

# **EXTENDING METER SERVICE LIFE**

Mary Ellen Wimberly  
Stoll Keenon Ogden PLLC



# Overview

1. Meter Testing Requirements
2. Meter Accuracy
3. Utilities Achieving Extended Service Life
4. Sample Testing
5. Case No. 2016-00432
6. Case No. 2019-00115



# Meter Testing Requirements



# Meter Testing Requirements

- KRS 278.210
  - Establishes statutory standard for meters
  - Meter may not be more than two percent to the disadvantage of the customer (2% **fast**)



# Meter Testing Requirements

- KRS 278.210(4):
  - “If a utility demonstrates through sample testing that no statistically significant number of its meters over-register above the limits set out in subsection (3) of this section, the meter testing frequency shall be that which is determined by the utility to be cost effective.”



# Meter Testing Requirements

- 807 KAR 5:066, Section 15
  - Requires meters be tested prior to initial placement into service
  - Provides accuracy limits for new, rebuilt, and repaired cold water meters
  - Prohibits any new, rebuilt, or repaired meter from being placed in service if it does not register within accuracy limits



# Accuracy Limits: 5/8 x 3/4 Inch Displacement Meters

- Maximum Rate
  - Flow Rate: 15 gpm
  - Accuracy Limit: 98.5-101.5%
- Intermediate Rate
  - Flow Rate: 2 gpm
  - Accuracy Limit: 98.5-101.5%



# Accuracy Limits: 5/8 x 3/4 Inch Displacement Meters

- Minimum Rate
  - Flow Rate: 1/4 gpm
  - Accuracy Limit:
    - 95-101% (New and Rebuilt)
    - 90% (Repaired)





# Meter Testing Requirements

- 807 KAR 5:066, Section 16
  - “Each utility shall test periodically all water meters so that no meter will remain in service without test for a period longer than specified[.]”
  - 5/8 x 3/4 Inch: 10 years



# Significant Savings Example

- Utility: 5,000 meters
- Meter cost: \$100
- Annual Savings:
  - 10 years: 500 meters replaced yearly
  - 15 years: 333 meters replaced yearly
  - 167 fewer meters purchased annually → \$16,700 annual savings



# Significant Savings Example

- Utility: 5,000 meters
- Meter cost: \$100
- Avoided Capital Expenditures:
  - Utility avoids replacing 2,500 meters over next five years (500 meters per year)
  - One-time savings: \$250,000



