



Building a New Tank?

What the Tankies Want You to Know

Christine Gunsauillus, EIT
The Tank Queen, LLC
Christine@TankQueen.com



1



2

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight

\$\$\$

Tips from my Tankie Friends



3

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight



4

STYLES & MATERIALS



Bolted Steel



Welded Steel



Concrete

5

STYLES & MATERIALS



Bolted

- *Thinner steel
- *Ice damage
- *Gaskets & bolts have lifespan



Welded

- *May need ptg. touch-ups
- *Full painting 20 - 25 years



Concrete

- *Spalling
- *Cracks, leaks
- *Once painted, must repaint

6

HOW DO YOU PICK? *What is most important*

- Immediate cost?
- Long-term cost: Net present value?
- Ease of maintenance?
- Design needs?
- Site limitations?
- Ability to modify?
- Qualified contractors?
- Schedule?
- NIMBY?
- Customer service?



7



New Tank Trends

- Elevated NOT Standpipe
- Multiple Tanks (Frank Houston at DN Tanks)
- Sized for Today's Needs – Bigger isn't better (Rob Horvat at KLH)



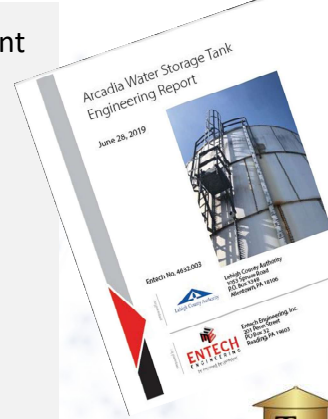
8

HOW DO YOU PICK?

Consider all of your options for different tanks and be curious (Dave Beiler at Quandel)

Engineering Study

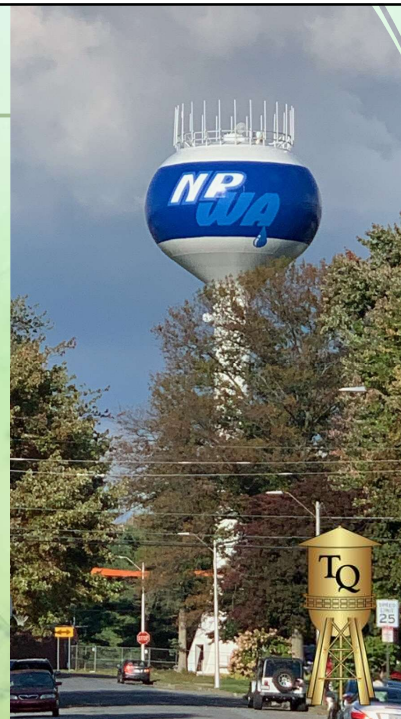
- 80-Year Life Cycle
- Pros and Cons of Five Options
 - Different types & quantities
- Findings



9

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight



10

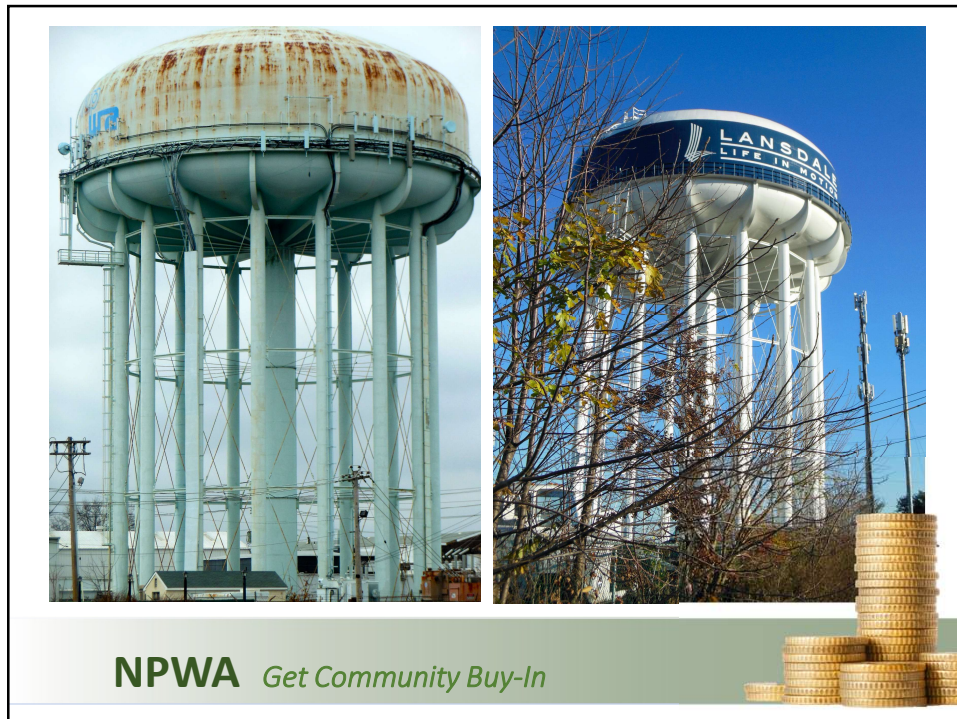


11

Do You Have a...

