

PAINE FIELD RESERVOIR RECOATING

HOW DO YOU RECOAT A RESERVOIR IN HALF
THE TIME YOU NEED?

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BACKGROUND

- Reservoir 4 (Paine Field Reservoir) is owned and operated by Mukilteo Water & Wastewater District
- Constructed in 1989
- Located at Paine Field Airport between Cities of Everett and Mukilteo in Snohomish County, WA



HISTORY

- Reservoir is supplied by a transmission main and booster station located on-site
- Reservoir sets grade for Snohomish County Airport (Paine Field) and a significant amount of industry
- Construction of reservoir was conducted with a participation agreement with Tramco, in exchange for guarantee of 18,000 gpm for 45 minutes, or 810,000 gallons of fire protection storage
 - Agreement had provision for maintenance, which could occur for 6-8 weeks every 3-5 years
- Reservoir had never been out of service





HISTORY

- Hanger 1 is currently owned by ATS, Hanger 3 is currently owned by Boeing
- Both are on the same deluge fire suppression system



ISSUES

Question:

Coating system is 25+ years old; how do we recoat it and keep industry in service?

Answer:

Lots of meetings



PROCESS

- Met with all the stakeholders regularly for 18 months
 - Boeing, ATS, Snohomish County Airport, Fire Marshal
- Options presented:
 - Construct temporary storage (approx. 1.0 MG) for fire suppression only
 - Construct a new 1.0 MG low level reservoir adjacent to the existing
 - District expected these options to be paid for by Boeing and ATS because they were the only customers that would benefit



SELECTED ALTERNATIVE

- Limit industrial activities to reduce fire flow requirement to 4,500 gpm
 - Required throttling down the fire pump system
- District agreed to have the tank back in service within the 6-8 week time frame in the agreement

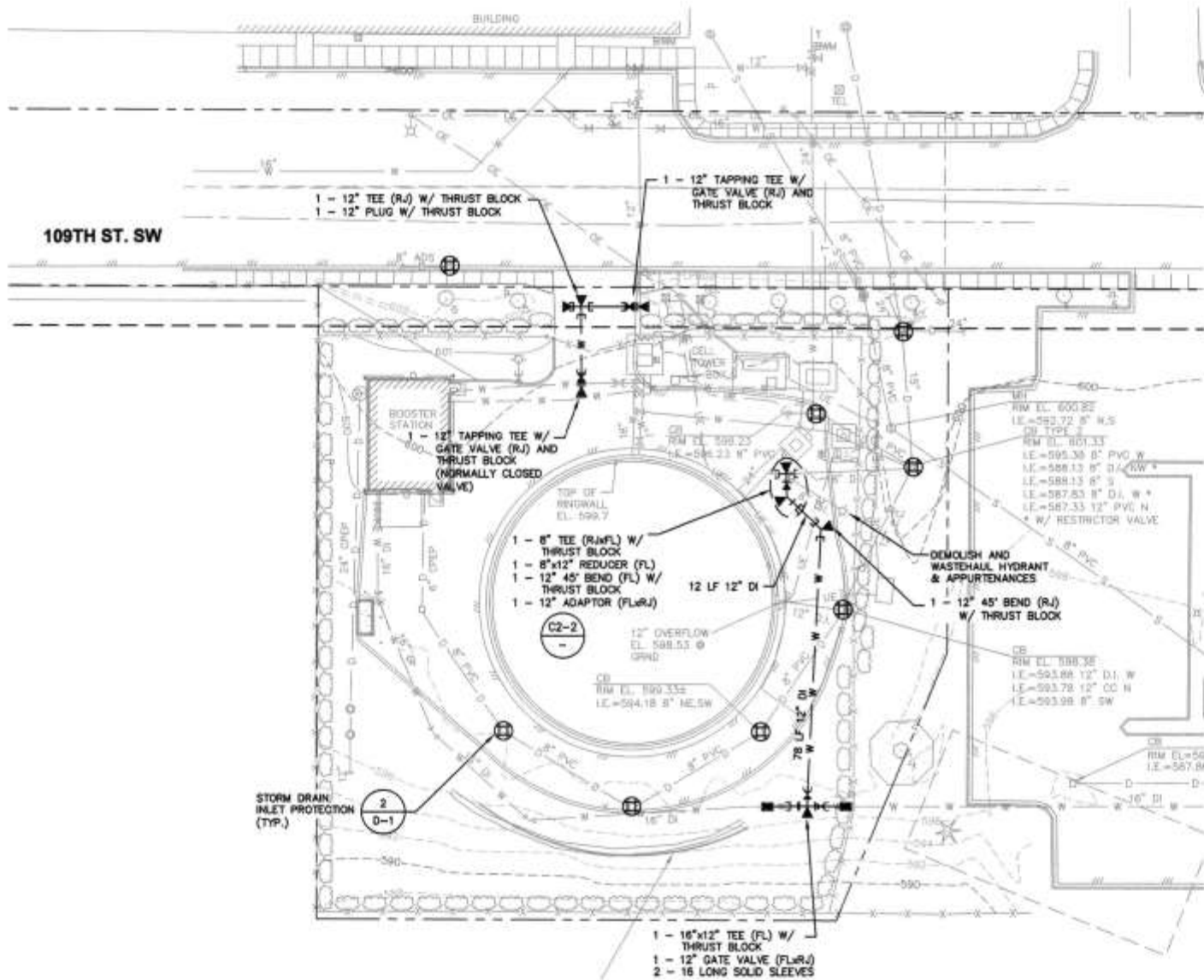
QUESTION: How are we supposed to do that?



