



# **Local Perspective: Oregon's UIC Program for Stormwater**

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Water Environment Services

A Dept. of Clackamas County

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● ● ● | WES provides:

- " Sanitary wastewater collection & treatment in many cities & in unincorporated areas
- " Stormwater management services in two Clackamas County Service Districts
- " Septic system and 1200C ERCO programs County-wide





## Presentation outline:



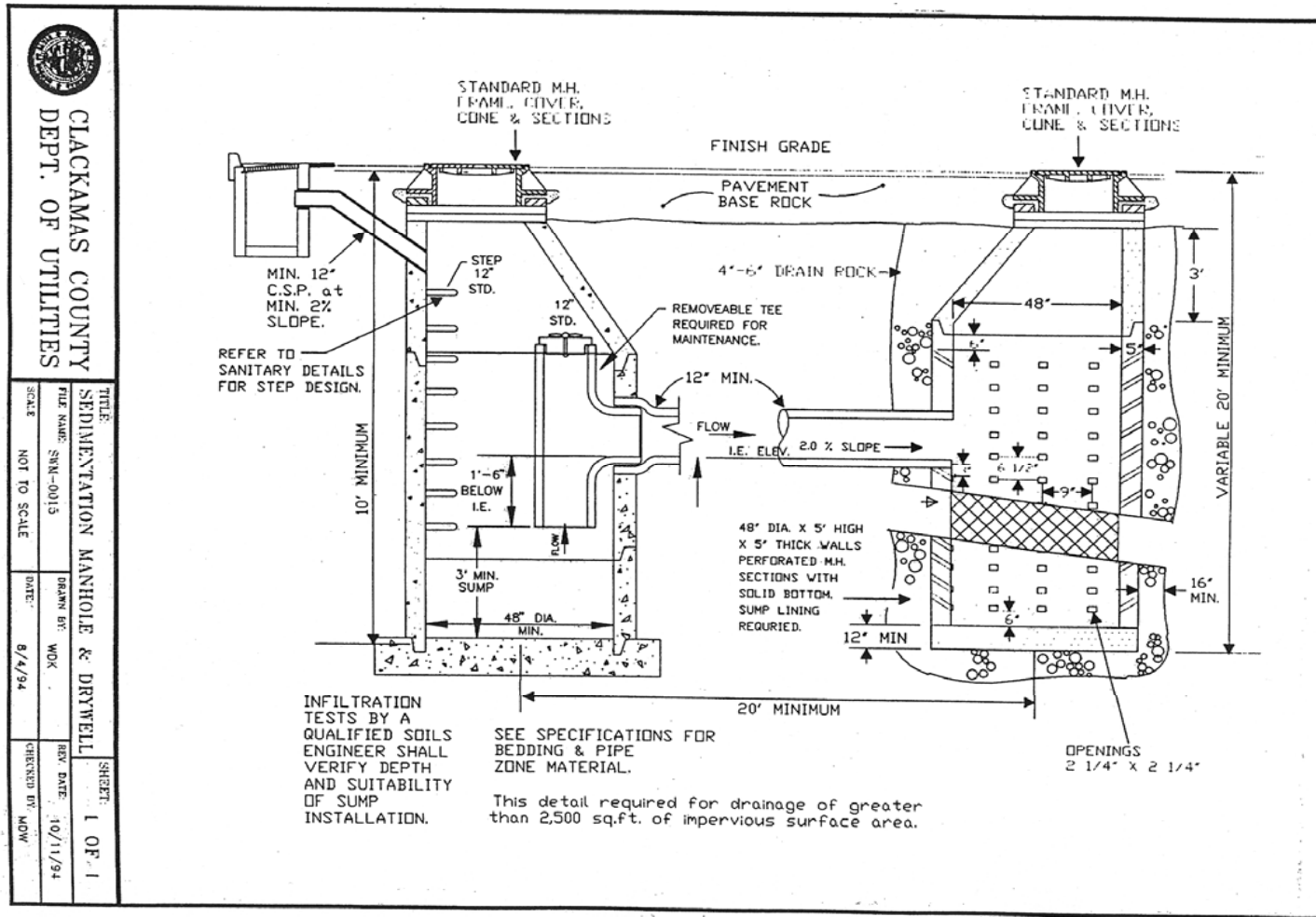
1. UIC Program basics, etc
2. Discharge Authorization
3. Stormwater Mgt Plan
4. WPCF Permits
5. HB 2118
6. Portland's WPCF Permit
7. ACWA Monitoring Study
8. KJ Analysis for ACWA
9. Questions/Answers

# ● ● ● | 1. Underground Injection Control

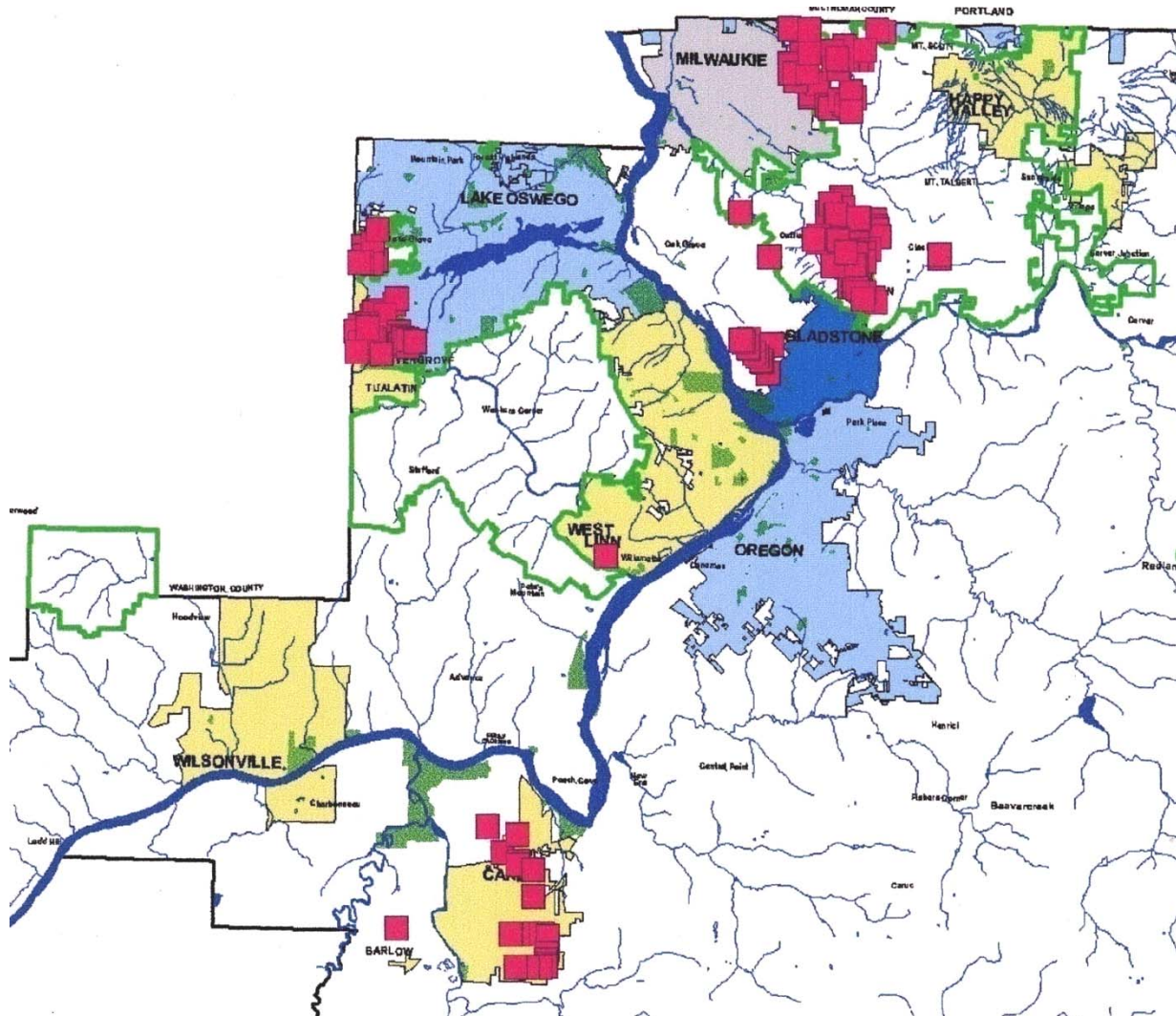
- " UIC programs protect groundwater quality
- " Authorized by the Federal Safe Drinking Water Act, not the Clean Water Act.
- " EPA's UIC Program has been delegated to Oregon's DEQ since 1984.



# Drywell w/Sedimentation Manhole



# Clackamas County Owns about 250 Stormwater Injection Devices





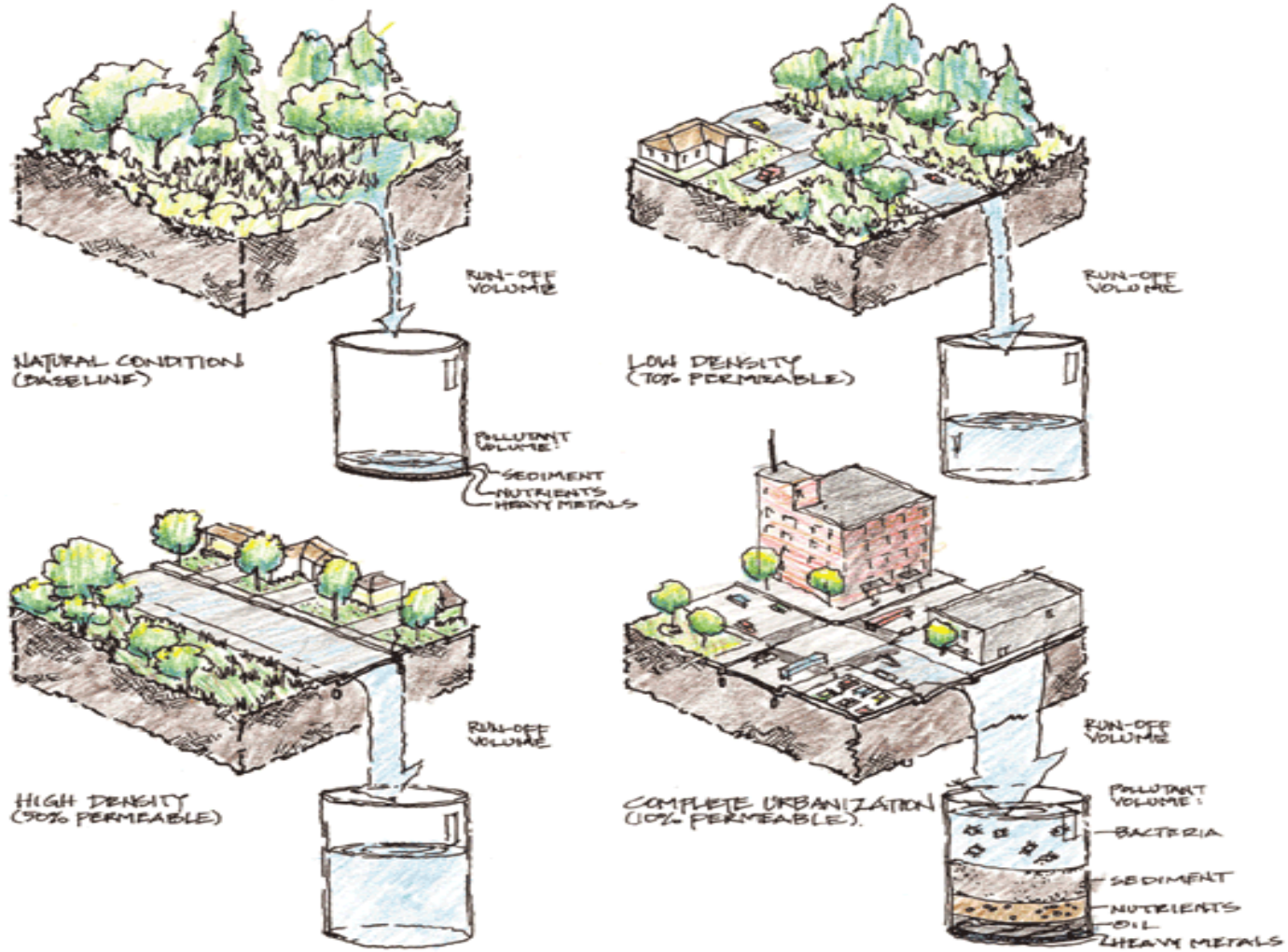
# Potable Water Supply



- “ City/County UIC & MS4 programs protect WQ upstream from public surface water intakes & near public & private water wells.
- “ Clean surface water and clean groundwater are precious resources!
- “ Public wells in/near WES’ area? Rivergrove WD (2), Milwaukie (8), & SWA (many). And four intakes on Clackamas River.



