Large Meter Replacement Program

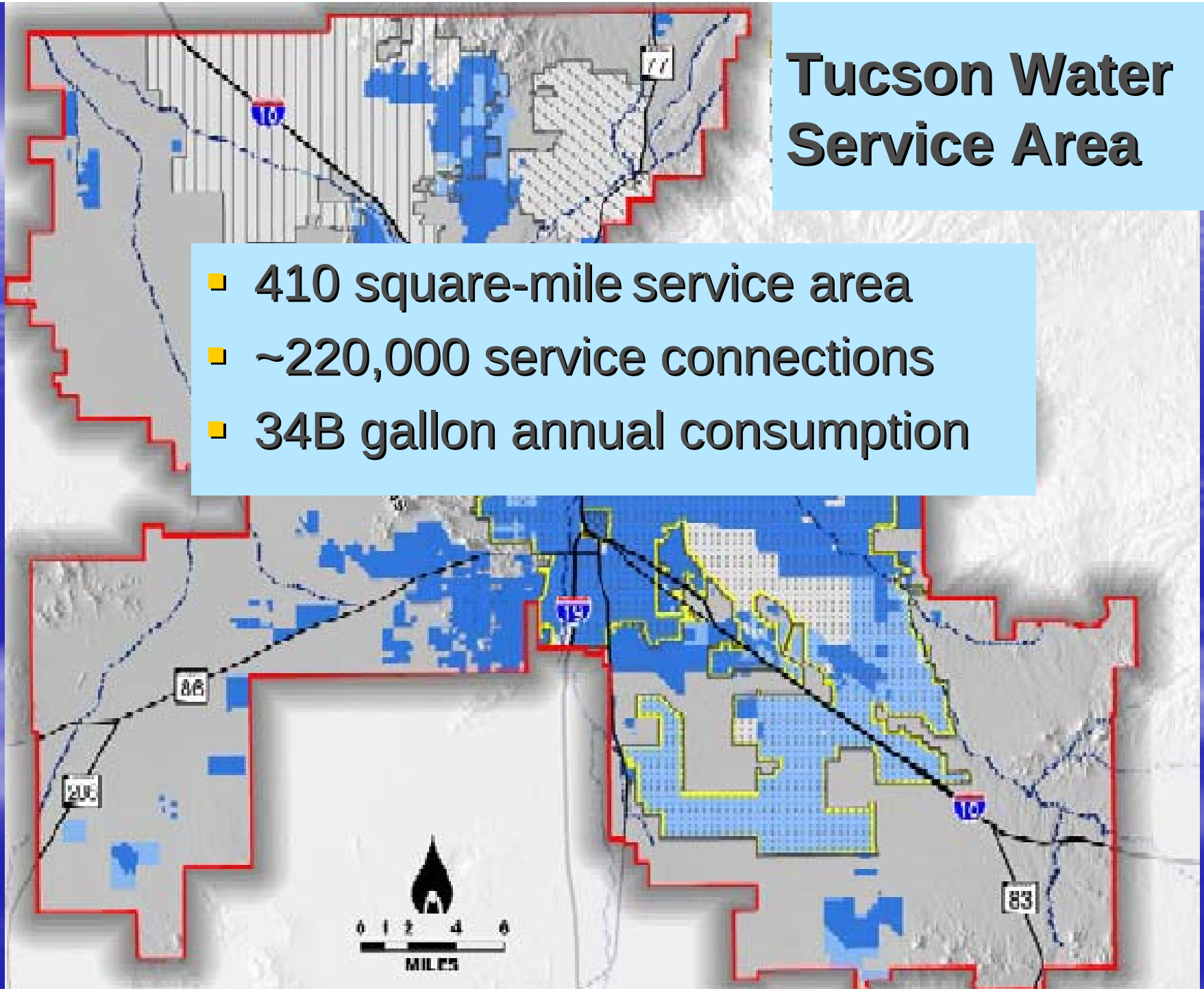
Joseph Olsen, PE
Engineering Manager
Tucson Water

