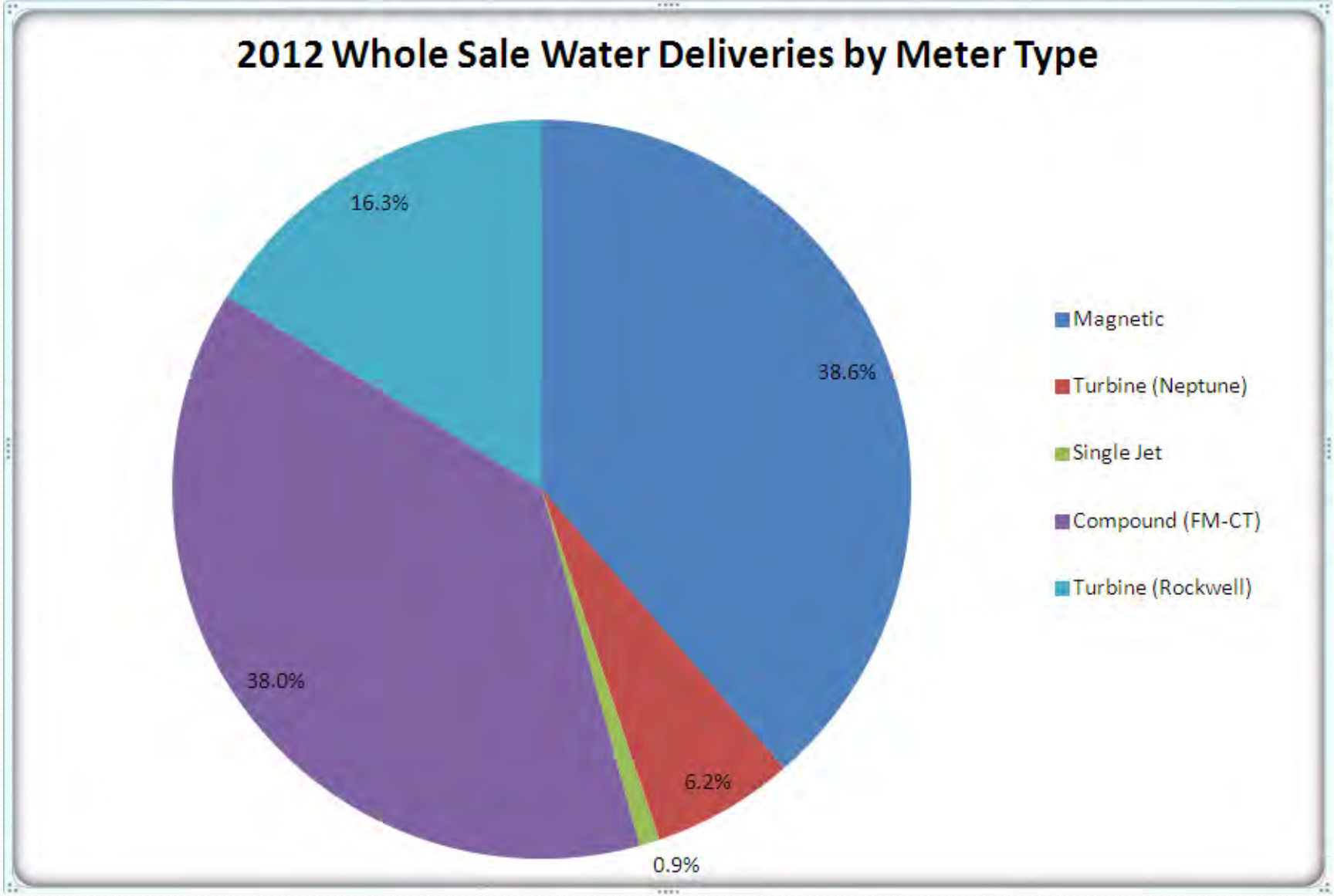
Whole Sale Meter Testing and Revenue Issues