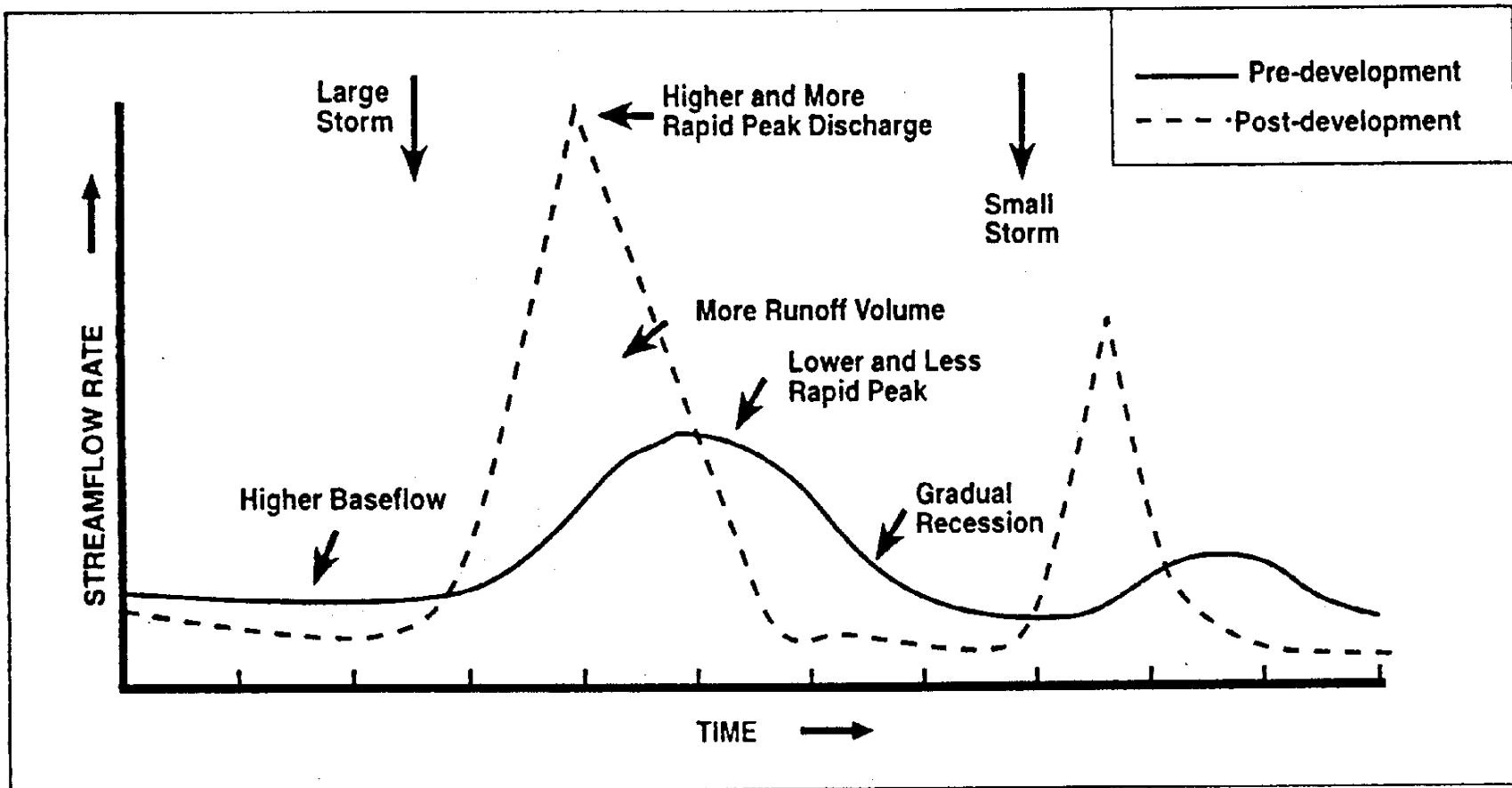
# Traditional Mgt. Approach





# Hydrology

## STREAMFLOW





# Channel Instability



- “ Effective imp. area >10% can cause it. Effective imp. area >30% yields significant adverse impact to channel...Stream bank damage, downstream sediment deposition, & fish habitat quality decrease. Difficult to ever regain proper function.



## Best urban drainage system?

- “ This will vary from site to site. *Getting closer to area’s pre-development hydrology is ideal.*
- “ Stormwater injection and infiltration systems allow rainwater to percolate down into the earth, replenishing precious groundwater supplies. This stormwater does not race into overloaded urban creeks during storms.
- “ The proper BMPs for a site will protect or improve stormwater quality. *Some BMPs reduce stormwater discharge volumes.* For certain sites, injection can be a prudent option for stormwater management



# Healthy Aquifers

- “ If some stormwater in your area is currently being diverted away to creeks/rivers/wetlands by surface-discharging storm sewer systems, this can contribute to depletion of groundwater levels. Injected and/or infiltrated stormwater can partially recharge these aquifers.
- “ Healthy aquifers provide many benefits:
  - 3 drinking water,
  - 3 irrigation/industrial needs, and
  - 3 cool, spring-fed flow to our creeks and rivers.

## 2. Authorization to Discharge by Rule



- “ A “Rule Authorized” entity can discharge w/o a DEQ permit if:
  - “ Registration documents have been properly submitted to DEQ for the IDs (WES did this on 12/29/2000), and
  - “ If the entity qualifies for this benefit in the eyes of DEQ under OAR 340’s Division 44’s Chapter 18.

## ● ● ● | Discharge authorization (cont.)

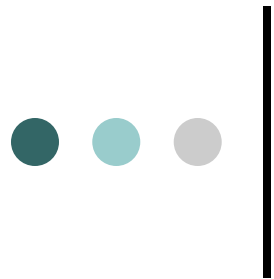
Basic requirements for all types of stormwater injection devices (ID) include, but aren't limited to:

- " No other waste, such as industrial waste or sanitary waste, is mixed with stormwater
- " No domestic drinking water wells within 500'...at present or in the future!
- " No public water supply well within 500' (or within the 2 year time-of-travel zone if available)
- " Cannot discharge directly into groundwater
- " Must have one between ID and groundwater: 1) confining barrier, 2) engineered or natural filtration medium, or 3) solid BMPs. DEQ currently asks for at least 5 feet of unsaturated soil/rock.

# ● ● ● | 3. Stormwater Management Plan

- " Public agencies that own IDs need a written SWMP
- " Most industrial and commercial facilities w/IDs need SWMP
- " The SWMP specifies how groundwater is being (and will be) protected from IDs
- " Best Management Practices (BMP) are SWMP backbone

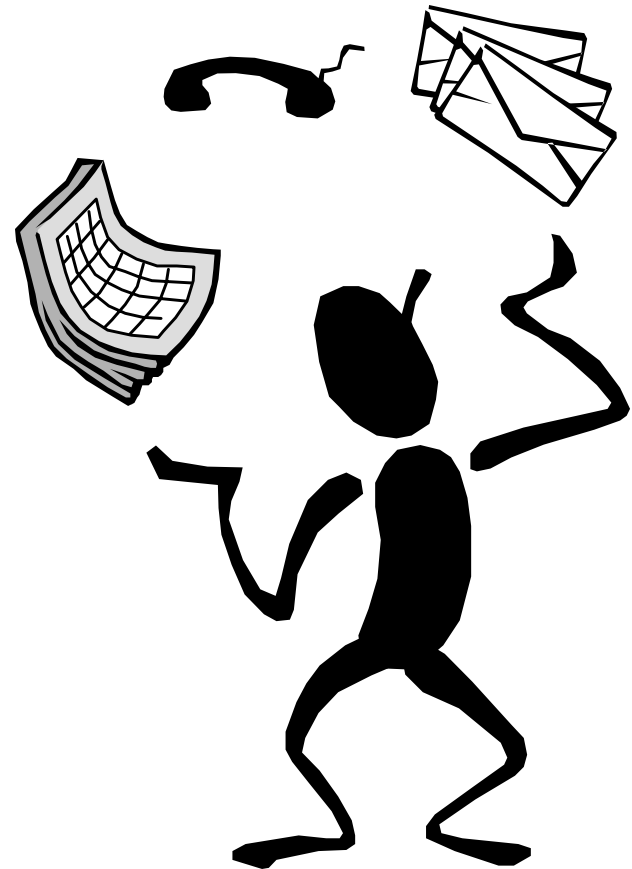




# BMPs for cities/counties include:

(but aren't limited to)

- " IDEP & Spill response
- " Street sweeping
- " Ind/commercial stormwater
- " Employee education
- " Public ed/involvement
- " Review of plans for new & re-development
- " Erosion control for const.
- " Cleaning CBs & MHs





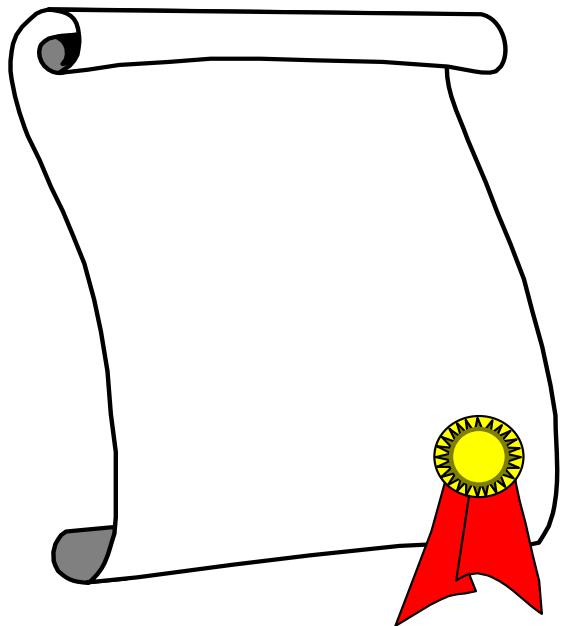
## 4. WPCF Permits



- " WPCF = Water Pollution Control Facilities
- " State of Oregon WPCF permits regulate discharges to soil and groundwater.
- " Clackamas County applied for a WPCF permit on December 19, 2001. The City of Portland's permit was issued in June 2005 (more on this later).



