

DOES WHAT COMES IN EQUAL WHAT GOES OUT?

IF NOT, LET'S LOOK AT YOUR FACILITY'S FLOW



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OUTLINE....

- ▶ – Why facilities measure water volume in and out their facility?
- ▶ – Primer on flow – the one equation you need to know
- ▶ – Examples of NC facilities
- ▶ – How to start a flow program



How and Why?

- ▶ – Why put a flow meter anywhere?
 - There is only one reason!
 - To produce DATA!!! Later...



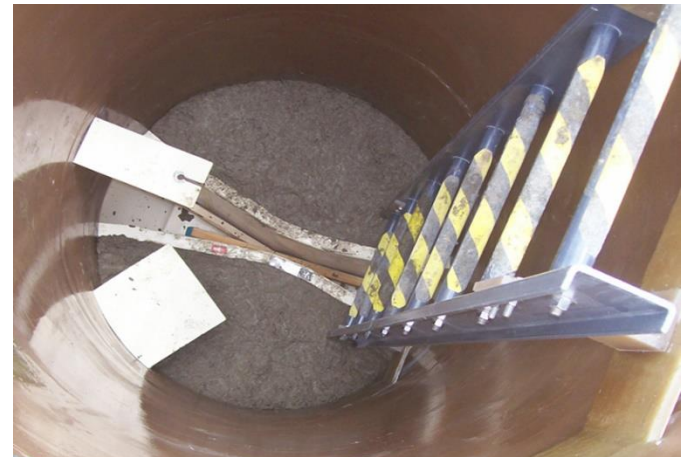
If the process in your facility is consuming or creating water then...

- Your local water authority likely requires water volume discharge monitoring
- You can save \$\$ by implementing a water volume discharge monitoring program

In the majority of water in-flow and out-flow accounting the intake meter is usually owned by the local water authority, whereas the discharge flow meter is owned and maintained by the facility, yet it is regulated by the water authority.



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Facilities in Virginia Consuming Water

- ▶ Breweries*, Wineries, bottling facilities, etc., that distribute their product. If they don't distribute a meter is not needed. In = Out
- ▶ Industrial facilities, manufacturing plants, mills, food & pharmaceutical complexes, etc.
- ▶ The “oddballs”. Server farms, furniture plants, seafood facilities, car washes, NCDOT rest stops, etc.



Facilities in NC “Making” Water

- ▶ Landfills – leachate produced by rain/groundwater has to be quantified prior to being sent to the local WWTP
- ▶ Livestock transportation wash down facilities – usually use well water to save \$\$ but the used wash water is sent to the local WWTP
- ▶ Green facilities – that have access to re-use water and/or collect rain water and use it within their building. No flush facilities?



NCDOT Rest Areas? 4 Scenarios...

- ▶ Buy clean water from a local WTP, yet they discharge waste water to a local WWTP
- ▶ Buy clean water from a local WTP, yet they collect and treat the waste water on site
- ▶ Make clean water on site, yet they discharge waste water to a local WWTP
- ▶ Make clean water on site, yet they collect and treat the waste water on site



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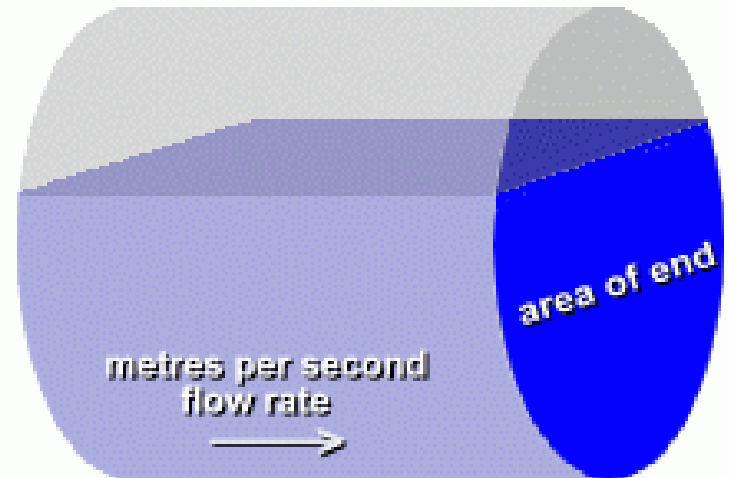
Osa Knows...



How is flow measured?



- ▶ By using the flow equation...
- ▶ $Q = \text{Velocity}_{\text{average}} \times \text{Area}$ $Q = \text{Flow}$
- ▶ 2 parameters are always needed
- ▶ $\text{Velocity} = \text{distance} / \text{time}$
- ▶ $\text{Area} = \text{distance squared}$
- ▶ The two multiplied produce volume over time – gpm, mgd, etc.



Flow is also divided into 2 categories...

- ▶ Full pipe – water is under pressure. Pipe is usually full, think opening a valve or tap...
- ▶ Open Channel – water is being moved by gravity, pipe is not full, think streams...
- ▶ Therefore, flow meters are divided into 2 categories
 - full pipe
 - open channel



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How do full pipe flow sewer meters measure flow?

- ▶ Full pipe meters usually only need to measure velocity
 - Area is fixed
- ▶ Magnetic – voltage produced when water moves through a magnetic field, voltage related to velocity
- ▶ Doppler – reflection imposed by water column or particles in the water – 2 types
Transit-time and Doppler



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How do open channel sewer flow meters measure flow?



- ▶ 2 types – Area/Velocity and level only
- ▶ Area/Velocity or AV flow meters measure velocity using radar, Doppler or magnetic technology, area via pressure or ultrasonic
- ▶ Level flow meters – usually non-contacting, obtain velocity by means of a hydraulic device and a lookup table. Most use flumes, usually in metering manholes



Let's Talk About Data...

- ▶ If there is only one reason to put a flow meter someplace, then make that the focus of your plan!
- ▶ Place a value on that data! What is it worth?
- ▶ How much is it going to cost to meet the regulatory requirements for your discharge meter?
- ▶ Who needs to see the data produced and how are they going to see it? Can we allow the local authority to have access to it remotely?
- ▶ Will it be manually and/or remotely collected? Does it need to be stored?
- ▶ Does our meter require maintenance? Routine calibrations?
- ▶ Plan first, budget last!



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Thanks!!!

Any questions?



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