October 25th, 2012 Operating Board Meeting

Topics to Cover

1. 2012 Meter testing progress and results to date
   - FM-CT and Compound meters
   - Turbine meters
   - Standby mechanical meters
   - Krohne mag meters
2. Non-revenue water and other indicators of supply meter integrity
3. Consumption revisions following metering equipment malfunction

Whole Sale Meters



FM-CT Meters

FM-CT/Compond Meters – 38.0%

- Primarily Neptune Protectus meters
- A couple of Badger meters
- Several domestic compounds
- **Tested annually against a reference meter tester**
- All active FM-CT/Compound meters have been tested in 2012, except one that was replaced mid-year with an electronic meter
- Two UMEs had to be replaced (Skyway & WD 125)
- Two other meters failed the low flow test and had to be repaired
- Overall, good results

Turbine Meters – Neptune – 6.2%

- only two in service, 12- and 16-inch for Highline WD
- 12-inch not testable; 16-inch somewhat but at very low flow for the size of the meter
- both expected to fail soon, based on past history
- New UMEs expensive, and take six months to get
- Until recently planned to purchase new UMEs prior to actual failure
- New plan is to replace with Sensus AccuMAGs in late 2012/early 2013; meters on order
- Costs similar but AccuMAGs expected to last much longer

Turbine Meters – Rockwell – 16.3%

- Cannot be tested in situ, these meters were scheduled to be replaced with FM-CT meters until a few years ago
- As a cost saving alternative, testing procedure now involves swapping the UME with one tested on the bench, then testing the removed UME on the bench to establish past performance
- 3-year testing schedule at present, next test cycle in 2013, HOWEVER
- One high use Rockwell increasingly degraded in 2011 and 2012, and caused HUGE under-registration
- Consider pro-active replacement of high use turbines with AccuMAGs where no customer meter exists downstream of SPU meter

Krohne Mag Meters - 38%

- Cannot be tested in situ against a reference meter
- Electronic confidence test performed annually
  - Check for lead resistance
  - Check for shorts (megar)
  - Check the electronics using a dedicated Krohne tool
- Completed 6 out of 21 this year
- One other Krohne mag needed major repair in 2012, and another one less major work

Non-revenue Water

Definition of Terms

- WaterIN – volume of water brought into the system; purchased from SPU plus production from own sources
- Retail – volume of water delivered to retail customers
- NRW – volume of non-revenue water, i.e., water brought into the system but did not generate revenue
- DSL – volume of distribution system losses:
  - Leaks
  - Retail meter under-registration
  - Theft
  - Other **un**metered uses
- MAU – measured authorized uses that do not generate revenue, like reservoir overflows, reservoir cleaning, etc.

Relationships and Formulas

WaterIN = Retail + NRW

NRW = DSL + MAU; MAU usually small so NRW ~ DSL

NRW% = NRW/WaterIN*100 , [%]

NRW% = 100 – Retail/WaterIN*100

Non-Revenue Water (or, DSL)

- NRW/DSL - increasingly visible indicator of supply meter health, given the Muni Water Law (MWL) reporting requirements
- Higher than 10% triggers action under MWL
- Negative is a physical impossibility
- Recent check-ins with several utilities nationwide indicates 6% as the lower attainable bound for “tight” systems
- As high as 30% in some older systems in corrosive soils
- So, **how are we doing in our region?**