## 5. HB 2118: Signed in June 2007



- “ Kept the UIC program from being returned to EPA (was proposed by DEQ in fall 2005!). EQC said “OK, but ask the legislature for money first”.
- “ Established new fees for DEQ’s UIC program. FTEs for program increased a bit.
- “ “New construction” and “annual” fees were first levied on 9/15/07. WPCF permit fees didn’t change.



## New fees are in 3 categories

- “ **Simple:** \$100 per device with authorization application (one-time fee). Includes roof drains, such as roof drains from apartment buildings. Also includes other sources determined to not pose a risk to groundwater quality.
- “ **Moderate:** \$125 per device with authorization application (one-time fee). Includes *at least a few devices* at commercial, municipal, etc. facilities.
- “ **Complex:** \$300 per device with authorization application + \$100 per device each subsequent year. Includes any other devices where conditions are complex and present higher environmental risks, such as parking lots with >1,000 vehicle trips/day, and heavy industrial sites.

## The last amnesty period

- " On 9/23/08, a 2<sup>nd</sup> chance to bring certain IDs into compliance was offered by DEQ. It said: "Owners...of systems without Authorization by Rule or a WPCF permit are not in compliance w/state rules and federal regulations".
- " Documents were due on 12-31-2008.





## 6. Portland's WPCF Permit

- " They own about 9,900 IDs, mostly drywells
- " 10 year permit. Annual reports needed.
- " Numeric limits...often are same as DW MCLs!
- " Monitoring @ 40 drywells. 15 randomly selected & 15 fixed for 10 years. 10 more are near public water wells (this isn't req'd by permit). Each are visited during 5 storms/year.
- " "Noncompliant" IDs (ie. high GW) identified & listed in "corrective action plan" with schedule
- " Closure & decommissioning plan created



## Portland's WPCF Permit (cont.)

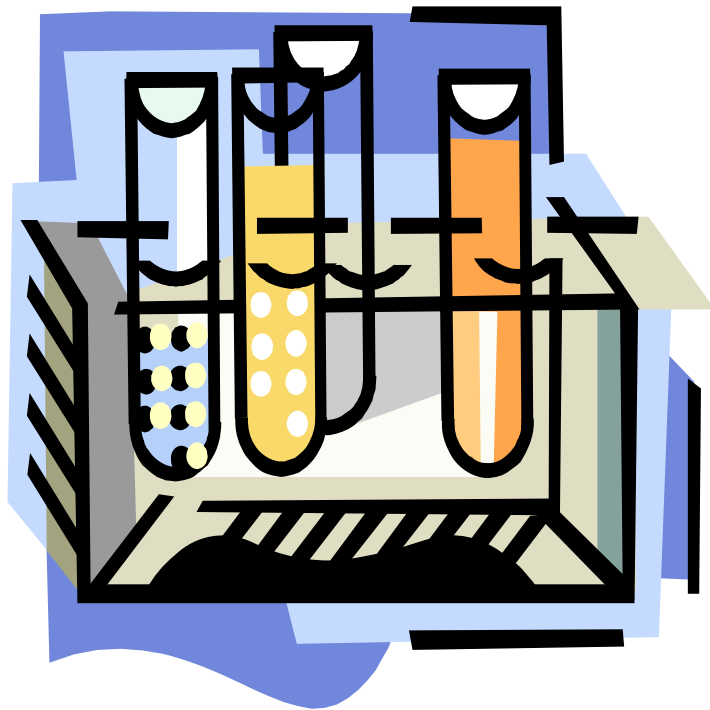
- " "System-wide assessment" was updated.
- " Inventory of drywells was updated.
- " Limit for lead is 50 ug/L, not 15 ug/L
- " Pentachlorophenol is present at most drywells. Does tend to adhere to particles and soils, so only WQ concern might be areas w/very shallow groundwater.
- " "Regional corrective action" is needed if large areas have very shallow groundwater.



## If you get a WPCF permit:

- “ IDs in areas w/high groundwater will need to be rebuilt (made shallower) or decommissioned if separation distance is insufficient.
- “ Portland’s Schedule F(5)(tt): *“Under no circumstance shall a separation distance between groundwater and the bottom of the public UIC be less than 5 feet, unless specifically authorized in writing...”*. Their table F-1 says drywells over 5 feet deep need a minimum separation distance of 10 feet, but this MIGHT be adjusted to as few as 5 ft in your community w/supporting evidence, study, etc.

● ● ● | If you get a WPCF (cont.)



- " More stormwater monitoring sites. More storms. Focus on IDs w/more risk (>1,000 TPD, commercial & industrial zoning, near water wells, etc.).
- " BMP effectiveness monitoring too?



## If you get a WPCF (cont.)

- " Annual reports
- " Revise SWMP (& rename to UICMP)
- " More frequent street sweeping? More catch basin and drywell cleaning? More Public Ed?
- " Need to work w/fire departments for drain blocking, spill notification, etc. You shouldn't wait for WPCF to do this, by the way.
- " Consultant assistance MAY not be needed, though too soon to say. Portland's documents are free, after all.
- " Annual bill from DEQ for \$1,950 will show up



## 7. ACWA Monitoring Study

- " Participants:
  - § Clackamas County
  - § Multnomah County
  - § Tri-Met
  - § Cities of Canby, Eugene, Milwaukie, Troutdale, Keizer, Lebanon, and Gresham.
- " Is underway at injection devices at this time
- " Year eight of study ends in June 2010
- " Eight stormwater injection devices are monitored during 2 storms/year
- " We now have 15 storms per site for most sites



# Parameters

- " Benzene, ethylbenzene, toluene, and 2 xylenes
- " Benzo(a)pyrene, naphthalene, fluoranthene, phenanthrene, and 12 other polynuclear aromatic hydrocarbons (PAHs)
- " Lead, chromium, cadmium (total and dissolved)
- " Nitrate and total kjeldahl nitrogen
- " E. coli (bacteria)
- " Total suspended solids



## 8. Analysis by Kennedy/Jenks Consultants for ACWA

- " All available data from MS4 and UIC systems in Oregon (10,180 data points!).
- " 41 stormwater pollutants analyzed
- " Only 10 ever exceeded Div. 40's Reference or Guidance Levels, or an EPA MCL *prior to injection*. Seven of these 10 exceeded <1% of the time.
- " The other 31 are...



## The 31 with no exceedences...

- " Benzene, Toluene, Ethylbenzene, and Xylenes
- " Metals: Copper, Barium, Beryllium, Mercury, Selenium, Thallium
- " Total Nitrogen and Cyanide
- " Pesticides: Alachlor, Atrazine, Carbofuran, Carbon tetrachloride, Chlordane, 2,4-D, Dalapon, Diquat, Endothall, Glyphosate, Picloram, Lindane
- " o & p-Dichlorobenzene and 1,3-Dichlorobenzene and 1,2,4-trichlorobenzene and Chlorobenzene
- " Bis(2-chloroisopropyl)ether and Bis(2-chloroethyl)ether

## Analysis by KJ for ACWA



The 3 which exceeded a Div. 40 Reference or Guidance Level, or an EPA MCL > 1% of the time *prior to injection*....

- " Pentachlorophenol (exceeded 11.7% of the time)
- " Lead (12.7% of the time for 15 ug/L)
- " A phthalate (4.7% of the time)



## Known uses for those 3 include

- “ *Pentachlorophenol*: Is a registered use pesticide. Found in some treated wood used for utility poles, railroad ties, and wharf pilings.
- “ *Di(2-Ethylhexyl) phthalate*: Used auto oil, auto belts, brake pads, packing peanuts, tires, and flexible PVC (flooring & wall lining materials, sealants, wire sheathing, rain coats, rubber boots, and medical utility devices).
- “ *Lead*: Wheel weights, roofs, road paints, pesticides, certain native soils, and fireworks.

# Analysis by KJ for ACWA

## Analytes Exceeding Screening Levels<sup>a</sup>

Analyte <sup>a</sup>	# of Exceedances <sup>b</sup>	# of Samples	% Exceeding	OAR Ref. Level (mg/L)	EPA MCL (mg/L)	Portland Permit MADL (mg/L)
Antimony <sup>a</sup>	1 (1)	347	0.3	— <sup>d</sup>	0.006	0.006
Arsenic	2 (2)	846	0.2	0.05	0.01	0.01
Benzo(a)pyrene	2 (2)	740	0.3	—	0.0002	0.0002
Cadmium	8 (8)	1609	0.5	0.01	0.005	0.005
Chromium	10 (3)	1226	0.8	0.05	0.1	0.1
Di(2-ethylhexyl) phthalate <sup>e</sup>	30 (30)	641	4.7	—	0.006	0.006
<b>Lead<sup>f</sup></b>	<b>227 (78)</b>	<b>1782</b>	<b>12.7</b>	<b>0.05</b>	<b>0.015</b>	<b>0.05</b>
NO3-N	2 (2)	633	0.3	10	10	10
<b>Pentachlorophenol<sup>e</sup></b>	<b>79 (79)</b>	<b>675</b>	<b>11.7</b>	—	<b>0.001</b>	<b>0.001</b>
Zinc	1 (1)	1661	0.1	5	—	5

### Notes:

a Screening Levels are OAR-340-0020, EPA Maximum Contaminant Level, and Portland Maximum Allowable Discharge Limit.

b # of detected concentrations > than screening level(s). Values in parentheses are exceedances of MADL.

c Metals results were not differentiated between total and dissolved.

d — No screening level is available.

e Analytes were only sampled by City of Portland.

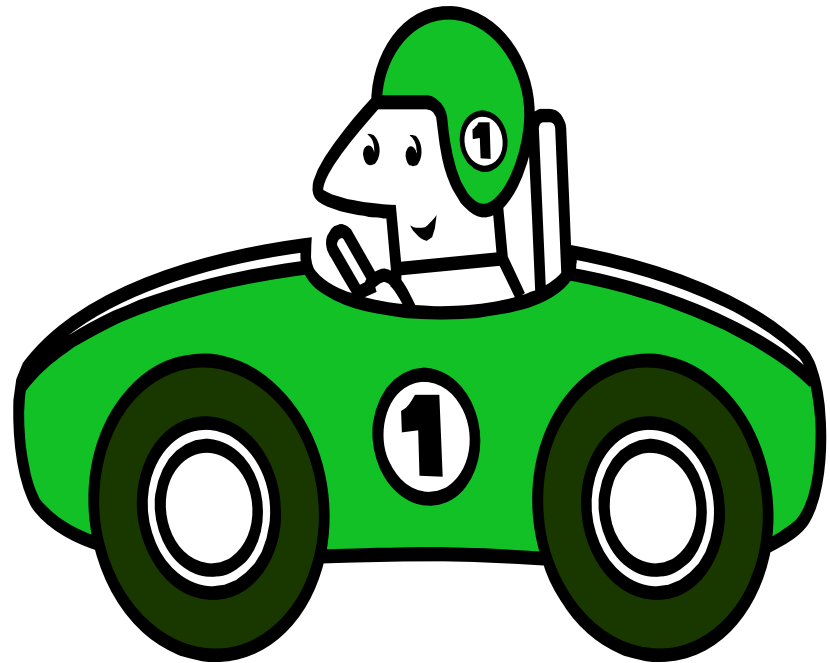
f Analytes in bold had more than 10% of samples exceeding the screening level(s).

\* Detection limits for 50 non-detect concentrations of antimony exceeded respective screening level(s).

\* Detection limits for 4 non-detect of bis(2-chloroethyl)ether, 22 non-detect of selenium, and 80 non-detect of thallium exceeded respective screening level(s).

