MERCURY:
A POTW View

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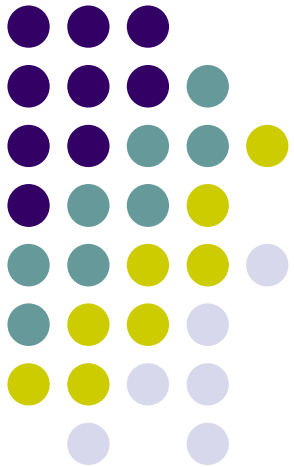
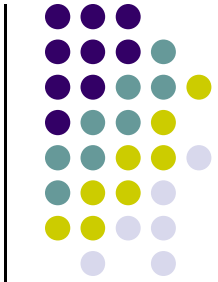
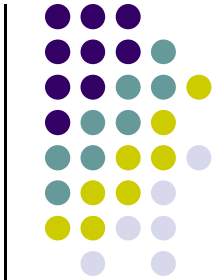


Greensboro and Mercury



- No Amalgam Separator Program
- Number of Dentists
  - 4643 Dentists in North Carolina in 2009
  - 277 in Guilford County NC
- Configuration of Dental Offices
  - Most dentists located in service area of 16 MGD POTW
  - Average Influent Hg 16 MGD POTW = 0.254 ug/l
  - Average Influent Hg 40 MGD POTW = 0.047 ug/l

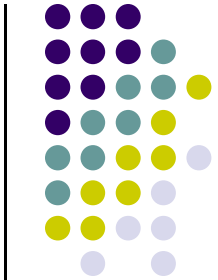
Greensboro, North Carolina



2 POTWs (~ 50% hydraulically loaded)

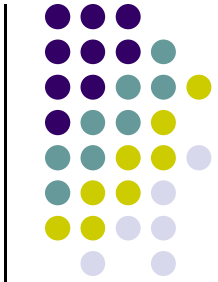
- 16 MGD Activated Sludge – Tertiary Treatment
  - 5 SIUs - (1) Tobacco Products (4) Electroplaters-413
- 40 MGD Activated Sludge – Tertiary Treatment
  - 29 SIUs - (1) CWT (2) TEC (2) Pharmaceuticals (3) OCPSF (7) Metal Finishers (2) Electroplaters-413 (4) Textiles (1) Tobacco (1) Industrial Laundry (3) Electrical & Electronic Components (1) Capsule Mfg. (1) Chemical Packaging (1) Photographic Paper
- Sludge Incineration (since 1970)
  - Fluidized Bed Incinerator
  - All solids handling at the 40 MGD POTW

Mercury As A Pretreatment Program Pollutant of Concern



- NPDES Permit or Water Quality Standard
- Activated Sludge Inhibition
- Biosolids/Sludge Criteria
- Pretreatment MAHLs for Mercury

Hg = Pollutant of Concern: NPDES Permit Limits



- NPDES Permit Limits (both POTWs)
  - Daily Maximum Limit 12 ng/l = 0.000012 mg/l
    - North Carolina Mercury WQS = 0.000012 mg/l
    - IWCs = 97% and 96% so NPDES limit is the WQS!
  - NPDES Permit requires weekly effluent Low Level Mercury Sampling (1669) and Analysis (1631)
  - POTW influents also sampled/analyzed weekly
- Sampling and Analyses Currently Contracted out to Commercial Lab
  - >$28,000 per year

Mercury Compliance History

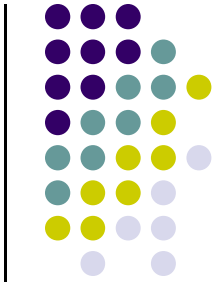
	NPDES VIOLATIONS	
CY	**16 MGD POTW**	**40 MGD POTW**
2005	3	2
2006	1	3
2007	0	2
2008	0	5
2009	1	3
2010	0	1
	5 / 312 analyses	*16 / 312 analyses*
% Compliance	98.4%	94.9%