Non-revenue Water as Reported

Wholesale Customers' Distribution System Non-Revenue Water								
Customer		**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
MI	Cedar	8.2%	7.4%	10.1%	10.4%	3.1%	-1.2%	3.5%
Bothell	Tolt	18.7%	18.8%	4.6%	5.5%	4.7%	0.1%	6.6%
Northshore	Tolt	NA	2.5%	1.9%	0.8%	1.2%	0.9%	6.7%
WD 49	Cedar	-4.9%	-3.4%	5.4%	1.6%	0.4%	1.4%	14.1%
WD 45	Cedar	7.3%	6.1%	6.1%	5.0%	5.3%	2.8%	6.3%
Shoreline	Tolt	5.9%	7.4%	6.6%	-0.7%	1.9%	3.3%	-13.2%
Cedar River	Cedar	14.1%	10.0%	4.6%	1.9%	3.0%	3.9%	2.1%
Woodinville	Tolt	0.3%	-0.6%	5.6%	8.5%	9.0%	5.7%	3.6%
Olympic View	Tolt	7.8%	8.5%	7.0%	5.8%	4.4%	6.1%	12.6%
WD 20	Cedar	5.5%	7.6%	5.4%	7.1%	10.2%	7.1%	10.0%
WD 90	Cedar	11.4%	7.7%	7.0%	11.0%	7.9%	8.6%	6.9%
WD 125	Cedar	14.4%	12.7%	12.7%	13.8%	8.5%	8.8%	8.2%
Highline	Cedar	7.8%	3.2%	7.2%	10.1%	8.2%	8.8%	8.1%
Coal Creek	Cedar	7.0%	5.9%	6.6%	8.4%	7.2%	9.6%	10.1%
Soos Creek	Cedar	12.0%	9.1%	7.3%	7.5%	10.2%	9.6%	13.6%
Duvall	Tolt	13.1%	7.7%	4.5%	2.5%	5.2%	10.2%	7.3%
WD 119	Tolt	17.0%	4.4%	10.0%	7.4%	12.4%	11.5%	NA
Lake Forest Park	Tolt	6.0%	14.3%	19.4%	39.8%	24.3%	13.7%	7.4%
Renton	Cedar	14.3%	17.0%	20.2%	18.6%	16.9%	14.7%	13.0%
Seattle retail								**8-9%**
0%								
AVG (except values < 0 %)		10.0%	7.9%	6.6%	6.7%	6.1%	6.1%	8.0%
17		15	15	17	16	17	16	15
Renton and Lake Forest Park not included in AVG calcs								

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Seattle retail								**8-9%**
3%								
AVG (except values < 3 %)		10.7%	8.3%	6.9%	8.4%	7.1%	7.8%	8.4%
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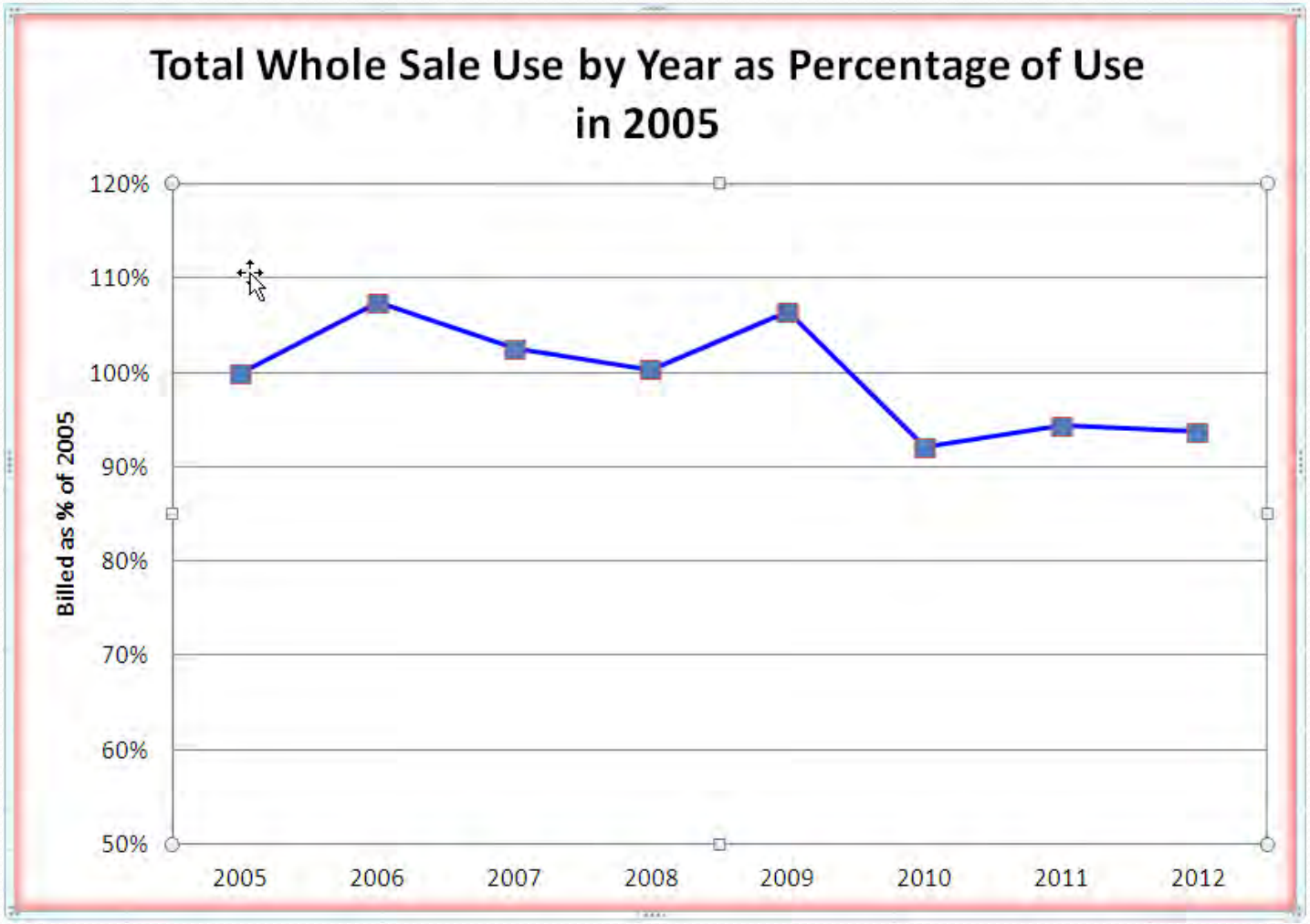
Other Indicators of Supply Meter Accuracy