# Meter Accuracy

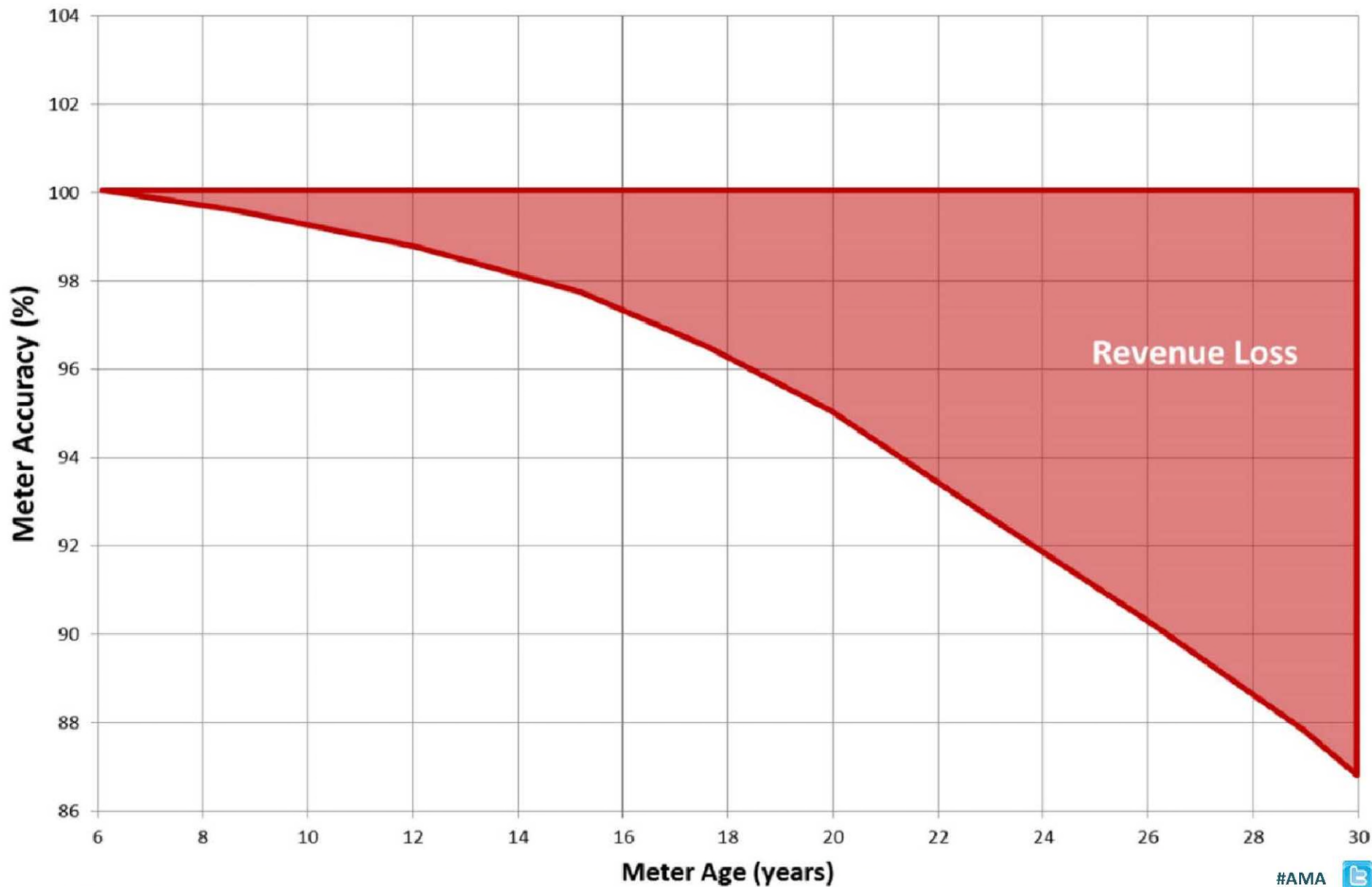


# Meter Accuracy

- Meter accuracy > 10 years
- Most meters warranted for accuracy for **at least 15 years**
  - Example: Sensus warranty
    - Sensus SRll: 15 years
    - Sensus iPERL: 20 years



# Meter Accuracy Over Time



#AMA 

# Meter Accuracy

- Declining meter accuracy = slow meters
- Without regulation, utilities would change meters when revenue loss from slow meters > cost to replace meters



# Utilities Achieving Extended Service Life





# *Warren County Water Dist. v. PSC*

- Case No. 2011-00220
  - Joint Applicants sought deviation from 10-year testing requirement based upon results of sample testing from Case No. 2003-00391
  - Testing Results:
    - Meters remained within standards for 15 years
    - Lost revenue from inaccurate meters did not exceed cost of testing until 21 years in service
  - PSC authorized deviation to permit meters in service for 15 years without testing



# *Warren County Water Dist. v. PSC*

- Utility brings action for review → REVERSED
- Franklin Circuit Court found:
  - Significant that meters do not over register
  - Sampling plan was cost-effective → met KRS 278.210(4)



# Case No. 2009-00253

- Kentucky-American sample tested group of meters
- Meters tested within standard after 15 years of service
- PSC extended time in service to 15 years for meters
- Estimated annual savings: \$90,000
- Estimated annual capital expenditure savings: \$545,000



# Sample Testing



# Sample Testing

- Sample = subset containing characteristics of a larger population
- Statutes and regulations acknowledge sample testing



# Sample Testing

- KRS 278.210(4)
  - “If a utility demonstrates through sample testing that no statistically significant number of its meters over-register . . . .”
- 807 KAR 5:041, Section 16 (Electric)
- 807 KAR 5:022, Section 8(5)(c) (Gas)



# Sample Testing

- ANSI/ASQ Z1.9-2003 (R2013), Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming [“ANSI Standard”]
  - Three Inputs
  - Acceptance Calculation