- Site?
- Zoning?
- Zoning Permits & Approval?
- Building Permits & Approval?
- NIMBY issues?
- PA DEP Permits?
- NPDES Permits (in PA)?
- Wetlands and Waterways?
- FAA Approval?
- Funding?
- Critical Need for Immediate Storage?

12



13

SCHEDULE

1-2 Years for Planning

- Concept
- Funding
- Site Acquisition
- Soil Borings
- Design
- Zoning
- Permitting
- Final Specs
- Bidding
- Contracting

14

SCHEDULE

1-2 Years for Construction

- Design and Submittals
- Site Clearing
- Foundation & Piping
- Material Acquisition
- Fabrication
- Shop Painting
- Tank Erection
- Tank Painting
- Chlorination & Filling
- Electrical
- Cell Carriers & Antennas
- Site Restoration & Fencing



15

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight



16

LOCATION *Ideally...*

- 1 Acre (200'x200') for 2 MG
- Level
- Easy Access (360 degrees)
- No Powerlines (OSHA Regs)
- Water Main Nearby
- No Houses Within 200'



17




18




19


LOCATION *How much space is needed?*



Bolted Steel
Dia. +20'
plus 50'x50'
laydown



Welded Steel
Dia. +60' (reservoir)
Dia. +75' (elevated)
plus corners



Concrete
Dia. + 80' plus
corners

20

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. **Design**
5. Accessorizing Your Tank
6. Oversight



21

DESIGN *AWWA Standards*

Industry Consensus for Minimum Requirements

- D100** Welded Carbon Steel Tanks
- D102** Coating Steel Water-Storage Tanks
- D103** Factory Coated Bolted Carbon Steel
- D107** Composite Elevated Tanks
- D108** Aluminum Dome Roofs
- D110** Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks
- D115** Tendon-Prestressed Concrete Water Tanks
- C652** Disinfection of Water Storage Facilities



22

DESIGN *AWWA Standards*



29CFR 1910 – Revised in 2017!

Occupational Safety & Health Standards

• **1910.23** Ladders and **1910.29** Handrails

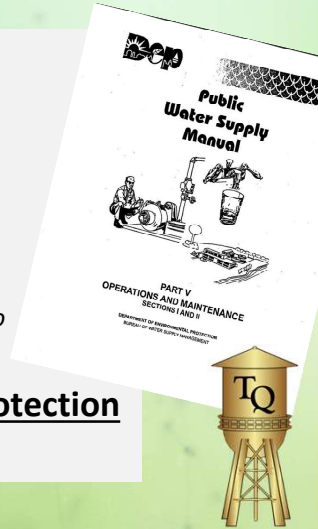
10 States Standard

Recommended Standards for Water Works

IL, IN, IA, MI, MN, MO, NY, OH, PA, WI and Ontario

PA Department of Environment Protection

Public Water Supply Manual



23

DESIGN *Specifications: Top Tips*


- Visit nearby similar tanks during design.
- Talk with the operators (Eric Moore at Entech).
- Request a sample spec from the tank manufacturers (Corey Meyers at DN Tanks).
- **DON'T** recommend copying an old specification.
- Request feedback from the tankies about the site, drawings, and specifications (Dan Knight at CB&I).



24

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight

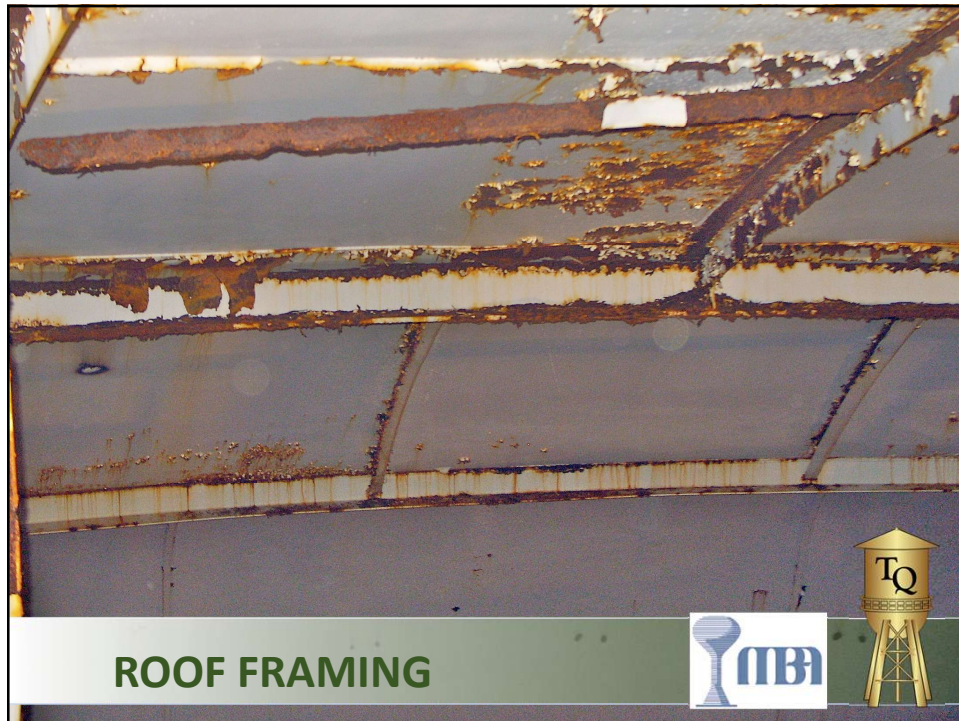
The image shows two water towers. The larger one on the left is blue and white with 'NP WA' written on it and a crown-like top. The smaller one on the right is yellow with 'TQ' written on it. They are set against a background of trees and a clear sky.