The Decline since 2005 - 2009



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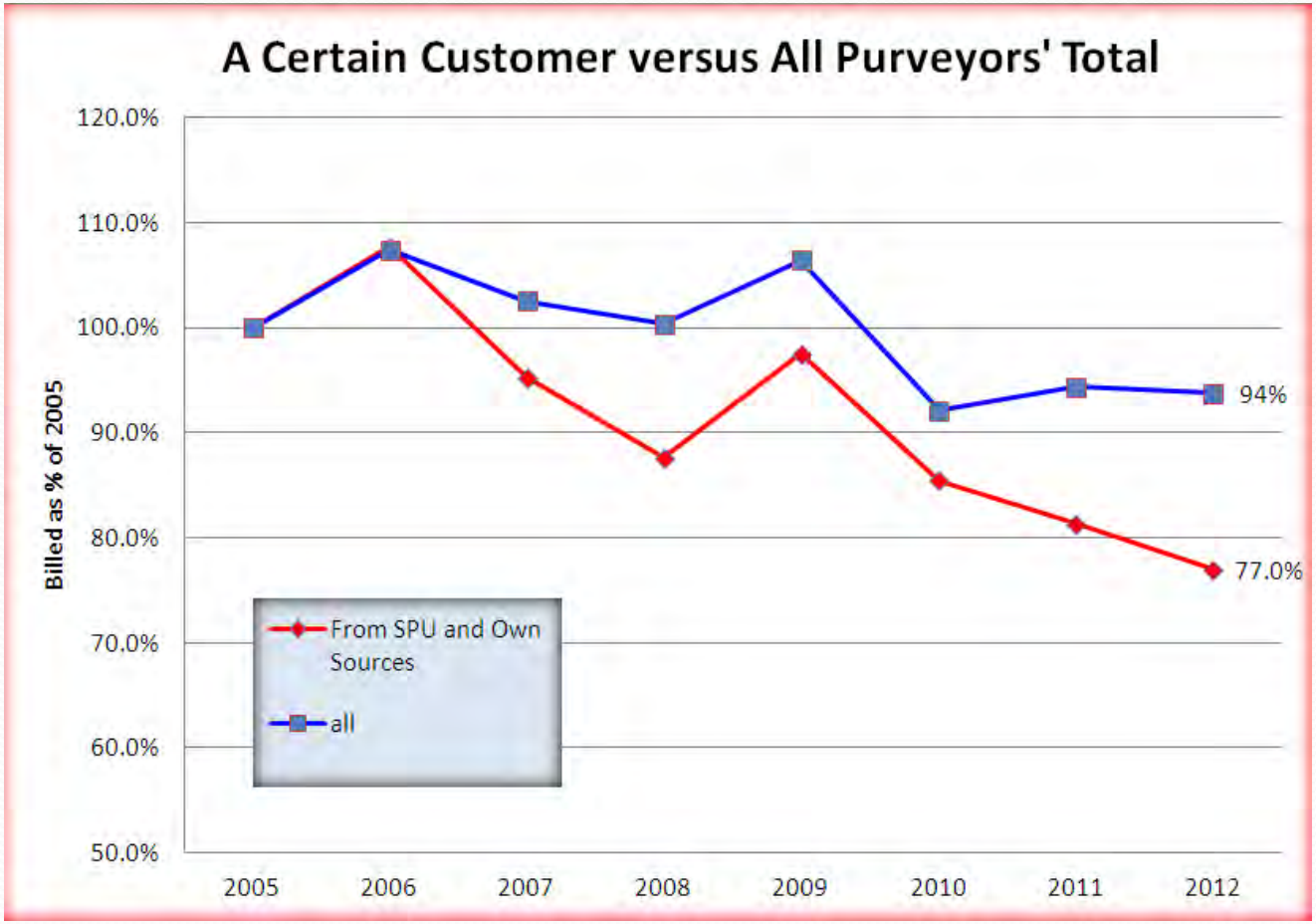