# ANSI Standard

- Three Inputs
  - 1. Acceptance Quality Limit (“AQL”)
    - Worst tolerable product average
    - Table A-1
    - PSC Cases
      - Use AQL of 2.0
      - Converts to 2.5

*Table A-1*  
AQL Conversion Table

For specified AOL values falling within these ranges			Use this AQL value
–	to	0.109	0.10
0.110	to	0.164	0.15
0.165	to	0.279	0.25
0.280	to	0.439	0.40
0.440	to	0.669	0.65
0.700	to	1.09	1.0
1.10	to	1.64	1.5
1.65	to	2.79	2.5
2.80	to	4.39	4.0
4.40	to	6.99	6.5
7.00	to	10.9	10.0





# ANSI Standard

- Three Inputs
  - 2. Inspection Level
    - Five different inspection levels
    - A7: “Unless otherwise specified, Inspection Level II shall be used.”
    - PSC Cases
      - Inspection Level II



# ANSI Standard

- Three Inputs
  - 3. Lot Size
    - Size of entire group
    - Example: Total number of meters of a certain age
  - Based on inputs, ANSI Standard provides sample size
  - Must randomly select sample!
    - PSC has approved selections by Excel, billing software, or other computerized process



# ANSI Standard

Lot Size	Sample Size
Less than 16	3
16 to 25	4
26 to 50	5
51 to 90	7
91 to 150	10
151 to 280	15
281 to 400	20
401 to 500	25
501 to 1,200	35
1,201 to 3,200	50
3,201 to 10,000	75



# Case No. 2016-00432: Maximum Flow Results

1.	99.5	13.	99.2	25.	99.6
2.	99.4	14.	99.6	26.	99.7
3.	99.2	15.	99.9	27.	101.0
4.	98.5	16.	99.6	28.	99.0
5.	99.3	17.	99.5	29.	99.6
6.	100.0	18.	99.4	30.	99.3
7.	99.5	19.	99.5	31.	98.5
8.	100.0	20.	99.2	32.	99.2
9.	100.2	21.	99.4	33.	98.5
10.	99.8	22.	99.6	34.	99.5
11.	100.3	23.	99.6	35.	99.3
12.	100.0	24.	99.5		



## ANSI Standard Acceptance for Maximum Flow

1	Sample Size: n	35
2	Sum of Measurements	3482.9
3	Sum of Squared Measurements	346596.6
4	Correction Factor (CF)	346588.4
5	Corrected Sum of Squares (SS)	8.235429
6	Variance (V)	0.242218
7	Estimate of Lot Standard Deviation	0.492157
8	Sample Mean	99.51143
9	Upper Specification Limit	101.5
10	Lower Specification Limit	98.5
11	Quality Index: QU (Upper)	4.040523
12	Quality Index: QL (Lower)	2.055093
ANSI Standard Table B-5 used to derive values below		
13	Estimate of Lot Percent Nonconforming above Upper	0.000%
14	Estimate of Lot Percent Nonconforming below Lower	1.720%
15	Total Estimate Percent Nonconforming in Lot (P)	1.720%
16	Maximum Allowable Percent Nonconforming (M)	5.580%
17	Acceptability Criterion (to accept, P<M)	<b>Accepted</b>



# Low Flow Calculation

- Commission approved using a lower level of scrutiny for low flow test
  - AQL: 10
  - Inspection Level I



Case No.  
2016-00432



# Case No. 2016-00432

- Request: Sample testing satisfies 807 KAR 5:066, Section 16(1)
  - “Each utility shall test periodically all water meters . . . .”
  - Does sample testing satisfy this requirement?
- Alternatively: Deviation from regulation requirements





# Case No. 2016-00432

- Request for deviation → GRANTED
  - Lots must be divided by installation year, manufacturer, and type of mechanism used to measure water usage
  - Only damaged meters can be removed
  - Low flow testing method approved
  - Commission found cost savings significant
  - Additional protections for customers are important



# Proceed With Caution . . .

- Line loss must be low



# Proceed With Caution . . .

- “Moreover, with respect to any utility that would seek to rely on this Order as the basis for a request for deviation allowing sample testing, the Commission observes that this Order should provide notice that **implementing such a plan prior to seeking Commission approval is a violation of 807 KAR 5:066, Section 16(1), and doing so may indicate a willful violation justifying the imposition of penalties.**”

