• **Parr’s Hill Evaluation**
  – Completed in early 2013
Sheppard Myers Dam Evaluation

- **Evaluation Completed June 2013**
  - Demolish existing spillway and construct a new labyrinth spillway and stilling basin
  - Embankment modifications
  - Construct new headwall structure
  - Install new drainage along embankment
  - Install toe drain weir box to measure seepage
Sheppard Myers Dam Evaluation

• Design anticipated to begin in 2016
• Construction Cost Estimate - $6 million
Parr’s Hill Reservoir & Pump Station

• 13 million gallons finished water storage
• New cover and liner installed
• New pump station for vertical can pumps
• Existing pump station reused to house stand-by generator
2014 Parr’s Hill Reservoir & Pump Station Improvements

Liner

Cover

Existing Pump Station

New Pump Station
Raw Water Conveyance/Pre-Sedimentation

Figure 1. Location Map – Google Earth – Imagery Date 2/28/2007
Total permitted capacity is adequate to supply current and projected future demands (2040)

- **WTP Permitted Capacity (11.6 mgd) is Adequate for Projected Demands**
- **Historical Production (2003 – 2012)**
  - Average Daily: 5.2 mgd
  - Maximum Day: 7.3 mgd
  - Maximum Day: 6.4 mgd (since 2008)
- **Projected 2040 Demand (Planning Study)**
  - Average Daily: 6.4 mgd
  - Maximum Day: 9.1 mgd
Phased Improvement Plan

• **Phase 1**
  – Old Plant Improvements, BW Recycle Modifications, Chemical Systems, Safety, Security, Portions of Electrical and SCADA/I&C Improvements

• **Phase 2**
  – New Plant Improvements, High Service Pumping, Portions of Electrical and SCADA/I&C Improvements
Clearlake – Phase 2

• Improvements to outlet structure
• Influent and effluent control valves added
• Level monitoring
Rapid Mix Improvements

Old Plant (Phase 1)

New Plant (Phase 2)

Install Mixer and Baffles in Existing Chamber
Low Duty Pumping Improvements

Old Plant (Phase 1)

New Pumps and VFDs

New Plant (Phase 2)

New Motors and VFDs
Old Plant Filter Improvements - Phase 1

- **Filtration Process Rebuild**
  - Replaced Underdrain
  - Install Dual Media
  - Install Air Scour Equipment
  - Coat Interior of Filter Boxes
  - Construct Curbs
  - Install PLC Controls, MOVs, Instrumentation, Replace Filter Gallery Piping
  - Pressure Inject Cracks, Coat Exterior of Boxes
Old Plant Filter Improvements - Phase 1
New Plant Filter Improvement - Phase 2

- **Filtration Process Improvements**
  - Install Underdrain
  - Install Dual Media
  - Install Air Scour Equipment
  - Raise Troughs
  - Install PLC Controls, MOVs, Instrumentation
New Roof on Clearwell - Phase 1
New Chemical Building – Phase 1

• Storage and feed equipment for:
  – Chlorine (sodium hypochlorite)
  – Fluoride
  – Caustic Soda
  – Sodium Permanganate

• PLC controls and instrumentation

• Chemical delivery area

• Safety equipment (eyewash and safety showers)
Chemical Storage and Feed Systems – Phase 1

Existing

New Chemical Building
pH Adjustment Soda Ash to Caustic Soda
Gas Chlorine to Sodium Hypochlorite
Fluoride Drum Storage to Bulk Storage
Instrumentation, Controls, and Data Acquisition Systems will Improve WTP Performance

- Existing I&C is minimal
- Data acquisition, analyses, control primarily manual
Instrumentation & Controls – Phase 1

- Primary Control Station & SCADA Programming
- Old Plant filter PLC, MOV, instrumentation
- Communications network
- Backwash water tank controls and instrumentation
- Chemical facilities controls and instrumentation
Total System Integration - Phase 2

Future Remote System Connections
Impacts of Phased Approach on WTP

• Old Plant will be in service during construction of New Plant
• Relocation of existing generator
• Instrumentation Capabilities
  – Local Automated Control – Phase 1
  – Remote Automated Control – Phase 2
• Construction Sequence of High Service PS
• Permitting Impacts
Lawrence Baker Sheppard Dam Evaluation

- Evaluation completed January 2016
- Minor Improvements scheduled for summer of 2016

Gannett Fleming
Excellence Delivered As Promised
Kitzmiller Dam

- Evaluation Completed February 2014
- Minor Improvements to be scheduled
Final Thoughts

• Keeping up with the improvements required for aging infrastructure is a challenge.
• Holistic review of system improvements is important.
• Engaging all stakeholders is critical.
• Phasing designs should be used after careful consideration.

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