Overview

- Tucson Water Service Area
- Large Meter Consumption
- Lost Water
- Large Meter Test Study
- Analysis of Results
- Unique situations

Tucson Water Service Area

- 410 square-mile service area
- ~220,000 service connections
- 34B gallon annual consumption



Large Meters (>3”)

- 203 large meters in Tucson Water system
- Annual consumption of 1.2B gallons
- 3.7% of total demand pass through 203 meters

- *In other words; <u>0.1% of meters deliver almost 4% of the utilities total water delivered</u>*

Enhancing the Meter Accuracies

- Many large meters installed >25 years ago
- Inappropriately utilized/sized meters based on application; e.g. turbo for apartment complex

Large Meter Study

- Selected ten 3” to 6”underperforming compound and turbine meters
- Replaced with single jet or positive displacement meters ranging in size from 2” to 6”
- Comparative analysis of 1-2 years consumption
- Goals:
  - Increased consumption and revenues
  - Payback on infrastructure investment <10 years
  - Lost water reduction

Results (Year 1 & 2 Average)

- Consumption:
  - **18.9M** gallons increase
  - **12%** increase

- Revenues:
  - **$86K** increased annual revenues
    - (Adjusted for rate increases)
  - **15%** increase in revenues

Results (Year 1 & 2 Average)

- Payback
  - 4.6 years on full infrastructure replacement costs

    - OR-
  - 1.1 year on meter costs

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Lost Water

- <10% goal for Tucson Water set by Arizona Dept. of Water Resources
- Multi-front battle to reduce causes from
  - Theft
  - Leaks
  - Inaccurate meters (both source and revenue)
- Too expensive to replace all 220,000 meters
- Focus on large meters first to maximize reduction

Results (Lost Water)

(Increased water read through 10 meters)

---------- **= 0.47%**

(Utilities average annual lost water)

- ***A half percent reduction in lost water achieved from only 10 meters retrofits***

Bottling Plant

- 4” compound replaced with 4” single jet
- Consumption increased 1.5M gallons annually
  - 3% increase in consumption
- Increased revenues $5,000 annually
  - 7% increase in revenues
- Payback period
  - 0.8 years for meter cost
  - 3.6 years for assembly retrofit to new specs

Condominium

- 4” compound replaced with 4” single jet
- Assembly brought above ground from a vault
- Consumption increased 780,000 gallons
  - 15% increase in consumption
- Increased revenues $2,400 annually
  - 18% increase in revenues
- Payback period
  - 2.9 years for meter cost
  - 13 years for total assembly costs