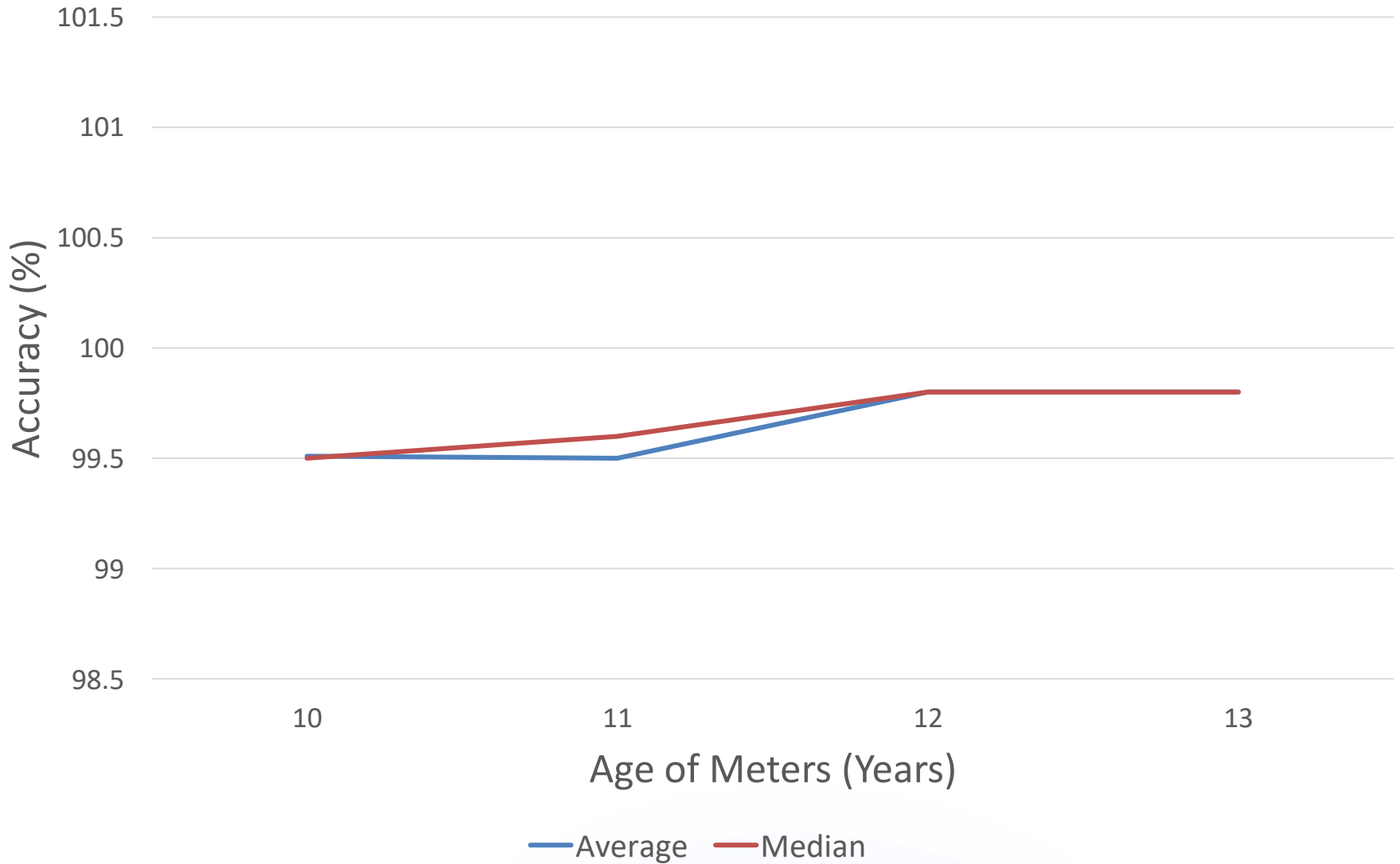


# Accuracy of Meters

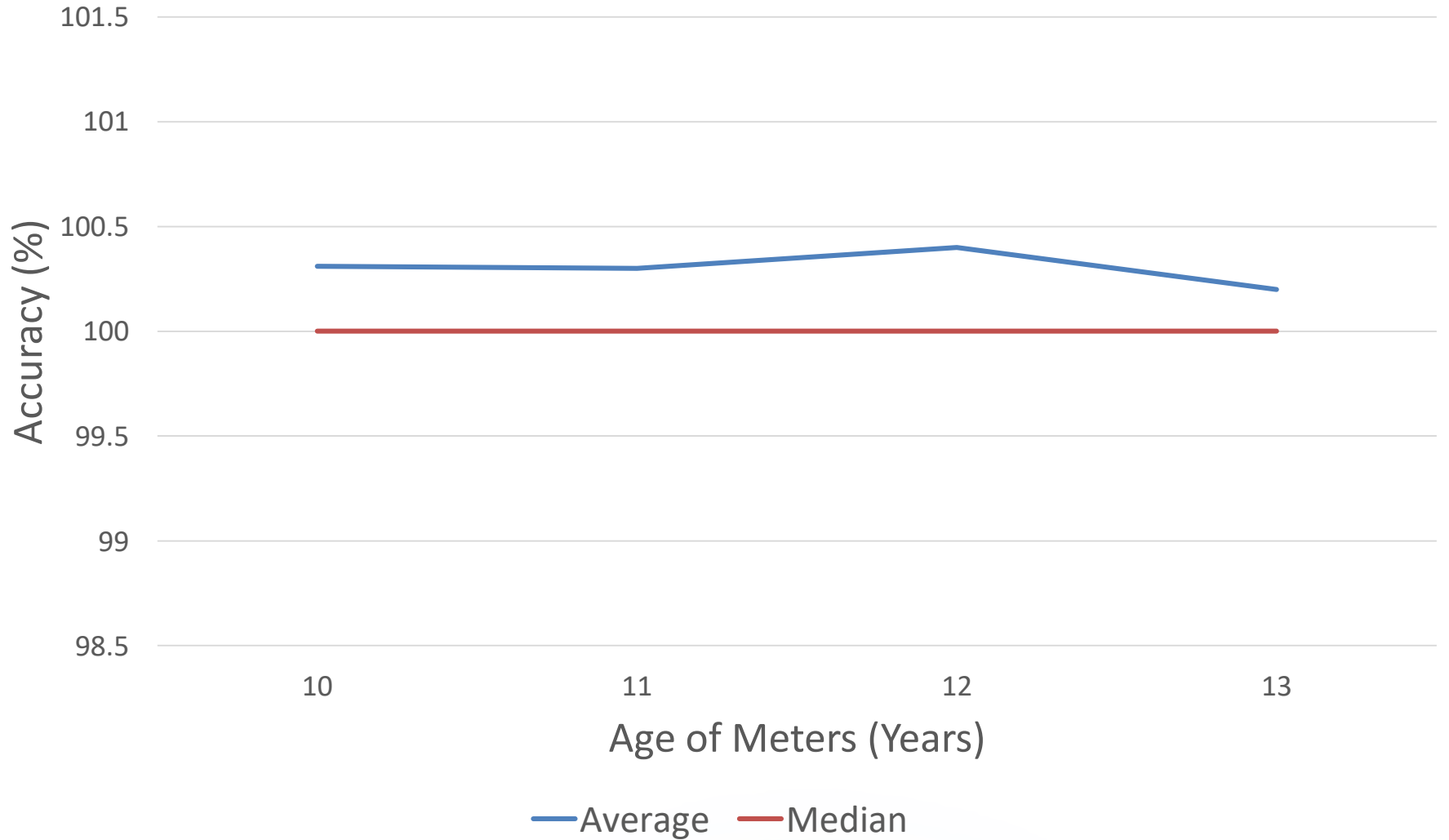
- Have Hardin County Water District's meters remained accurate after 10 years?