# Analysis by KJ for ACWA

- " Pollutant levels tended to be highest in commercial and industrial areas
- " Pollutant levels tended to be highest in areas with > 1,000 vehicle trips/day





## 9. Questions?



# The Avogadro Group, LLC

*Source Emissions Testing and Emissions Specialists*

## PM2.5 Condensable Emissions: How the Test Method Might Impact You

Kevin Crosby  
The Avogadro Group, LLC  
Antioch, CA

# EPA's PM<sub>2.5</sub> Implementation Rule

- May 2008 Promulgation – NSR, PSD, etc.
- Pollutants that contribute to PM<sub>2.5</sub>:
  - Directly emitted PM<sub>2.5</sub>
  - Secondary PM<sub>2.5</sub> (SO<sub>2</sub>, NO<sub>x</sub>, VOC, NH<sub>3</sub>)
- Directly emitted includes Condensable PM<sub>2.5</sub>
  - will not be accounted during the “transition period” which ends Jan 2011.
  - Meanwhile, how do we prepare to account for the condensable PM<sub>2.5</sub> (CPM)?

# Testing Methods for CPM

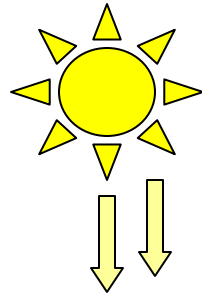
- What are we trying to measure?
  - primary emissions
- Criteria for evaluating a test method
  - representative, precise, accurate
- How do the available methods compare?
- Do the newer methods make any difference?
- What does it mean to the plant operator?

# What are we trying to measure?

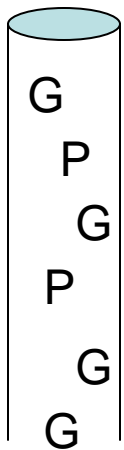
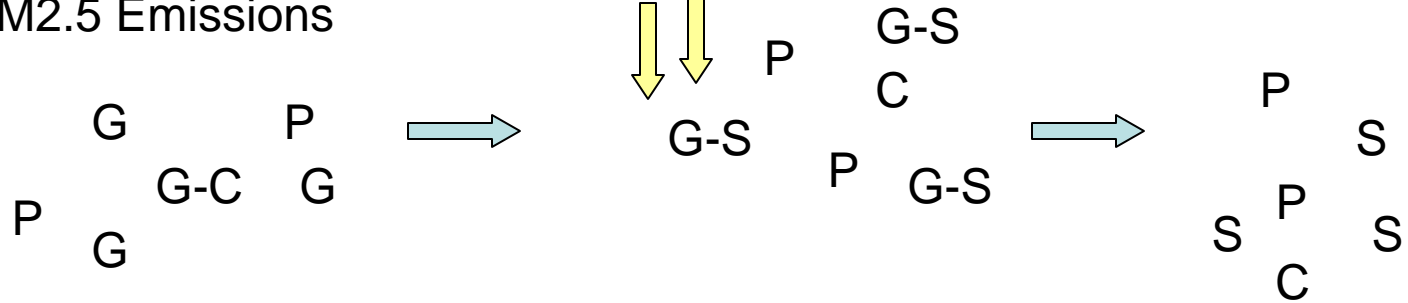
## Primary Particulate Matter less than 2.5 $\mu\text{m}$

Cooled

- some Gases to Condensables
- Primary PM2.5 Emissions



Photochemistry – other Gases (precursors) to Secondary PM2.5



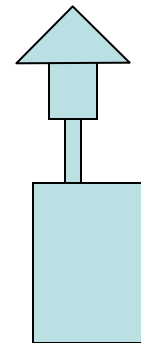
In-stack – Particles and Gases

Ambient Monitor – collects them all

Ambient PM2.5 commonly mostly secondary

**Primary PM2.5 Emissions**

- Particles (solid, liquid)
- Condensables



# Available “traditional” methods

- EPA 202 (with EPA 5 or EPA 201A)
- CARB 5, Oregon DEQ 5 or 7, Wash DOE 8
- Filterable PM “front-half”
- Condensable PM “back-half”
- All cool the sample by bubbling through water in impingers – maximized gas/liquid contact

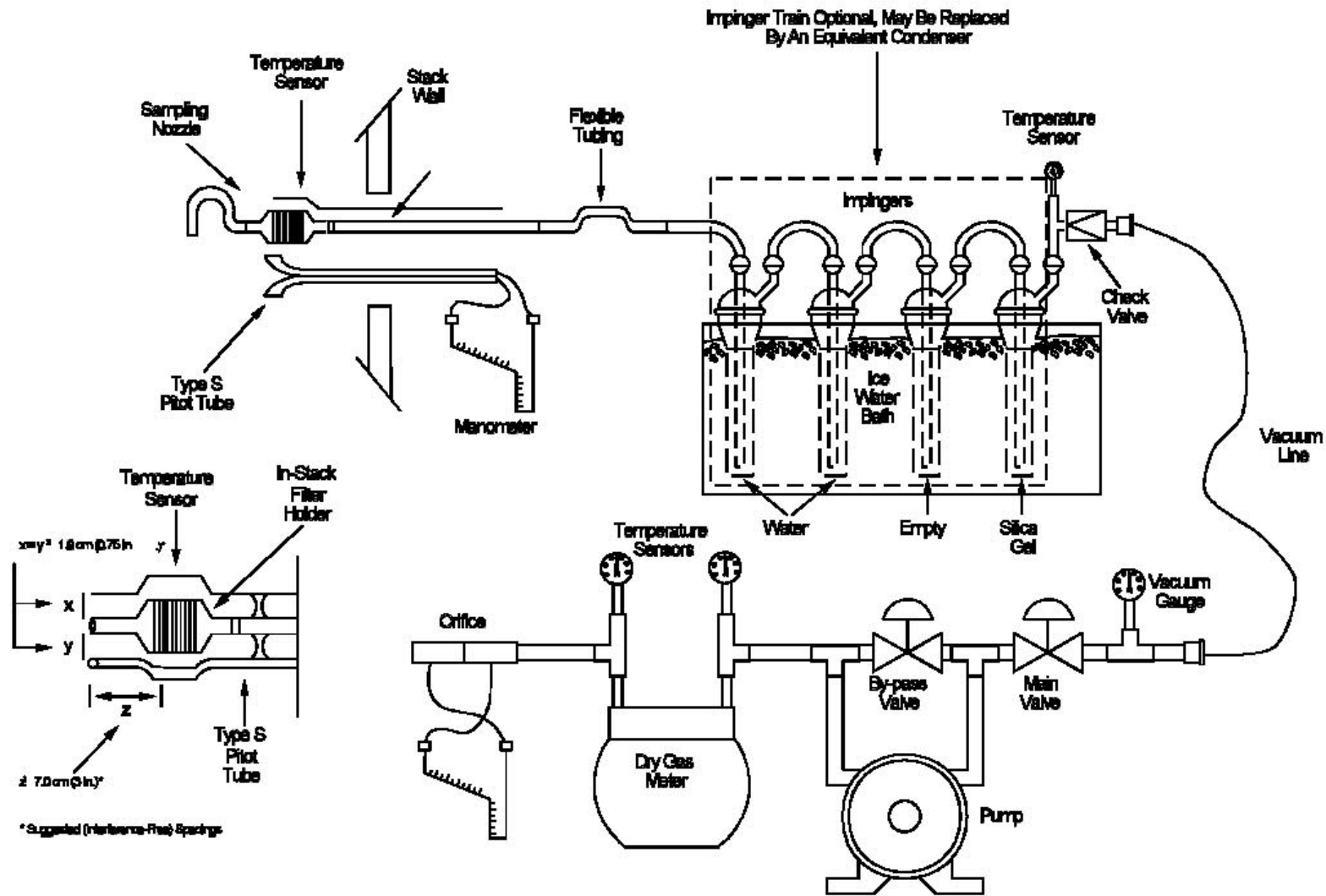


Figure 7. Schematic of EPA Method 17 Sampling Train.

# In-stack PM2.5 Cyclone and Filter



# Example of Typical Method

- Sample bubbled through impingers



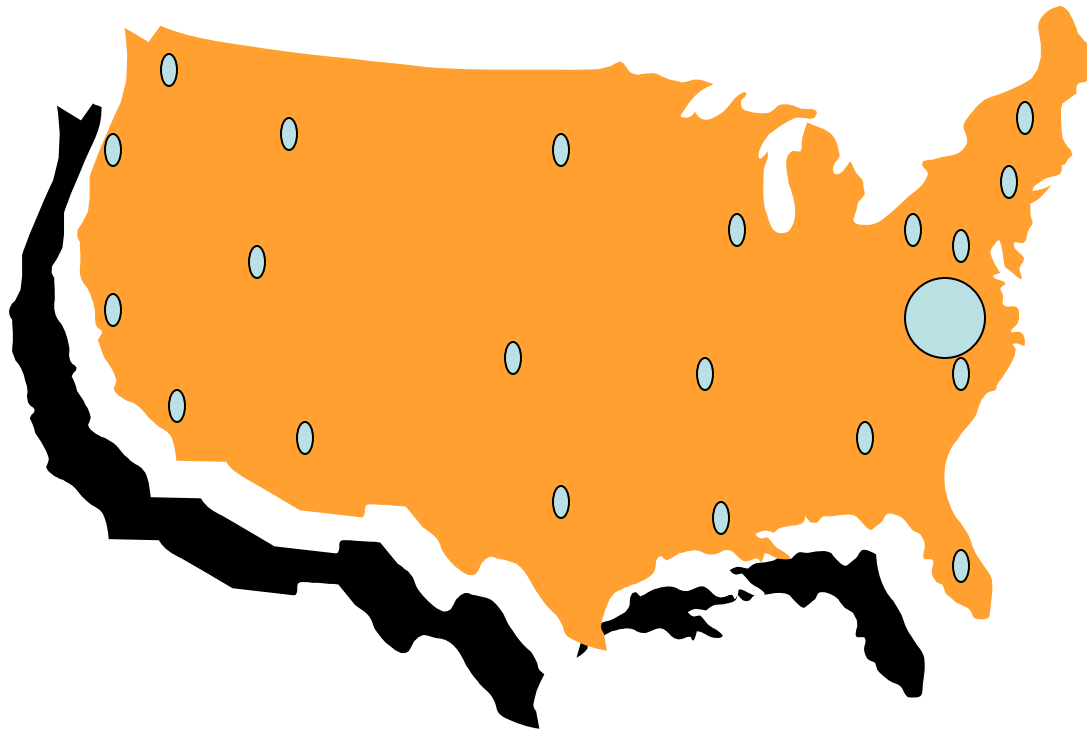


# Confusion

- In the stack, we can measure particles and gases
- Traditional test methods designed to measure condensables have included salts formed from dissolved gases – This happens because the gases are bubbled through water in impingers
- Example: Ammonia and  $\text{SO}_2$  dissolve to form ammonium sulfate  $(\text{NH}_4)_2\text{SO}_4$  which becomes part of the sample
- Some of this may be actual primary PM2.5 emissions, some may be an **Artifact** of the method
- Artifact - any feature that is not naturally present but is a product of an extrinsic agent, method, or the like
- All the impinger contents are counted as if they represent part of the condensable particulate matter

# Criteria for Method Evaluation

- Representative sample – like a political poll

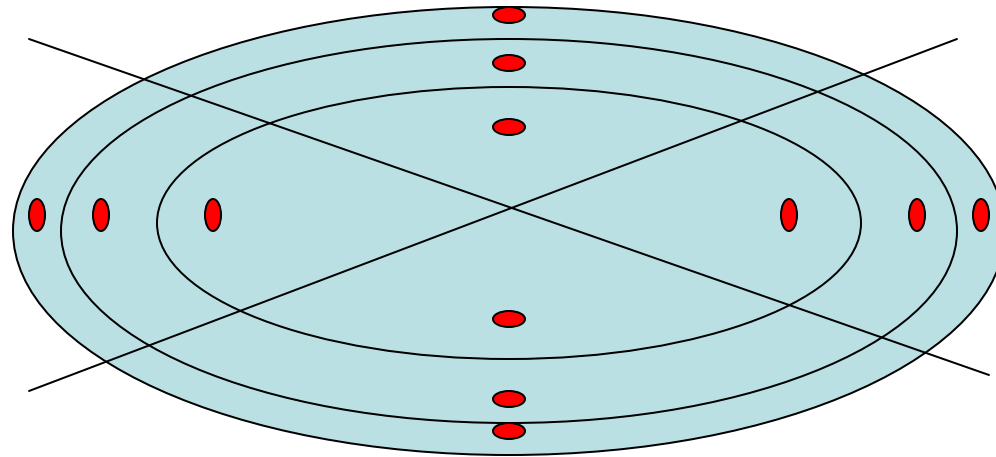


Pollsters don't sample just from one area

# Representative Sampling

(one aspect – also consider process variations, normal emission conditions, etc.)