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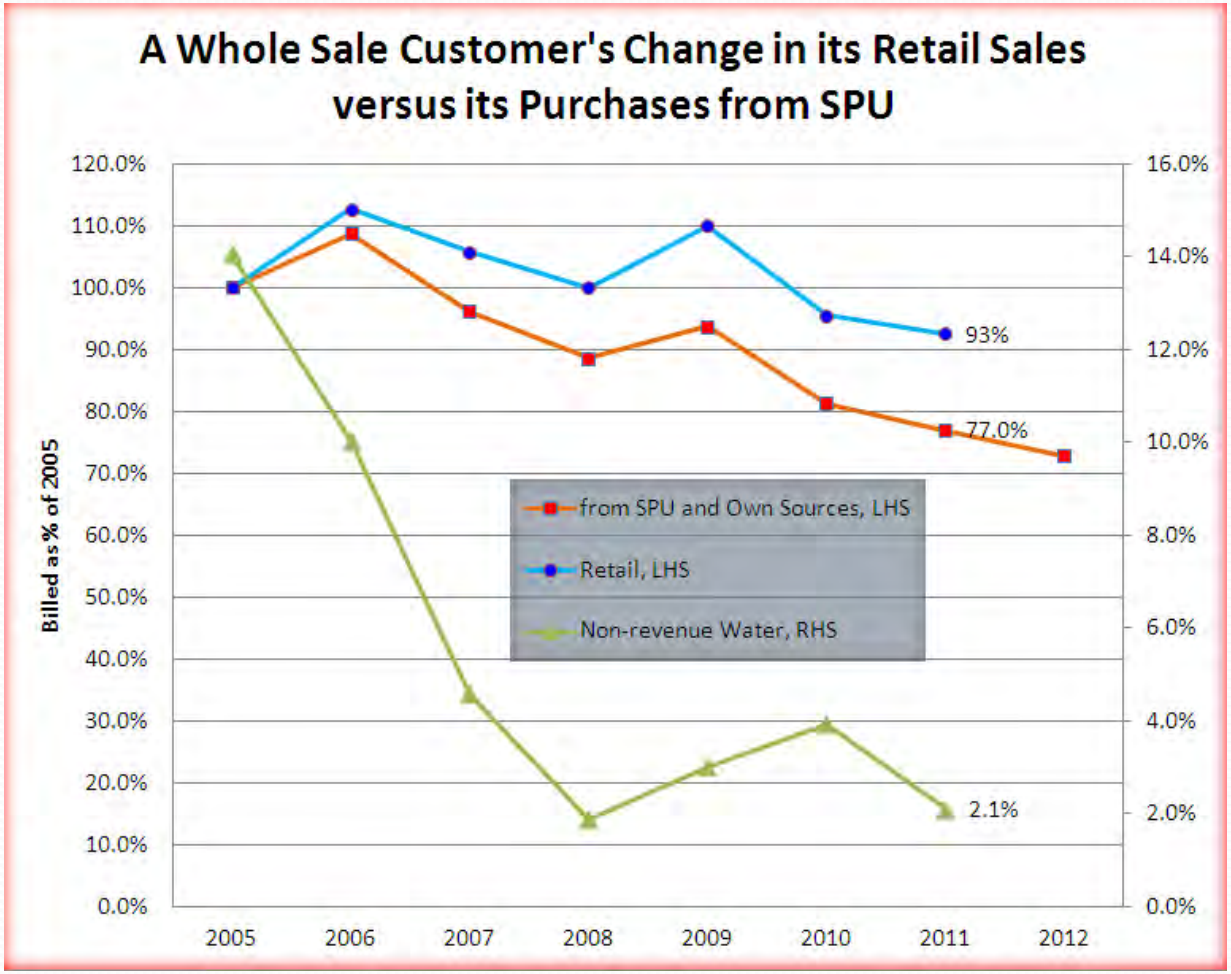