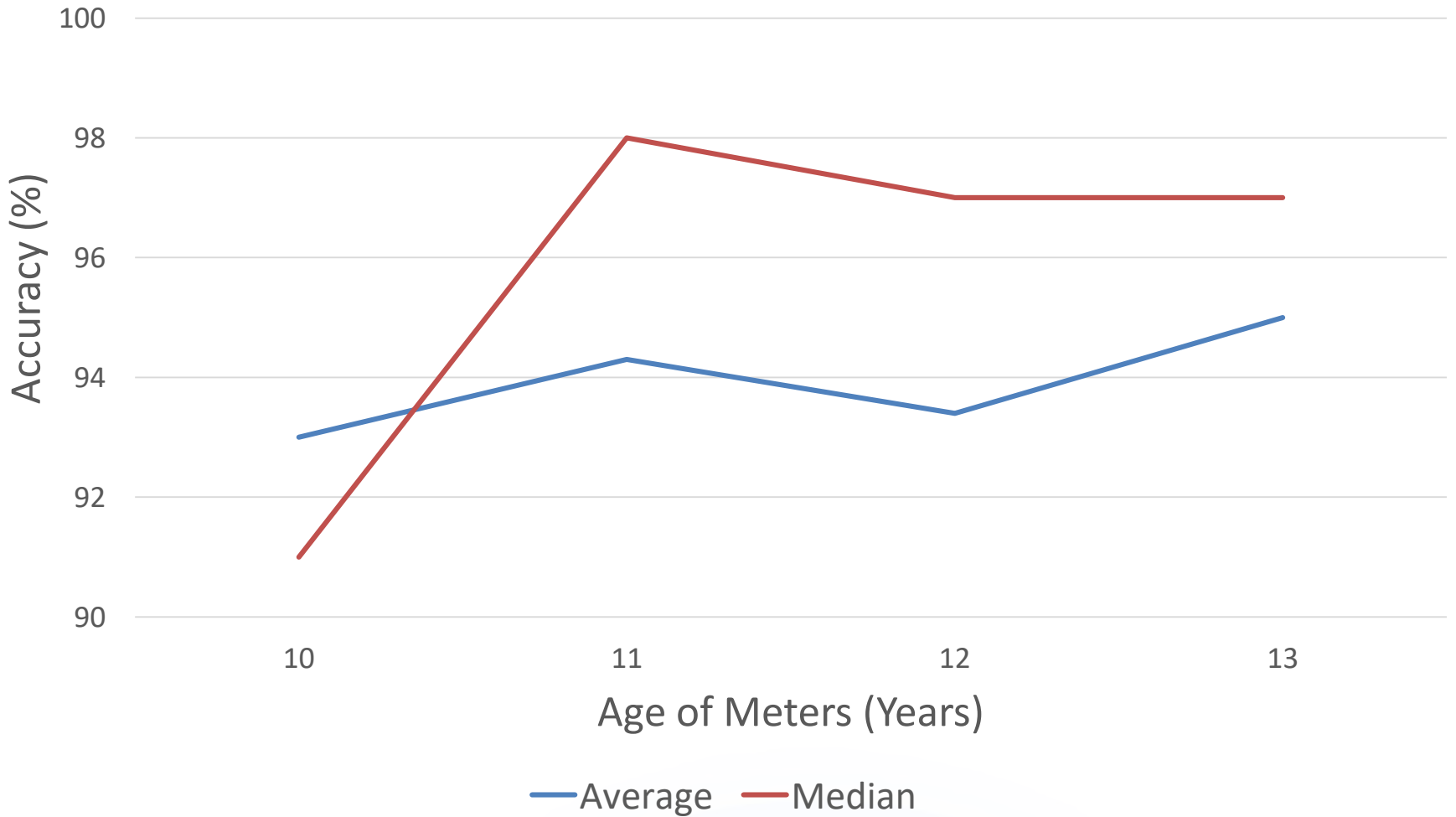
# HCWD2 Meter Accuracy - Maximum Flow



# HCWD2 Meter Accuracy - Intermediate Flow



# HCWD2 Meter Accuracy - Minimum Flow



Case No.  
2019-00115





# Case No. 2019-00115

- Grayson County Water District requested deviation from 807 KAR 5:066, Section 16(1)
  - Badger Model 25: 13 years → 15 years
- Approved with same restrictions as Case No. 2016-00432
- Commission stated Grayson District should test all meters in the sample at low flow rates



# Case Nos. 2020-00137 & 2020-00138

- Filed June 8, 2020
- Final Order requested by October 1, 2020



# Questions?

Mary Ellen Wimberly  
maryellen.wimberly@skofirm.com  
(859) 231-3047