- Methods are DESIGNED to include representative sampling from Traverse Points located at centroids of equal areas



# Representative Sampling Rectangular Stack or Duct

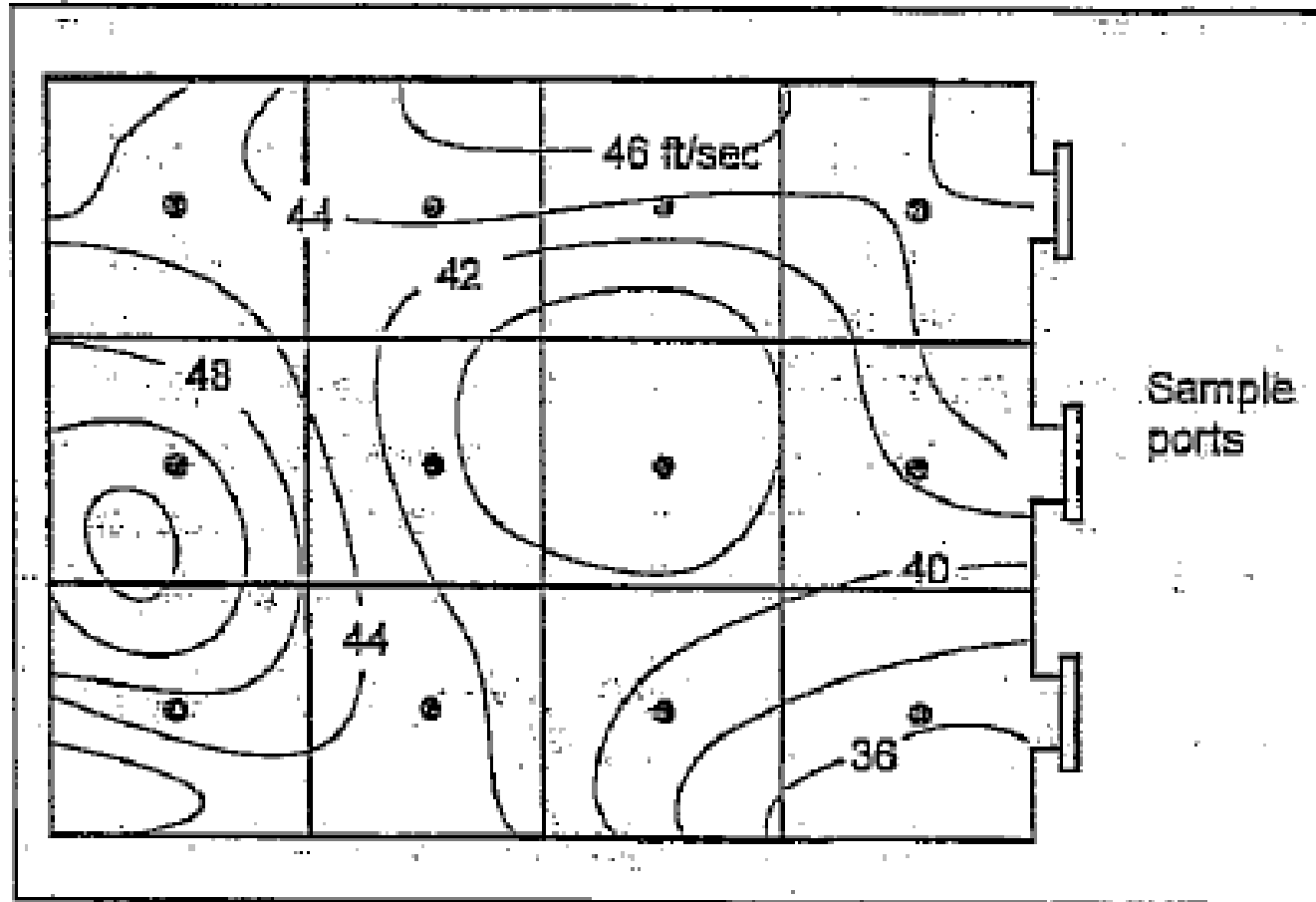


Figure 3-7. Variation of gas velocity in a rectangular duct and Method 1 traverse points

# Precision

- Published methods have been evaluated for precision
- This includes use of paired sampling probes and multiple test runs
- The statistics have shown that the methods can be conducted with sufficient precision
- The methods can all be representative and precise – OK so far

# Accuracy

- There is no standard against which to compare test results for “absolute” accuracy
- Methods may be compared one to another for “relative” accuracy
- **The method defines the results**
  - Each method provides a measurement
  - The measurement might be similar to “actual” emissions – **or it might not** – for a specific source
- This is the problem we face with condensables

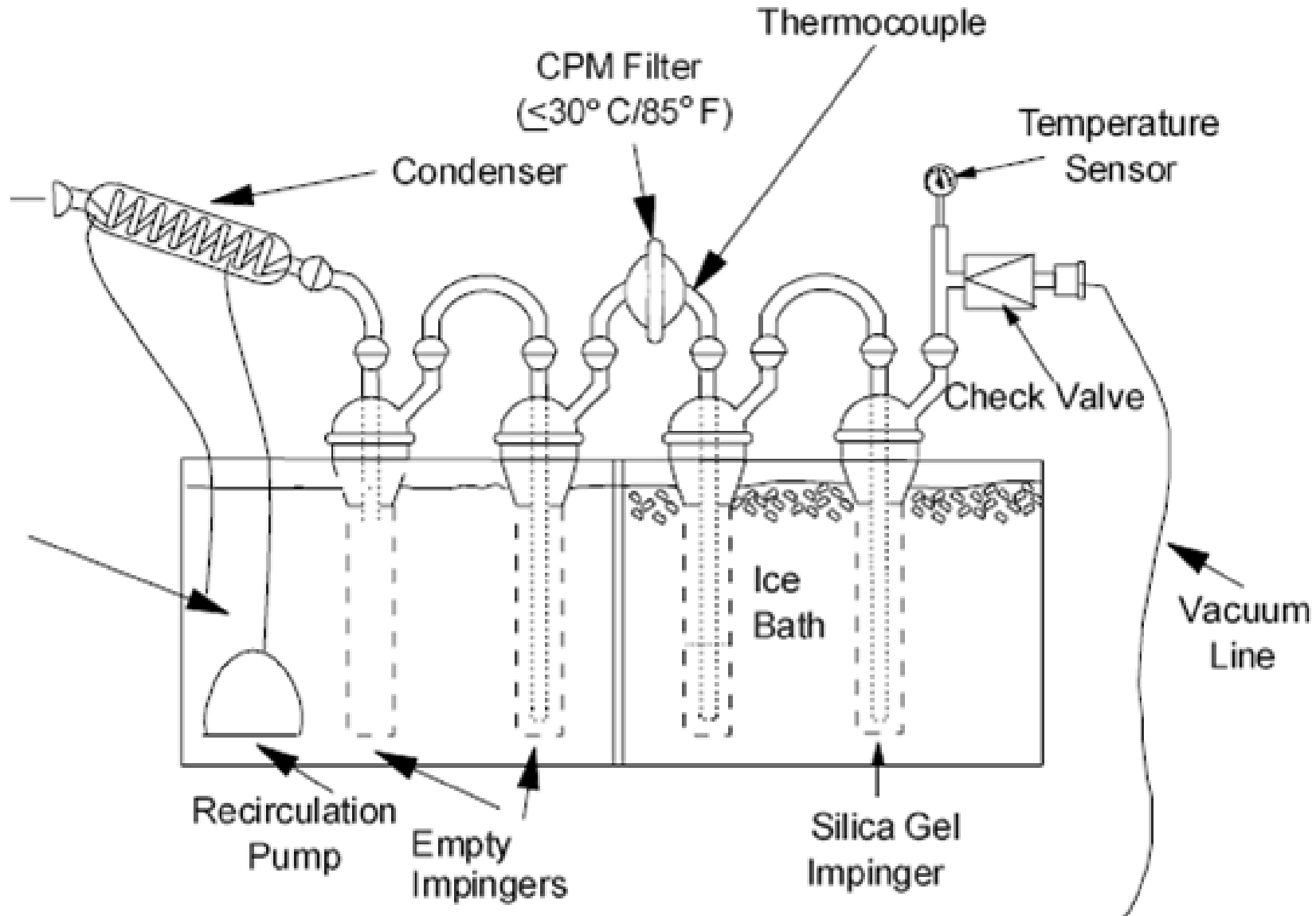
# Transition Period for Implementation Rule

- Develop appropriate methods
- End of transition (Jan 2011) include condensables in measurement of primary PM<sub>2.5</sub> emissions
- The Rule will then require application of methods to source types
- Now is the time to determine which methods might work best for each source

# Methods under Development

- EPA “other test method” OTM-028
  - AKA “dry 202”
- Dilution methods (measure filterable and condensable together)
  - EPA “conditional test method” CTM-039
  - GE Energy compact dilution sampler
  - ASTM dilution method