Observations

Violations Occurred When…

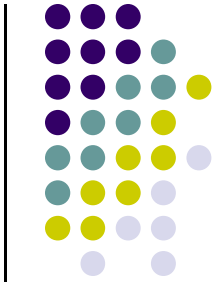
- Total Suspended Solids $\geq$ 10 mg/l
  - TSS NPDES Permit Limit = 30 mg/l
  - $CBOD_5$ NPDES Permit Limit = 4.0 mg/l
- POTW Recorded High Influent Flows following precipitation events
  - “Gulley Washers”
  - Legacy mercury
  - Siphons
  - TSS >10 mg/l

Hg = Pollutant of Concern: Activated Sludge Inhibition



- Method 245.1- Aeration Grab Composite
  - Quarterly Mercury Analyses - Review all NPDES Limits during the sampling to determine no impact
- Inhibition Literature Values from EPA
  - Activated Sludge: 0.1 mg/l
  - Nitrification: No value available
- Maximum Values From Greensboro POTWs
  - 16 MGD POTW = <0.2 mg/l (used literature)
  - 40 MGD POTW = <0.2 mg/l (used literature)

Hg = Pollutant of Concern: Biosolids/Sludge



- Greensboro Incinerates Sludge, but….
- We Still Analyze Sludge for all Land Application Metals - Goal is to Meet High Quality Sludge Concentrations
  - Incorrect assumption that POTWs incinerate because they cannot meet land application criteria
- New MACT (Air Quality) Mercury Standards for Incinerators issued in 2011

Greensboro Biosolids Mercury Concentrations mg/kg

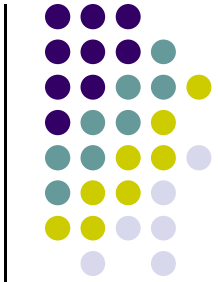
Year	Average	Maximum
2007	0.36	0.684
2008	0.28	0.836
2009	0.27	0.41
2010	0.12	0.276
2011 (4 mo)	0.12	0.183

40 CFR Part 503.13

Table 1 - Ceiling Concentration Hg Limit = **57 mg/kg**

Table 3 - “High Quality” Biosolids Hg Limit = **17 mg/kg**

NACWA Biosolids Data- 2001 MP&M Regulation Submittal

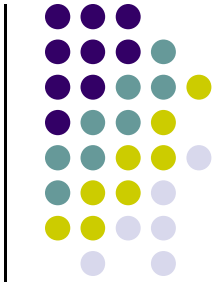


- 155 POTWs Submitted Hg Biosolids Data
  - Represented 1,511,092 Dry Metric Tons
- Number of POTWs not meeting Hg Ceiling Limit of 57 mg/kg = **0/155**
- Number of POTWs not meeting Hg High Quality Sludge Limit of 17 mg/kg = **1/155**
- Avg Hg Biosolids Concentration = **2.98 mg/kg**

CY2008 – CY 2010
Greensboro Mercury Averages

16 MGD POTW		
Influent	Effluent	% Removal
0.254 ug/l	0.0029 ug/l	98.8%
40 MGD POTW		
Influent	Effluent	% Removal
0.0473 ug/l	0.0067 ug/l	85.8%

Pretreatment MAHLs for Mercury (2009)



- Mercury Removal Rates (using 1631 data)
  - 16 MGD POTW = 98.2%
  - 40 MGD POTW = 89.13%
  - *EPA Literature Median Removal Rate = 60%*
- Maximum Allowable Headworks Loadings
  - 16 MGD POTW = 0.06261 pounds
    - Based on NPDES permit limit AHL
  - 40 MGD POTW = 0.01887 pounds
    - Based on NPDES permit limit AHL

Mercury:
The Bottom Line in Greensboro

16 MGD POTW [~5.5 MGD]		
Influent	Effluent	Inf. lbs/yr = 4.25
0.254 ug/l	0.0029 ug/l	Eff. lbs/yr = 0.048
40 MGD POTW [~21.0 MGD]		
Influent	Effluent	Inf. lbs/yr = 3.02
0.0473 ug/l	0.0067 ug/l	Eff. lbs/yr = 0.427