Office Complex

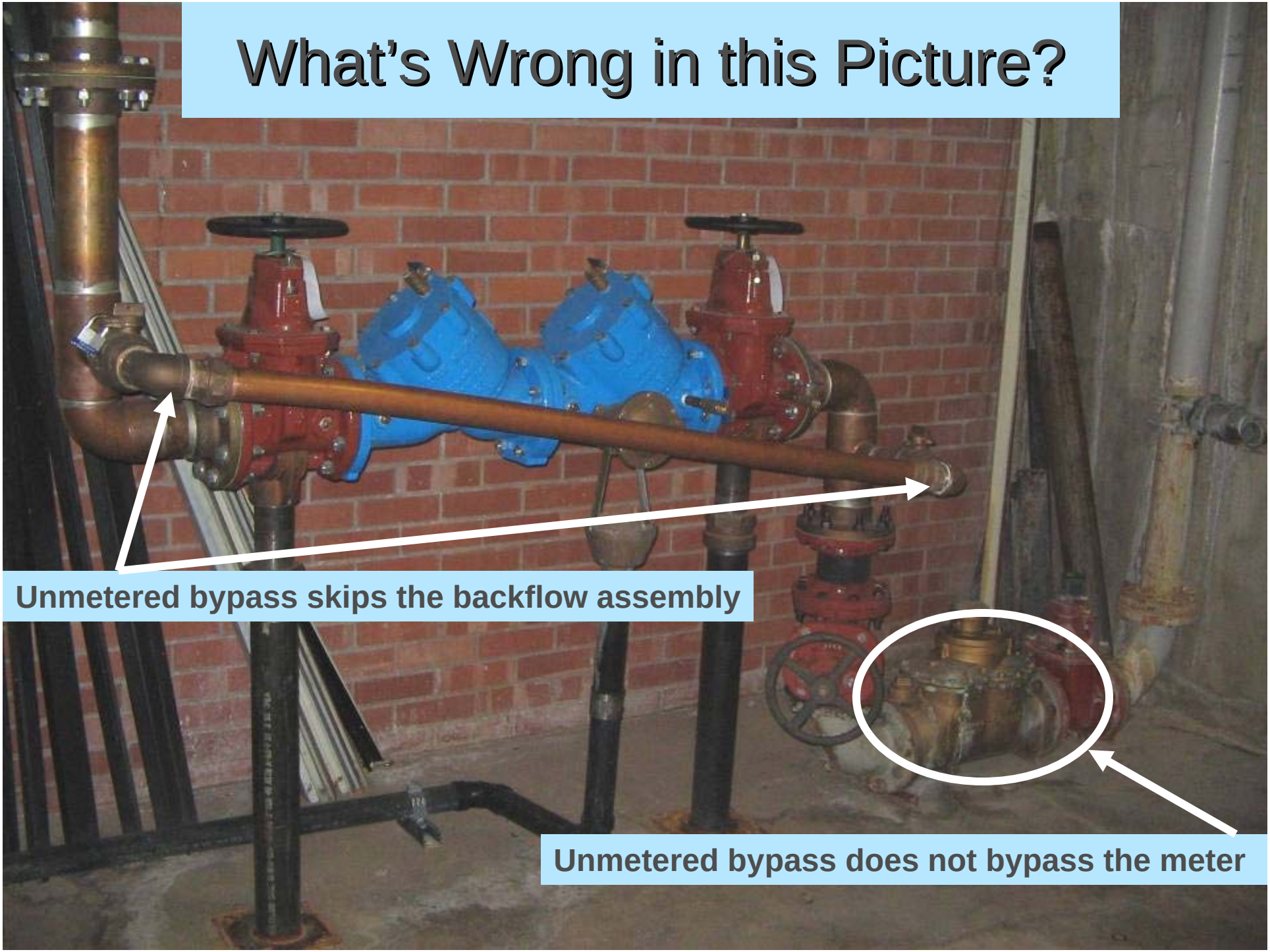
- 4” compound replaced with 2” positive displacement
- Eliminated a large meter vault
- Consumption increased 990,000 gallons annually
  - 20% increase in consumption
- Increased revenues of $3,400 annually
  - 29% increase in revenues
- Payback period
  - 2.0 years for meter cost
  - 3.6 years for total assembly costs

Department Store

- 4” compound replaced with 2” positive displacement
- Eliminated a large meter vault
- Consumption *decreased* 1,600,000 gallons annually
  - **38%** decrease in consumption
- *Decreased* revenues of $5,500 annually
  - **28%** decrease in revenues
- Payback period; impossible to obtain

Root cause; department store customer activity dropped 50% during test study year

What's Wrong in this Picture?