# OTM-028 or “New 202”

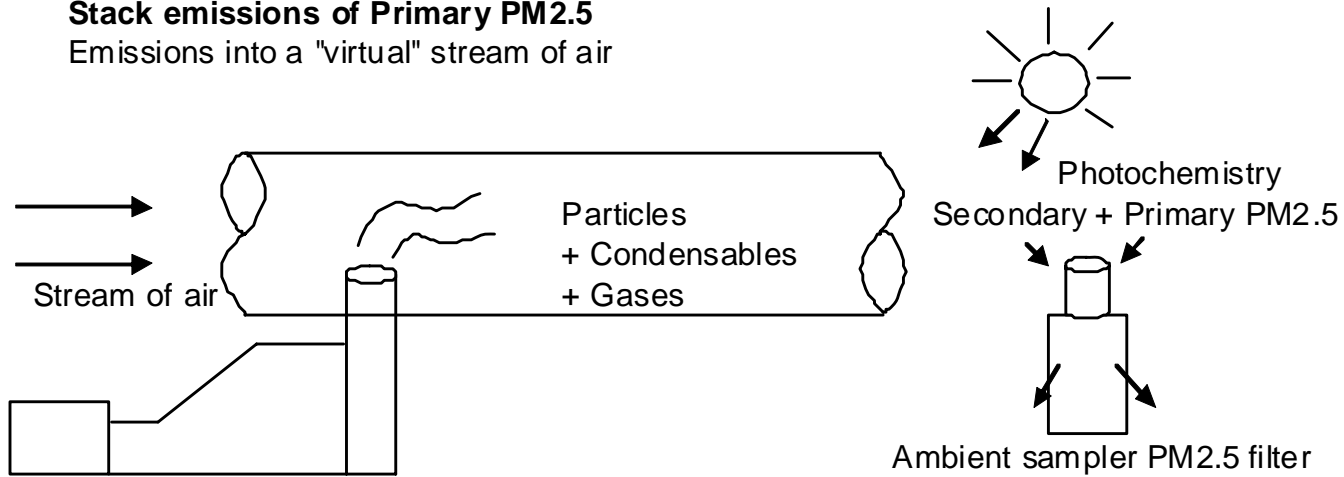


# OTM-028 or “New 202”

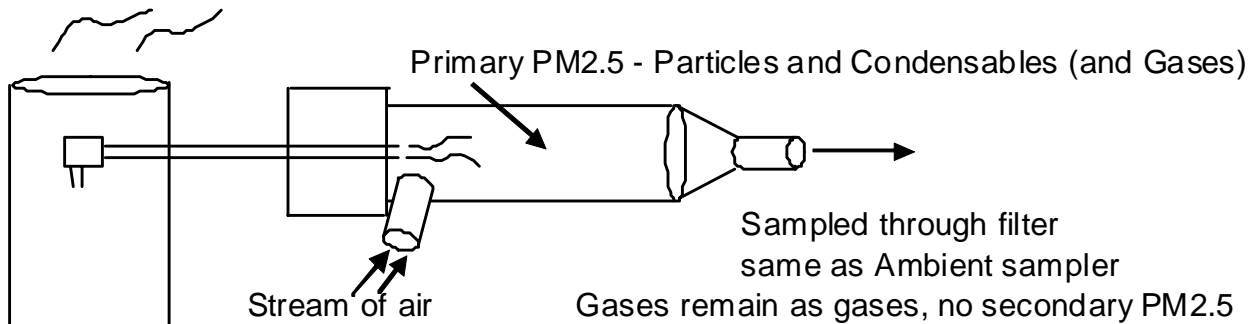
- First two impingers are empty at beginning of test run; condenser and impingers cool the sample to 85°F or lower
- condensed aerosols or particles collected in impingers and backup filter
- Condensate forms but there is no bubbling of gases through condensate
  - this minimizes gas-liquid contact
  - some, but **much less** of precursor gases are collected as artifact
- Some studies indicate 40 to 80% less sulfate artifact (as much as 85 to 95% for some high-SO<sub>2</sub> sources)

# Dilution Sampler Concept

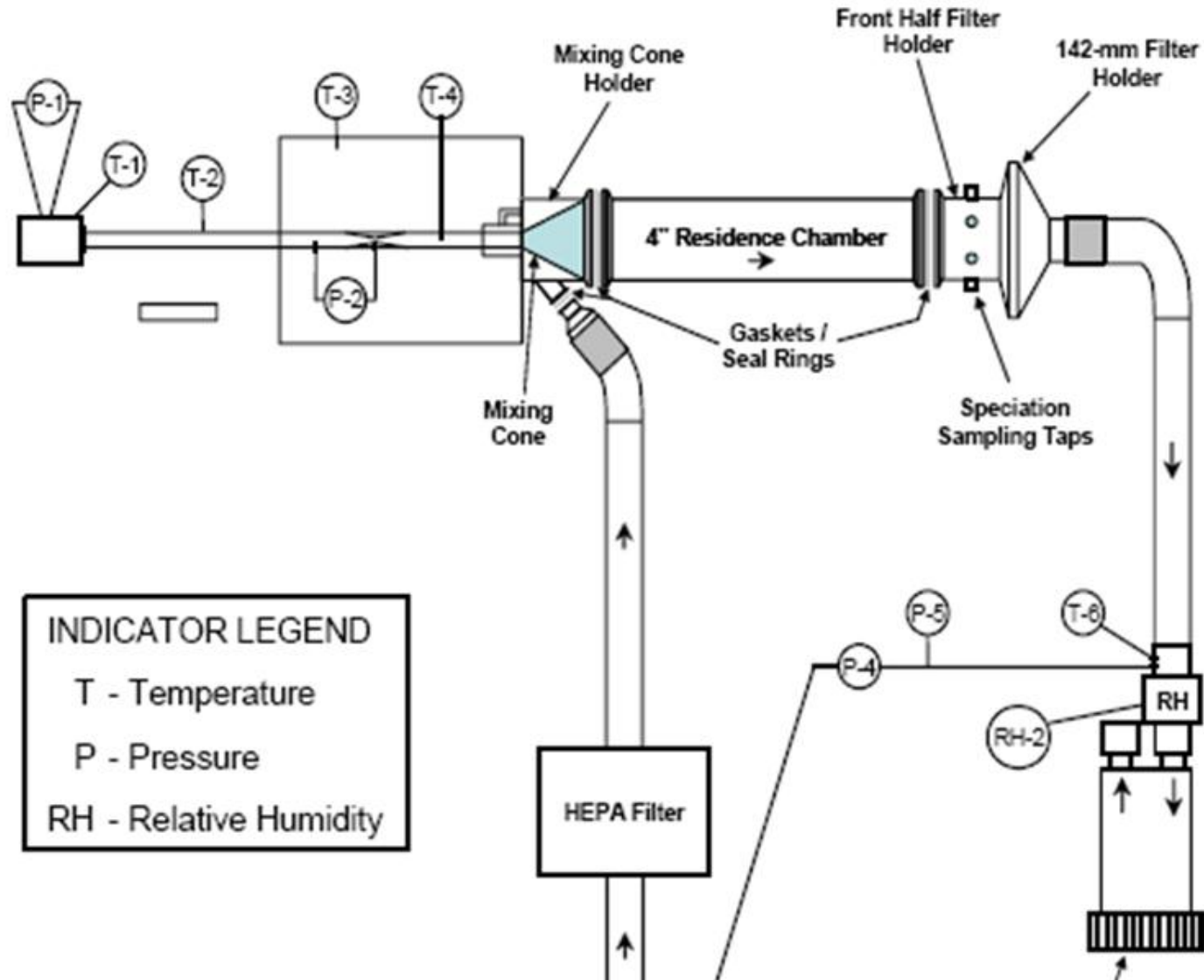
**Stack emissions of Primary PM2.5**  
Emissions into a "virtual" stream of air