Total Influent Mercury per year = 7.25 pounds

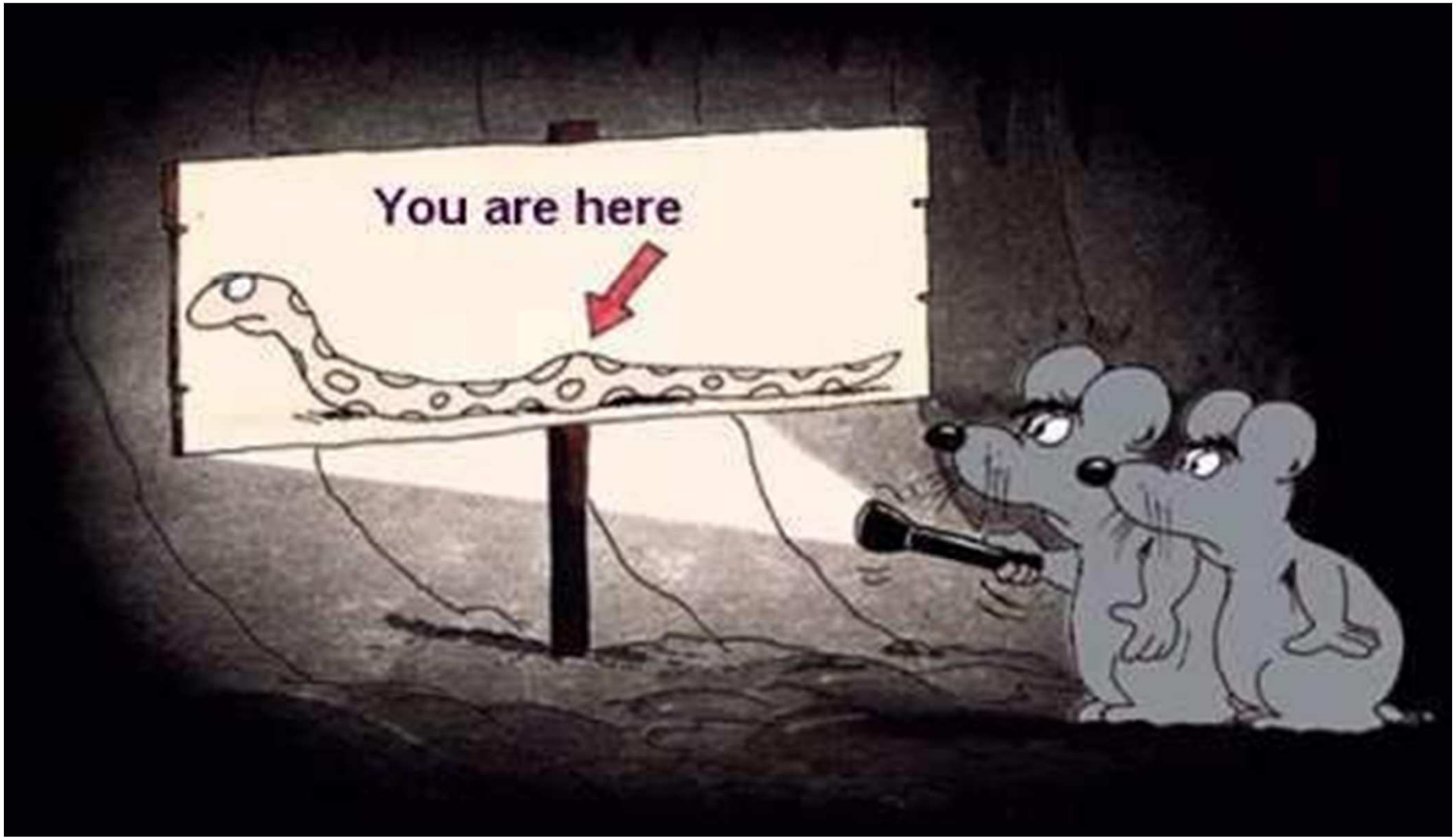
Total Effluent Mercury per year = 0.475 pounds

1 FTE = $50,000/3.625 pounds = $13,793/pound

1 FTE = $50,000/0.238 pounds = $210,084/pound!

But It's Just One More Regulation…

So Where Does This Leave Us?



And Afraid of What Will Happen Next…

But remember…

When you are in deep trouble, say nothing, and try to look like you know what you're doing!