STEP 1: PIPING IMPROVEMENTS

- District installed site piping that allowed the existing booster station to pump out of the tank, rather than only into it
 - Pump VFDs maintained normal system pressure while tank was out of service
 - Pumps could pump down at 2,000 gpm. Reservoir gravity drain could only flow at 400 gpm. This saved days on the schedule.
 - This work occurred the year before the coatings contract was put out to bid.





STEP 2: COATINGS SELECTION

- Interior and Exterior Coating Systems
 - Exterior could be painted while full
 - Interior had to be returned to service in 8 weeks
- Exterior System
 - Existing coatings were tested and believed to be in good condition
 - Traditional epoxy tie coat and polyurethane top coat selected
 - Reservoir to be coated while full
- Interior System
 - Lots of issues here



STEP 2: COATINGS SELECTION

- Interior Coatings - Traditional
 - Typically blast, prime, and two coats of epoxy
 - Blast/prime could take 6-8 weeks normally
 - Application of the stripe, intermediate, and finish coats
 - Cure time – As soon as 7 days @ 77 degrees
 - Time to refill to 800,000 gallons to fulfill agreement
 - Easily applied by wide array of coating contractors
- Interior Coatings – Plural Component System
 - Blast and hold prime with dehumidification
 - Apply stripe and single finish coat
 - Cure time – As soon as 24 hours @ 77 degrees
 - Time to refill to 800,000 gallons to fulfill agreement
 - Highly specialized with very technical equipment
- Big Issues
 - Could the contractor blast and coat everything in time?
 - What type of risks and costs were we taking to save time?
 - Would you lessen coverage by applying only one coat?



STEP 2: COATINGS SELECTION

- Blasting the existing coating system
 - Interior coatings could be very difficult to blast
 - Mill scale could be present
 - Contingencies in case it was difficult
 - Incentives:
 - Early completion incentive
 - Liquidated damages
 - Roof and floor were Lump Sum
 - Interior walls were per Square Foot
 - Allow us to stop blasting, recoat, and complete in 3 years
- Contingencies in place, time to get to work!



STEP 3: RECOATING THE RESERVOIR

- Exterior
 - Prepped and primed
 - Swing stages to paint
 - Issues
 - Very windy
 - Tiny drips from rollers landed in car parking lot
 - (Better than the planes that were there!!!)
 - Contractor immediately resolved the issue



STEP 3: RECOATING THE RESERVOIR

- Interior
 - Contractor brought in heavy equipment
 - Meetings every morning to discuss the work
 - Started with 10-12 hour days
 - 8 men blasting at a time
 - Issues
 - Mill scale found in the roof
 - Compressor and generator issues
 - Crews performed other work if equipment was down
 - Rigging
 - Dryspray



STEP 3: RECOATING THE RESERVOIR

- Interior
 - Stripe and finish coats



STEP 3: RECOATING THE RESERVOIR

- Oops – when blast hoses spring a leak!



STEP 4: ANNIVERSARY INSPECTION

- Performed at 1.5 years
- 3-year warranty
- How to inspect below the waterline?



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STEP 4: ANNIVERSARY INSPECTION



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