**Stack sampling of Primary PM2.5 by CTM-039**  
Sample "emitted" into a stream of air



# CTM-039 Diagram

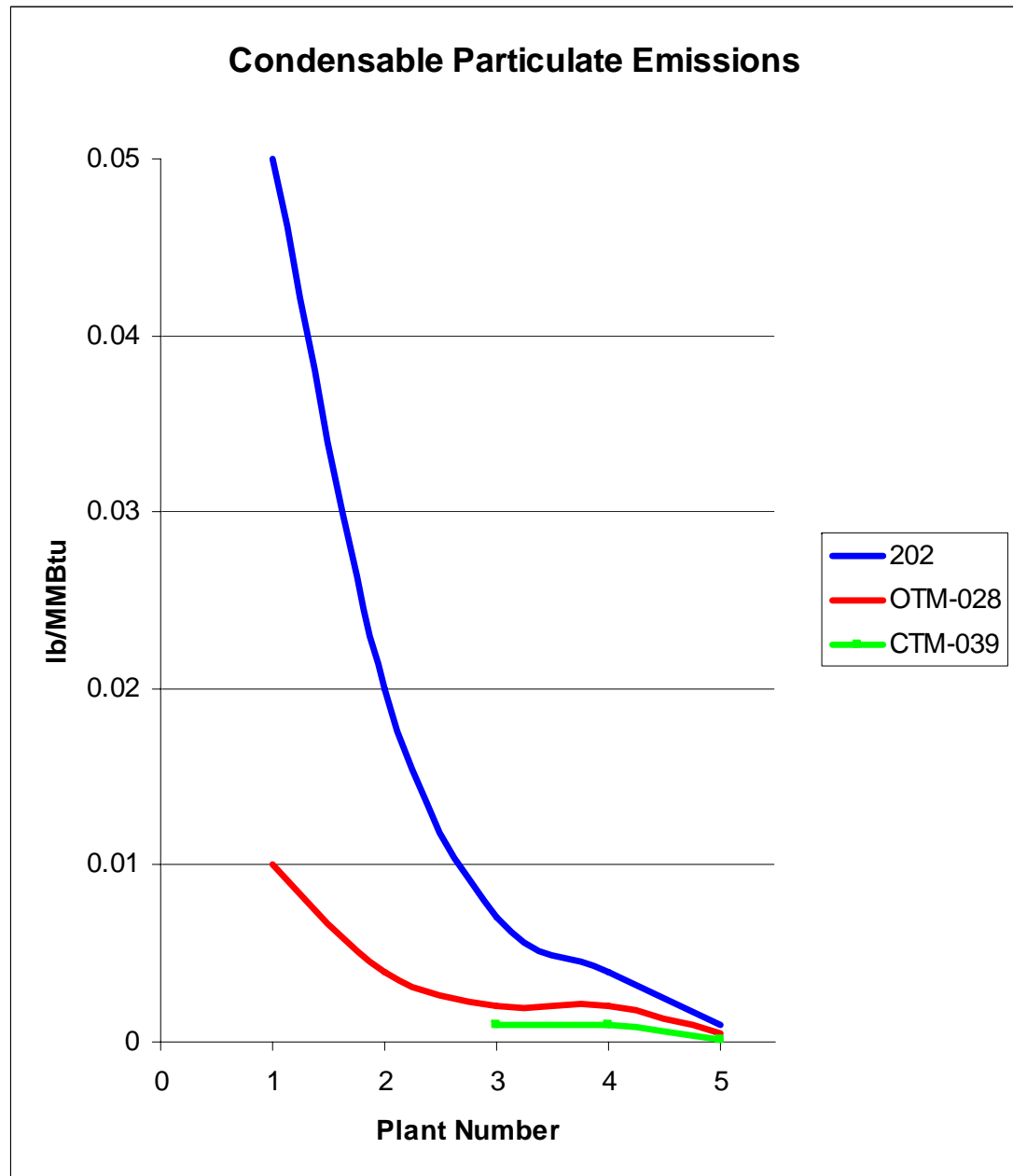


# CTM-039

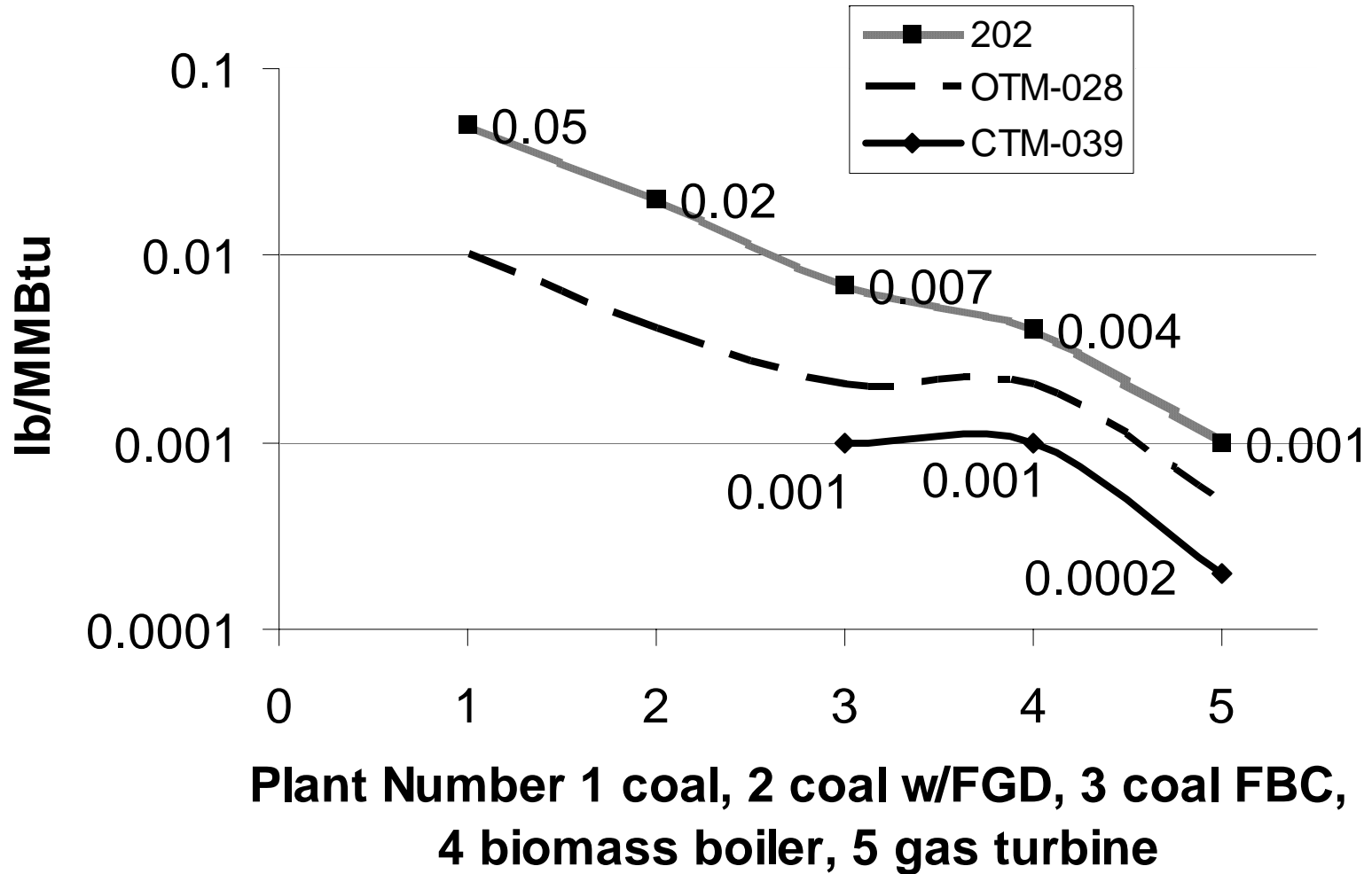
- Objective: measure primary PM<sub>2.5</sub>
- Designed to emulate dilution of stack emissions in ambient air
- Condensables form in the same way as in actual emissions
- Developments may provide much lower detection limits for low-concentration sources

# Method Performance

- **Plant 1 coal**
- **2 Coal FGD**
- **3 FBC**
- **4 Biomass**
- **5 Turbine**



## Approximate Measurement, Condensable Particulate Emissions



# Advantages / Disadvantages

Method	Benefit	Drawback
Wet impinger “traditional” 202	Results fit with existing databases Routine for testers	Significant bias from dissolved gases Too many choices
Dry impinger OTM-028 “New 202”	Uses existing test apparatus Testers are becoming familiar Can have much lower bias	Somewhat more complex Limited data so far Bias not eliminated
Dilution CTM-039	Emulates actual PM2.5 formation process Can virtually eliminate bias	Uses new, expensive equipment Little hard data yet

# What does this mean?

- Method selection will determine results
- “Old” data may be outdated - Your emissions may be lower
- Your emissions may be lower than even the “New dry 202” can provide
- Use a quality tester – attention to detail, good scientific approach for consistent results – experience counts, but good science prevails

# Questions ???

Kevin Crosby

Technical Director  
Antioch, California

## The Avogadro Group, LLC

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*Source Emissions Testing and Emissions Specialists*



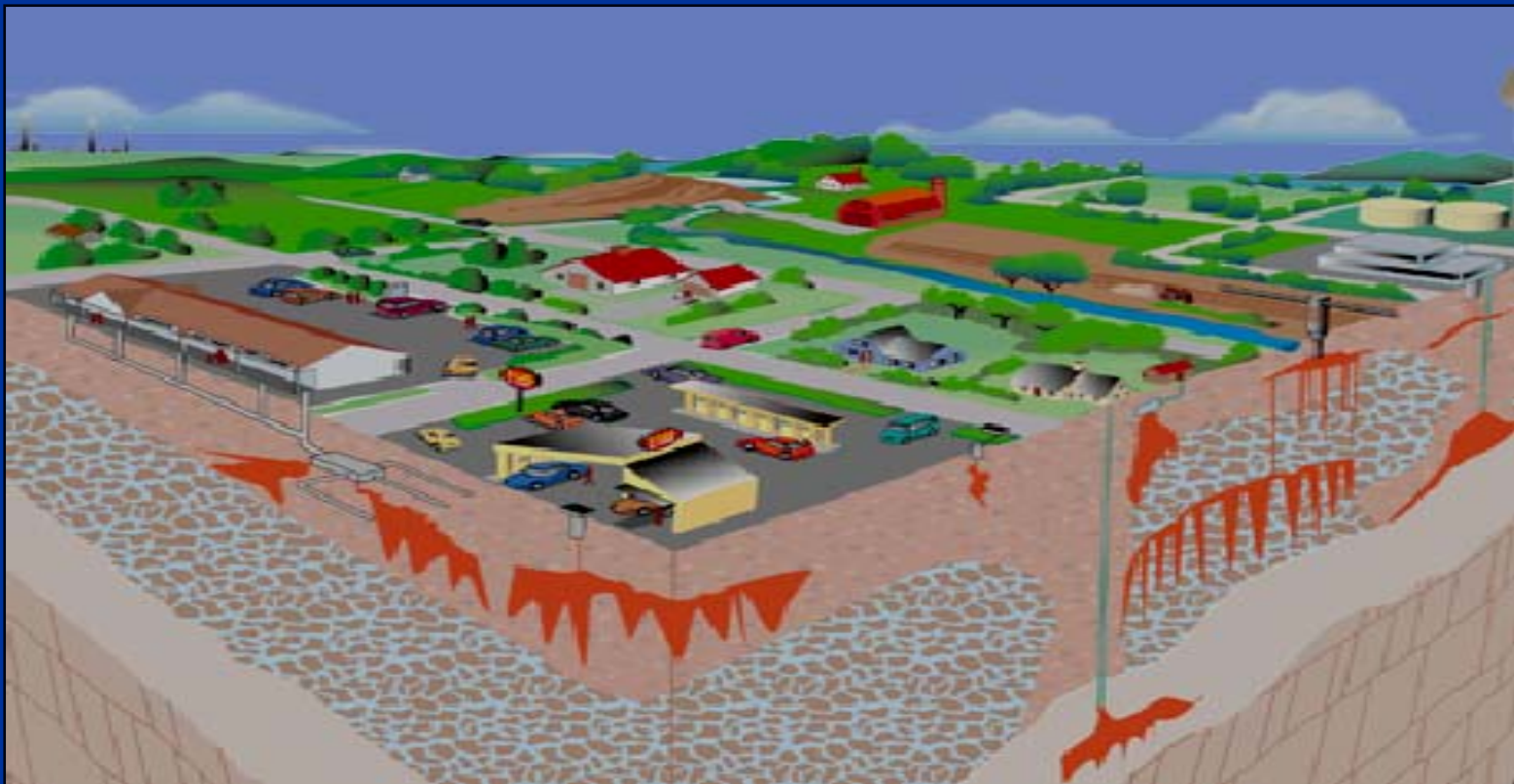
# What we will cover today



- › Program Goal and History
- › Laws and Regulations
- › What is a UIC well
- › UIC well use in WA
- › 2 Program requirements
- › UIC Program requirements for “new or proposed,” “existing” stormwater wells, heat pump/air cond. return

# UIC Program Goal

The goal of Washington's UIC Program is to protect ground water quality by regulating discharges from UIC wells.



# UIC Program History

- › 1974, Congress passed the Safe Drinking Water Act and required EPA to create the UIC Program to protect drinking water sources by controlling discharges to UIC wells
- › 1984, Ecology received authority from EPA to regulate UIC wells
- › 1992, WA State's Ground Water Quality Standards adopted
- › 2006, UIC rule revisions adopted
- › 2007, NPDES Phase I & 2 municipal permits - UIC wells not covered under permit

# UIC Laws and Regulations

- › Federal Safe Drinking Water Act
- › WA State Water Pollution Control Act, chapter 90.48
- › Chapter 173-218 WAC UIC Program
- › Chapter 173-200 WAC Groundwater Quality Standards

# What is a UIC well?



- › A UIC well is a man made structure used to discharge fluids into the subsurface.
- › It has to be deeper than wide at the land surface or a subsurface distribution system or an improved sinkhole.
- › Examples: drywell, infiltration trench with perforated pipe, drainfield, storm chambers and borehole
- › EPA Classification: Class V well

# Exemptions

- › Storm drain components designed and intended to move water to surface water
- › Infiltration ponds, dispersion systems or infiltration trenches without perforated pipe
- › Septic system drainfields receiving only sanitary waste and serves less than 20 people per day or design capacity of 3,500 gpd or less

# How UIC wells are used in WA



- › **Manage Stormwater**
- › Dispose of sanitary waste
- › Enhance remediation at clean up sites
- › Heat pump/air conditioning return flow wells
- › Recharge aquifers
- › Dispose of commercial and industrial waste fluids

# Examples of Prohibited discharges

- › Vehicle maintenance, repair waste fluids
- › Vehicle and engine wash water
- › Industrial waste fluids, not under a discharge permit
- › Sites with contamination, when the use of the UIC well would increase mobility of the contaminants
- › Stormwater from areas
  - › Storing treated lumber
  - › Storing or handling hazardous substances

# What do I have to do if I own or manage a UIC well?

- › Meet the rule requirements (rule authorization):
  - › All UIC wells must be registered once with Ecology (on tribal land register with EPA Region 10) and
  - › Meet the ground water protection requirement (non-endangerment standard). The discharge meets the GWQS at the top of the water table.

OR

- › A permit will be needed to operate a well.

# Registration

- › Registration - Proposed or “New “ wells should be registered before they are in use; design phase preferable
- › Existing stormwater wells, built before February 2006 have registration deadlines
- › Must use the Ecology UIC Web Application or Excel spreadsheet for many sites or wells (Word version will be phased out)
- › Registration is free.

