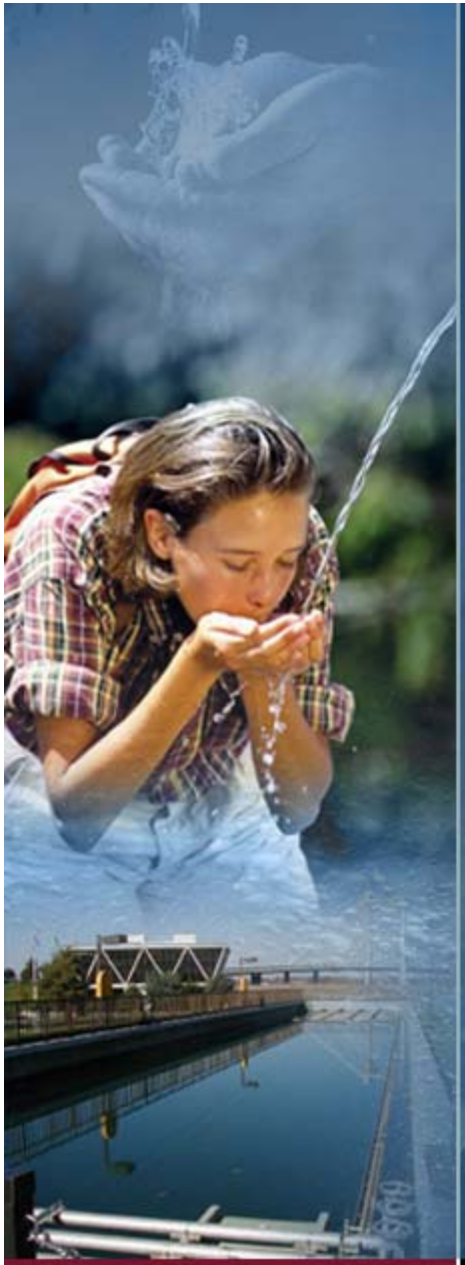

Reusing Old Facilities for New Treatment Systems – Engineering Issues

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2010 PNWS-AWWA Conference
Tacoma, WA

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Today's Topics

- Treatment of Tacoma's in-town South Tacoma Wellfield groundwater
- Emphasis on the engineering design issues associated with older facilities
- Water quality and treatment discussion is later today

Acknowledgements

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  - Craig Downs
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South Tacoma Wellfield Background

- 13 wells along South Tacoma Way in the middle of town
- Wells range in capacity from 0.8 MGD to 11.5 MGD
- Wells discharge to the Wells Pipeline
  - Originally was an open channel flume dug in the 1900s
  - Been replaced with buried pipe over the decades
  - Now is a combination 36” to 42” steel or concrete pipe
- Wells Pipeline connects to the Hood Street Reservoir and the South Tacoma Pump Station