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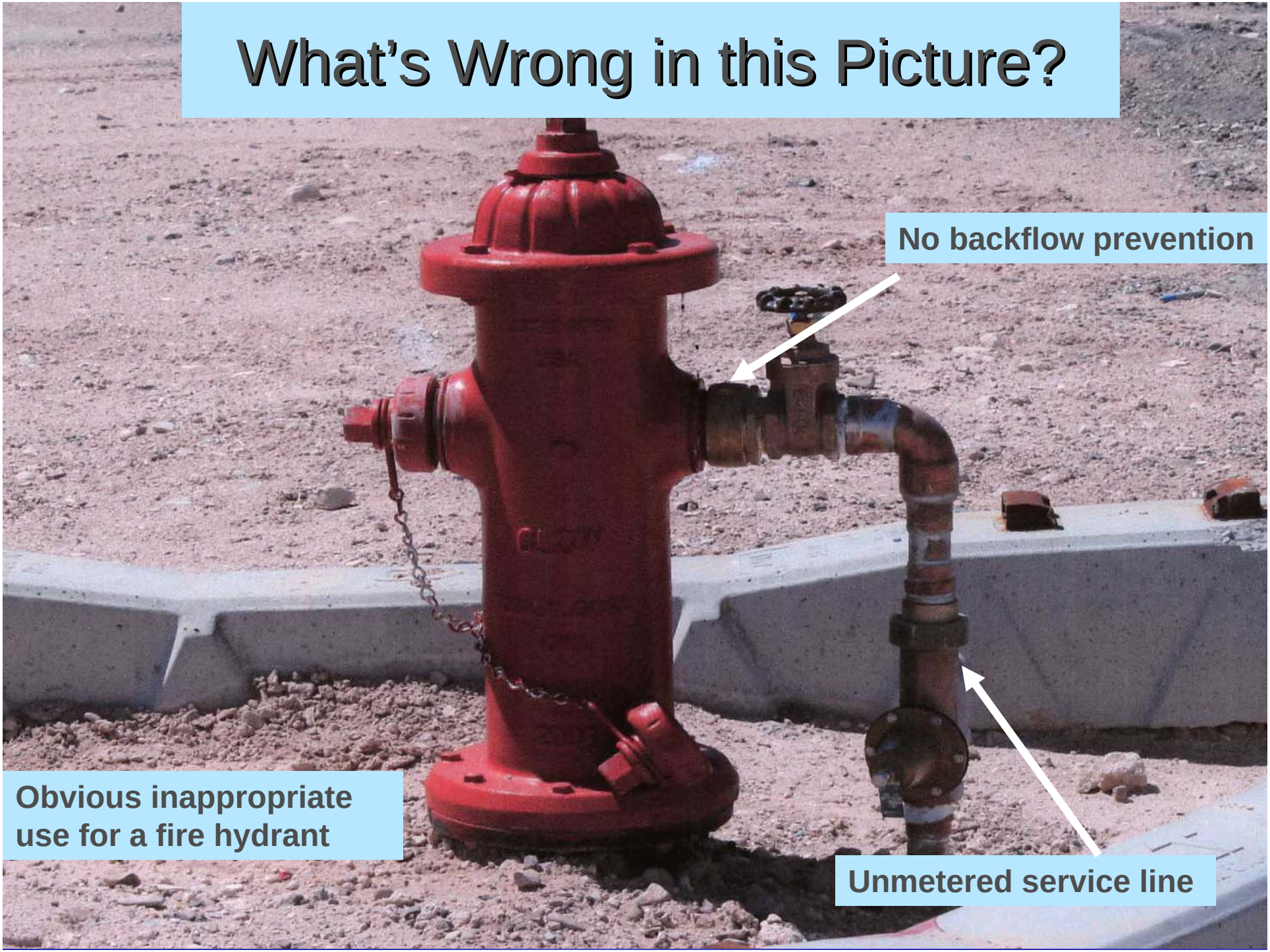