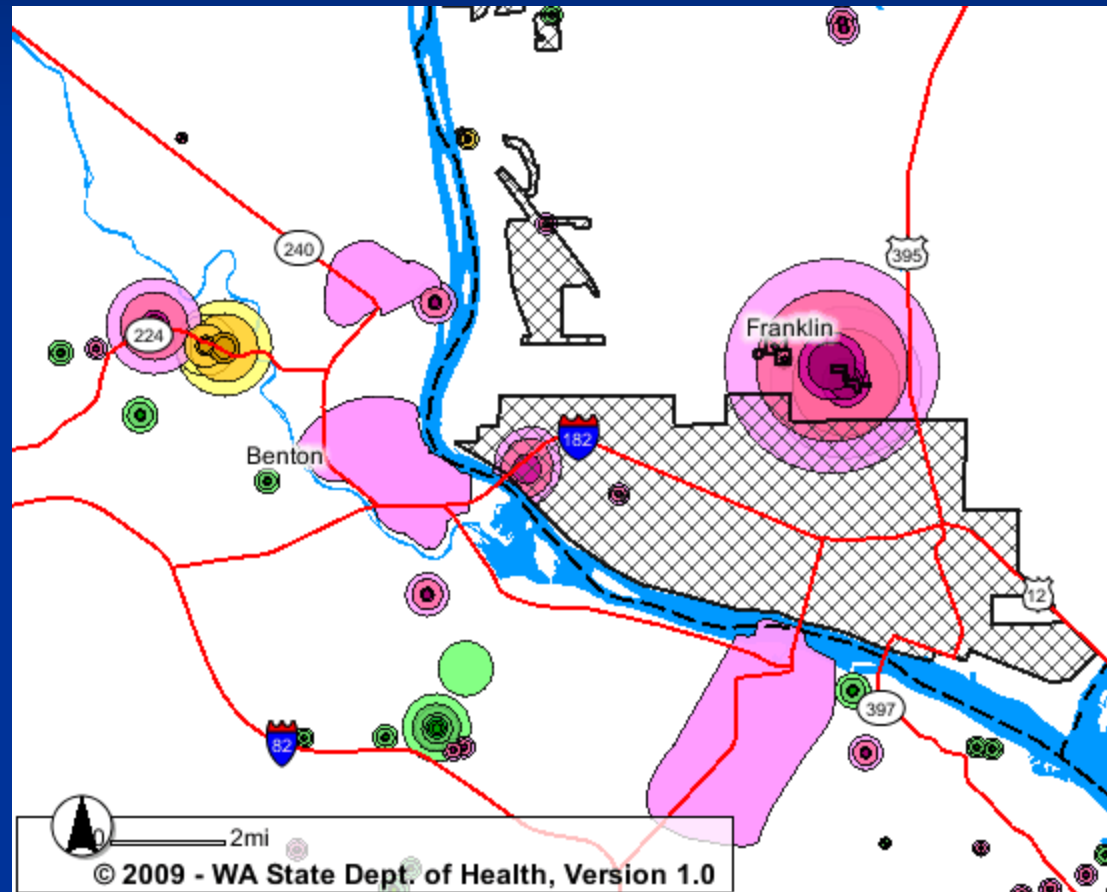
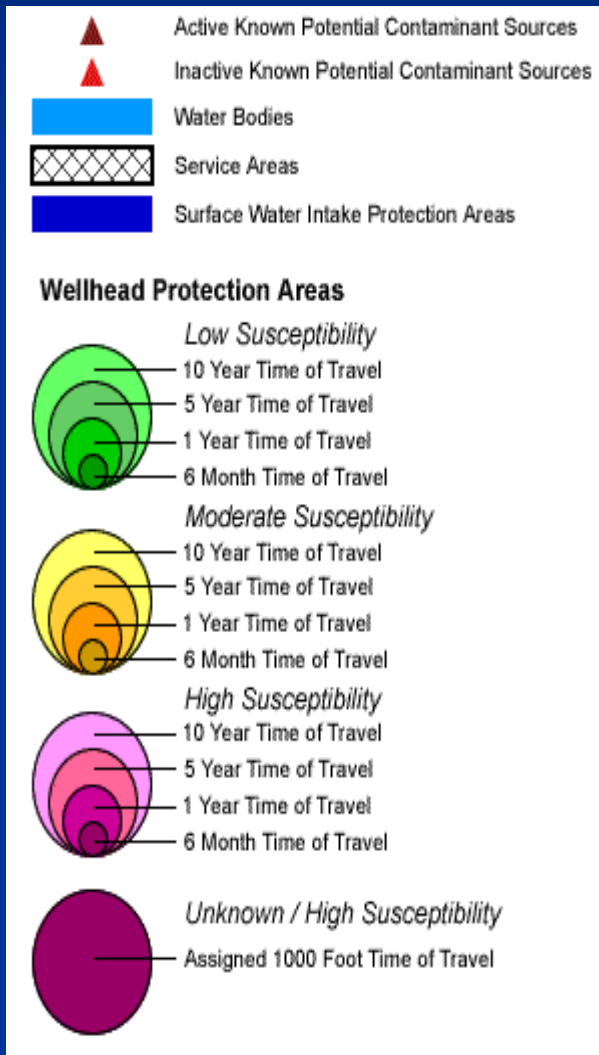
# Groundwater Protection Requirement/ Non Endangerment Standard



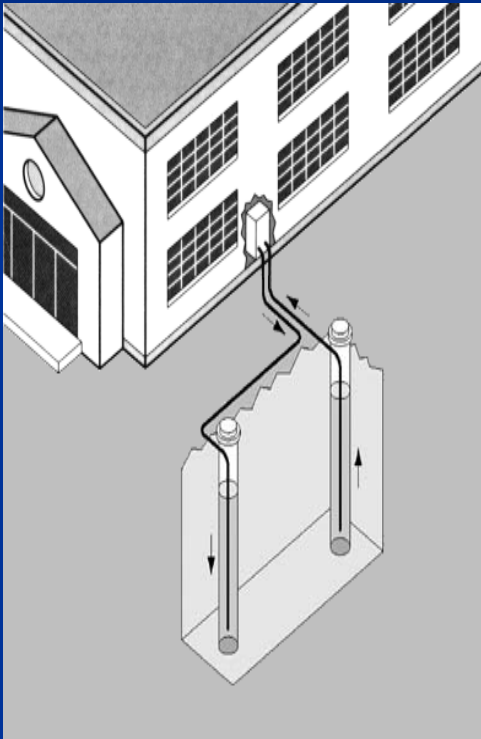
- › A UIC well must be constructed, operated maintained and decommissioned in a manner that protects ground water quality.
- › Must be in compliance with state law, Ground Water Quality Standards and local ordinances.

# Well Head Protection Areas

<http://www.doh.wa.gov/ehp/dw/swaphome.htm>



# Heat Pump /Air Conditioning Return Flow Wells



- › Open loop only (UIC)
- › Ecology's Water Resource Program requirements – well drilling & water rights
- › No chemicals added
- › Cannot impair beneficial uses of ground or surface water

## Heat Pump /Air Conditioning Return Flow Wells

- › If within one mile of surface water & using 5,000 gpd or greater provide hydrogeologic information and show that the return water will not impair the surface water
  - › Concern: discharge reaches surface water and return water temperature is higher than the surface water temp.

# Non Endangerment Requirements for New Stormwater Wells

- › Only stormwater allowed - some exceptions
- › No prohibited discharges
  - Some discharges may be allowed with treatment, i.e. stormwater from fueling area
- › Setbacks from slopes and building foundations

## Non Endangerment Requirements for New stormwater wells

- › UIC well within 100 ft. from a drinking water well has to provide information showing the UIC well discharge is not in the water well cone of influence
- › UIC well not allowed at clean up sites, where the stormwater would encourage contaminant transport
- › Use either the Presumptive or Demonstrative approach to design well

## Non Endangerment Requirements for New Stormwater wells

- › Vertical separation between base of well and top of ground water is required for all new stormwater UIC wells, 5 ft. minimum except for non pollutant load roof
- › Apply appropriate operation and maintenance BMPs from Ecology stormwater manual for the life of the UIC well
- › Treatment BMP, if necessary
- › Meet closure requirements of UIC rule

# Presumptive and Demonstrative Approach

- › Presumptive approach:  
Stormwater management practices from a current Ecology manual are applied to a UIC well it will be presumed the Ground Water Quality Standards will be met.
- › Demonstrative approach: the owner must demonstrate the site practices will meet the Ground Water Quality Standards.

# Required Guidance documents

	<b>Guidance for design, siting, treatment determination</b>	<b>Construction, treatment options, source control BMPs</b>
Drywell, Drainfield	Guidance for UIC Wells that Manage Stormwater	Current Ecology Stormwater Manuals, and Emerging Treatment Tech. website
Infiltration trenches	Current Ecology Eastern or Western stormwater manual or an approved equivalent local manual	Current Ecology Stormwater Manuals and Emerging Treatment Tech. website

# Determine Treatment Requirements for New Drywells (remove solids , metals and oil)

Based On:

- › Vadose Zone treatment capacity, Table 5.2
  - › High to none treatment – depends on filtration, adsorption , CEC and thickness. If thickness is less than required – NONE treatment
- › Pollutant Loading Classification, Table 5.3
  - › Based on average daily traffic
- › Determine treatment, Table 5.4

# Required Treatment to reduce Solids, Oil and Metals, Table 5.4

Treatment Capacity vadose zone Pollutant Load	HIGH	MEDIUM	LOW	NONE
INSIGNIFICANT	NONE	NONE	NONE	NONE
LOW	NONE	NONE	NONE	REMOVE SOLIDS
MEDIUM	TWO STAGE DRYWEL	TWO-STAGE DRYWELLS	REMOVE SOLIDS	REMOVE SOLIDS
HIGH	REMOVE OIL	REMOVE OIL	REMOVE OIL and SOLIDS	REMOVE OIL and SOLIDS

# Infiltration Trench Requirements



## Treatment—

- › Sediments NOT considered as a treatment BMP - solids removal/basic treatment required
- › Sediments considered treatment BMP - pretreatment BMP required
- › High Use Site - Oil control BMP

# Infiltration Trench Requirements



- › Non pollutant load – no treatment
- › Vertical separation between ground water or impermeable layer and trench base
- › Short and long term infiltration rate for trench with treatment soils
- › In ground water protection area

## Requirements for EXISTING UIC wells used for stormwater management

Existing wells, built and in use prior to February 3, 2006, are considered grandfathered in to the Program unless they are determined to be a high risk to ground water (cause or contribute to a water quality problem)

# Requirements for Existing UIC wells used for stormwater management

**$\leq 50$  wells**

**$> 50$  wells**

Register wells	By Feb 2009	By Feb 2011
UIC well assessment	By Feb 2011	By Feb 2013

Extensions allowed if approved by Ecology

# Well Assessment Requirements for Existing Stormwater Wells

- › Evaluate the potential risks to ground water from the use of your UIC wells
- › Identify UIC wells that are a high threat to ground water
- › Include schedule for retrofitting wells determined to be a high threat.
- › Prohibited or public health hazard must be rectified ASAP.

## Well Assessment Requirements for Existing Stormwater Wells cont.

- › Keep copy of well assessment at the site (or municipality).
- › If rule authorization documentation is needed, well assessment can be sent to Ecology for review

# Examples of high threat to ground water wells



- › UIC well receiving a prohibited discharge without treatment (i.e. fueling area)

- › UIC well built into the ground water



- › UIC well receiving stormwater from an area or use that is considered a high pollutant load (high use site) and the vadose zone has no treatment capacity

# What does “retrofit” mean?

- › If a high threat or prohibited UIC well is identified, the owner must reduce the pollutant load from the UIC well by:
  - › Revising the operational or structural source control BMPs at the site (includes treatment); or
  - › Closing the UIC well.

# Compliance and Enforcement

## RCW 90.48

- › Technical Assistance and Site Visit Notice
- › Warning Letters or Letters of Noncompliance.
- › Order
- › Penalty

# Summary

- › Registration required for all UIC wells
- › Ground water protection requirement different for new and existing stormwater wells
  - › New - use the Ecology stormwater manuals or UIC guidance BMPs to be rule authorized (or demonstrative approach)
  - › Existing wells are grandfathered in unless wells are a high threat to ground water
    - › Well assessment
    - › High threat wells have to be retrofitted

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UIC website

[www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html](http://www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html)