Project Location

Project Facilities

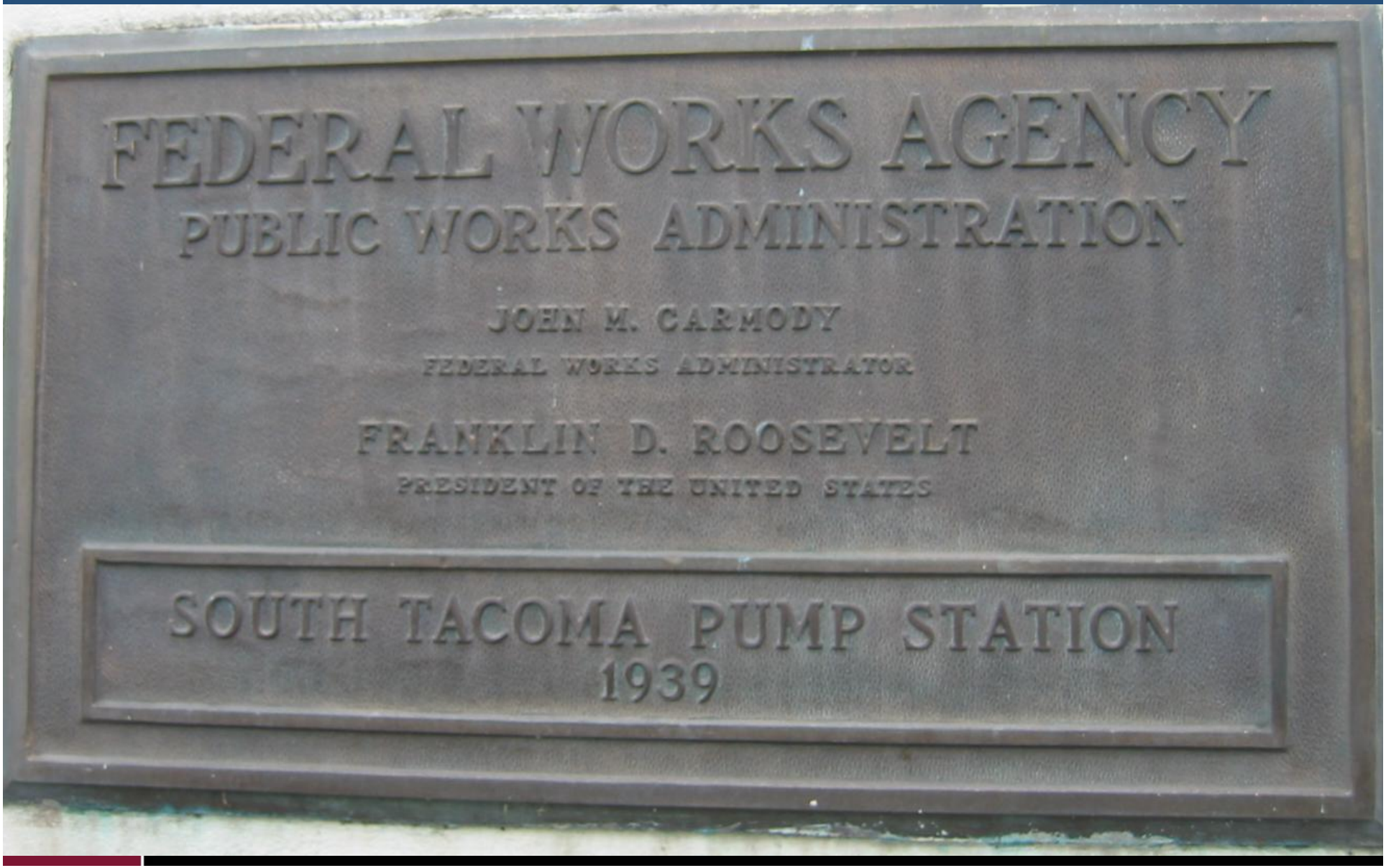
- Hood Street Reservoir
  - Originally open reservoir
  - Converted to 10 MG partially buried reservoir in 1985
  - Receives both groundwater and treated Green River water
- South Tacoma Pump Station
  - 16.7 MGD facility with 0.5 MG clearwell
  - Pumps groundwater directly into distribution system

Hood Street Reservoir

1929 Hood Street Treatment Building

1939 South Tacoma Pump Station

South Tacoma Pump Station Building Plaque



Evaluation Project Goals

1. Implement corrosion control improvements at Hood Street Reservoir and the South Tacoma Pump Station

2. Add fluoridation systems at both locations

3. Upgrade existing onsite hypochlorite system at the Hood Street Reservoir

Design Issues

- Incomplete or aging record drawings
- Changing design or code requirements
- Equipment and piping conflicts
- Uncertain condition of buried assets

Incomplete or aging record drawings

- Earlier drawings have less details then modern sets
- Some drawings were lost during office moves
- Some drawings accidently destroyed over time
- Subsequent redesigns not fully documented
- Relying more on institutional memory and on-site informational gathering

Hood Street Treatment Building Cabinets

Changing Design or Code Requirements

- Modern code requirements have generally become more stringent
  - But…older construction used greater margins of safety
- Tacoma Water example is structural/seismic
  - Many revisions were after 2001 Nisqually earthquake
  - Existing buildings can be “grandfathered” as long as no “substantial” changes are done
  - Should “critical” utility equipment be in grandfathered buildings?