Consumption Revisions after Meter Problems

Consumption Revisions

- Challenge and stressful for both sides
- SPU is looking for a partnership based on principles that all can agree on, as well as common interests
- **Everybody, including Seattle, must pay fair share to cover costs of the regional system**
- That “fair share” is measured by the supply meters
- Seattle’s share is the difference between water production and the total of whole sale meters

Consumption Revisions – Common Interests

- Seattle retail customers pay full whole sale rate for water delivered but not registered by a whole sale meter;
- Seattle Retail is a whole sale customer of the regional system much like any F&P contract customer
- The cost of metering rises significantly as meter accuracy bar is raised
- Whole sale customers are responsible for most costs related to their respective whole sale meters
- Common interest – minimize cost of metering

Consumption Revisions - Goals

- Fair and reasonable
- Works both ways – for credits and for additional bills
- Metering problems get identified early – incentive for pro-active sharing of information between SPU and Customer
- In line with BMPs in the water industry
- Time span: Revisions can be done to consumption over of period of X years
- Applied consistently while mindful of unique circumstances

Consumption Revisions - Goals

- Approach dependent on data availability
- When data is available and sufficient, use the data to determine duration and extent of the revision
- When data is NOT available, use common sense principles to define a reasonable revision
- Allow for spreading out the impacts of the revision over several months or years depending on its size

When there is data…

- Easy! Use the data!
- Essentially, the “errant” volume can be reasonably well calculated
- Data from a customer’s master meter downstream of the SPU meter
- Repair events typically define when malfunction ended

When there is INSUFFICIENT data…

- … yet something clearly went wrong
- For example: negative or low NRW
- Often the problem evolves over time, e.g.,
  - the meter gets less accurate over time before it's discovered
  - This usually makes data driven calculations infeasible
- For what period should consumption be adjusted?
- By how much?

An Approach Based on NRW/DSL

- NRW/DSL tracking is now legally required of each water utility
- NRW/DSL cannot be negative; in fact,
- NRW/DSL can not be below a certain value (6%) ……
- …… unless special considerations apply
- If NRW/DSL is out of range for the year, supply volume should be revised to bring DSL within range

Consumption Revisions

- Going forward, perform annual review and adjustment when NRW/DSL numbers become available
- Agree on min level of NRW/DSL
- Review presented to the Board
- Annual review will help meet the goal of identifying problems early

Consumption Revisions

- What to do about the last several years?

- Revise the last X years so that NRW/DSL for each of us is no more than 6%

Parameter	Value
Period of time	Current year and the prior three (3)
Min level of NRW/DSL	Six (6) percent