25

A close-up photograph of a large, dark-colored metal tank. A circular manhole cover is visible, secured with many bolts. The ground in the foreground is covered with dry, brown leaves. A small yellow water tower with 'TQ' on it is visible in the bottom right corner.

SHELL MANHOLES

26



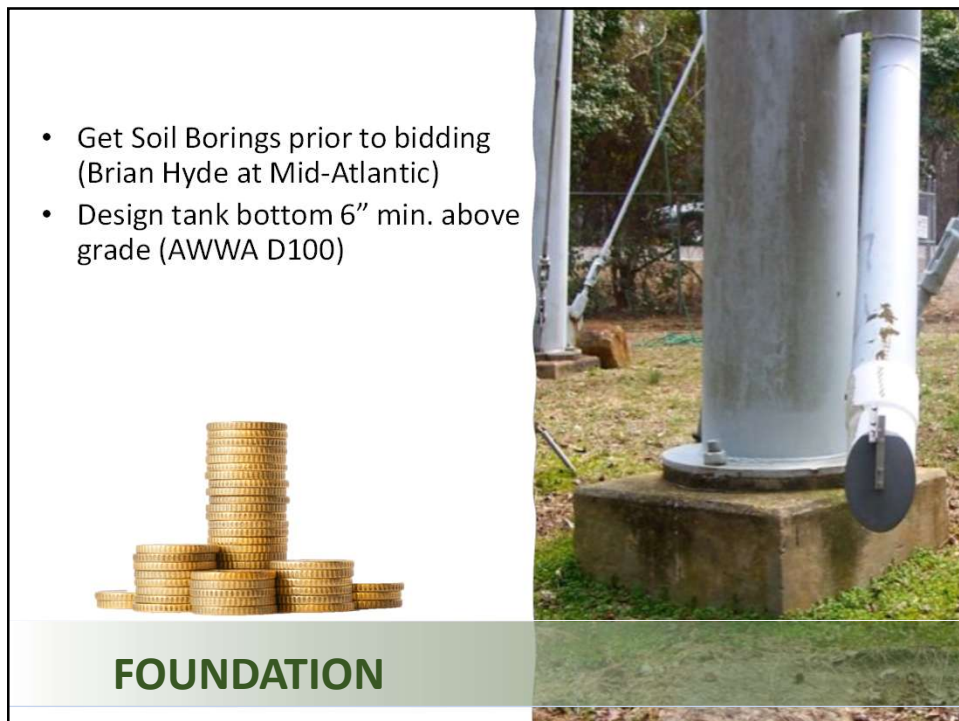
27



28



29



30



31



32



33

COATINGS *Selecting a Coating System*

How do I pick a system?

- Experience
- Advice from coating manufacturers
- Advice from painting contractors (Jamie Stoltzfus at IK Stoltzfus)
- Budget
- Surface
- Tank Location



34

OVERVIEW

1. Tank Types: Styles & Materials
2. Schedule
3. Location
4. Design
5. Accessorizing Your Tank
6. Oversight



35

Oversight *Inspections*

1. Cell Carrier Removal
2. Existing Tank Demolition
3. Foundation & Site Work
4. Shop Painting
5. Welding Inspection
6. NDT & X-rays
7. On-site Painting
8. First Anniversary



36

Oversight *Anniversary Inspection*

- 1 year after construction
- MUST Include verbiage in specs
- Repairs done:
 - at no cost
 - while under warranty
- Typically only need touch-up painting
- Full life-span of coatings is achieved



37

LESSONS LEARNED

- You don't know what you don't know.
- Lots of standards and guidelines to help.
- Think carefully before cutting and pasting.
- Tank manufacturers, contractors, & suppliers **WANT** to help.
- In this industry, we help each other.



38

*Connect with me on **Linkedin***

Join me at these Conferences

PennTec *June 22-25 at the Kalahari Resort*

PMAA *Sept. 7-9 at Wind Creek Bethlehem*

WWOAP *Sept. 21-23 in Boalsburg, PA*

Questions?



Christine Gunsallus, EIT
The Tank Queen, LLC
484-354-9201
Christine@TankQueen.com