Hood Street Treatment Building

South Tacoma Pump Station Walls

Equipment and Piping Conflicts

- Many older, unused underground equipment is abandoned rather than removed
  - Cost effective process
  - Can allow abandoned pipe to be reused in the future
- Problem can occur when abandoned material potentially conflicts with new plans
  - Additional design and construction costs incurred
  - Potentially hazardous materials

Hood Street Reservoir Improvements

Hood Street Reservoir

- Multiple pipelines added over time throughout site
- Presence of abandoned pipelines marked on drawings
- Presence of some abandoned valves not on drawings
- Old open-air reservoir concrete bottom and sides still in place
  - Differential loading issue for new structures

South Tacoma Pump Station

- Just as old as Hood Street
- Very few piping changes to facility
  - Most of those changes properly recorded and easy to visually verify
- Easy to understand and avoid pipe conflict and equipment issues

Uncertain Condition of Buried Assets

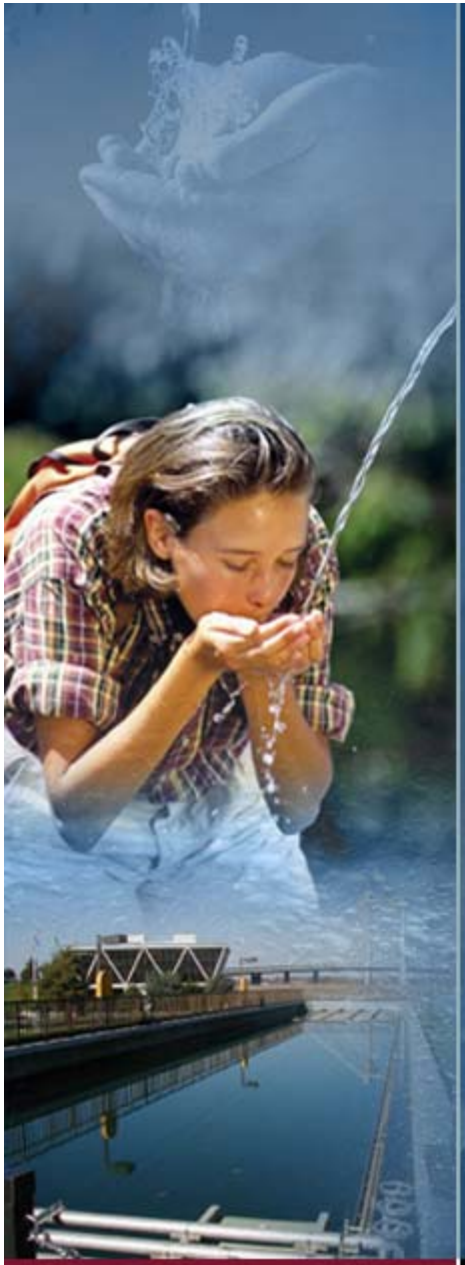
- Out of sight, out of mind
- Hood Street Reservoir proposes to connect two older pipelines together for better flow monitoring
- Aging pipelines can be in a range of conditions
  - Some can be very good structural condition
  - Others may be weakened and cannot withstand new tie-ins without breaking
- Potholing is important for collecting good condition data.

Next Steps

- Starting on final design at Hood Street Reservoir for a caustic soda/FSA chemical feed facility
  - Pipeline condition assessment
  - Underground utility survey
- South Tacoma Pump Station
  - Treatment system pilot testing
  - Assessing structural improvements

Conclusions

- Reusing old facilities can be a cost effective way of reducing capital costs
- Can also have several design challenges
  - New equipment doesn't match existing equipment
  - New equipment can conflict with abandoned equipment
  - Adding new eqiupment can trigger other issues.
- Design challenges with incorrect or missing as-recorded drawings is not limited to "old" facilities
  - Good project documentation is crucial



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