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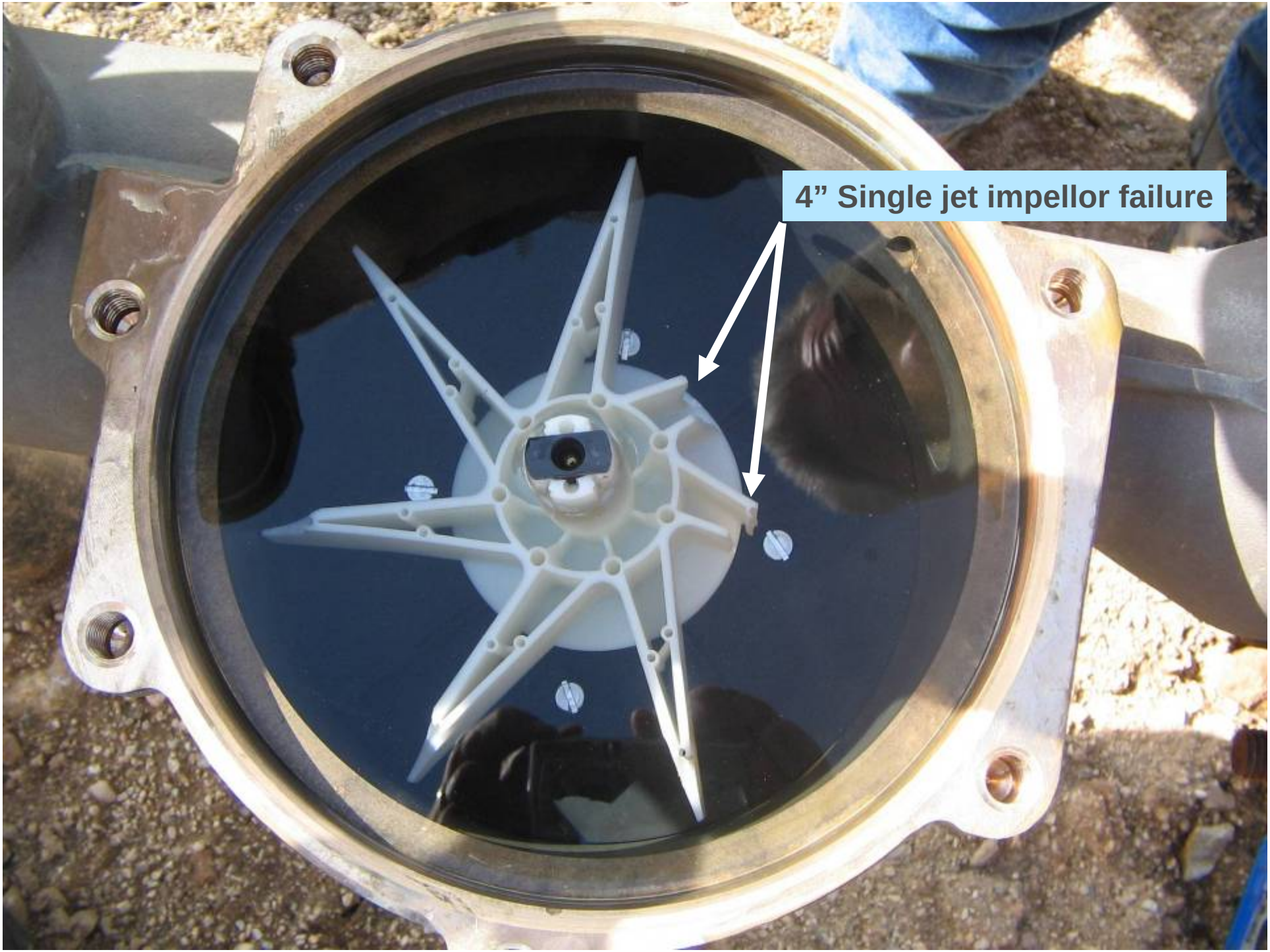
4” Single jet impellor failure

Common Sense Take-Aways

- Marry correct application to meter technology
- Appropriately size meters on usage/fixture counts
- Maintain annual large meter test program
- Small financial investment can net large gains

Looking Forward:

40 meters of 203 replaced to date;

continue at 10-15 annually