

## 1,4-Dioxane – Emerging(ed) Contaminant

- 2001 White paper
- 2003 First detection
- 2004 Guideline of 3 ppb
- 2008 Sampling at solid waste/hazardous waste sites
- 2009 Sampling at groundwater discharge sites
- 2010 Revised IRIS (10-6 cancer risk = 0.35 ppb)
- 2011
  - Reporting limit of o.25 ppb
  - Data coming in (2 WWTF and 68 sites)
  - 3 Lab methods
- 2015
  - Env-Or 600 readopted (AGQS=3 ppb)

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## Role of Various Programs

- Contaminated site program
  - Hazardous waste sites
  - Unlined and lined landfills
- Contaminated well program
- Drinking water program
- Groundwater discharge program
- Environmental health program (risk assessment)
- Laboratory services

## Contaminated Site Program

- 1,4-dioxane detected many sites
  - "State Sites"
  - Superfund Sites

#### Landfills

- Most unlined
- Lined landfills (leachate)
- Most sites CVOCs present
- Large majority of sites monitoring under permit
  - A few impacted water supply wells identified (one large site)

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## Contaminated Site Management

- Results to date (since 2008)
  - 1,4-dioxane routine COC
  - Hazardous waste (31%)
    - Unlined landfills (82%)
- Range of impacts/actions
  - Additional remediation/continued operation
  - Expanded plumes (GMZ)
    - Alternate water
  - Extended closure
  - Added to sampling program (GMP)

## Contaminated Well Program

- Sites where no viable PRP or source is unknown
- Sampled wells where CVOCs present
- Typical treatment GAC or GAC/air stripping not effective or reliable for 1,4-dioxane
   Bottled water provided



- One site w/ extensive 1,4-dioxane (case study)
   1,4-dioxane is the driver
- Other sites 1,4-dioxane detected but limited extent
- Research on treatment

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## **Drinking Water Program**

- Initiated voluntary sampling program
  - 215 sources
    - 4 sources exceeded 3 ppb
    - 3 sources between 0.35 ppb and 3 ppb
  - 3 sources above reporting limit and 0.35 ppb
  - Evaluated reverse osmosis POU system
  - 75% removal efficiency (influent 9 ppb)
  - Sampled wells w/ history of CVOCs
  - Work closely w/ contaminated site program
- Worked w/ USEPA to identify chlorinated waste sites closed prior to the assessment of 1,4-dioxane
  - Need resources to sample private wells near closed sites
- Require new proposed sources of drinking water for community water systems to sample for 1,4-dioxane

#### **Town of North Walpole**

- Population 600
- Drinking water has 2.5-3.5 ppb 1,4dioxane
- Source of contamination is difficult
  - Deep transmissive aguifer
  - Releases could have occurred over 30 years ago
- Options to assist North Walpole are Limited
  - EPA Waste Programs
  - Drinking Water SRF/Enforcement

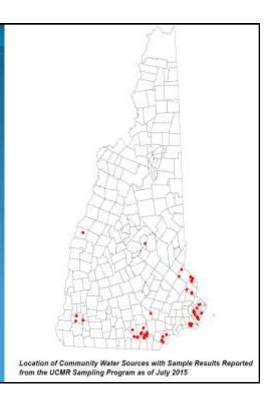
  - USDA/CDBG Loans and Grants

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### Unregulated Contaminant Monitoring Rule

- 54 Sources or Points
- 3 detections
  - 2 GW wells previously identified
  - 1 Distribution point (likely a false positive)

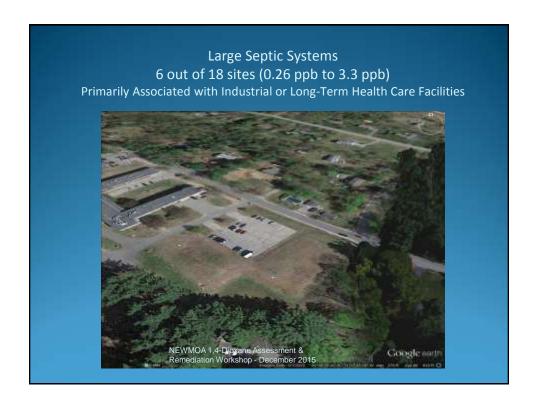


## Groundwater Discharge Program

- Permits required for:
  - Domestic wastewater discharges >20k gallons/day
  - Domestic wastewater discharges with reduced setbacks
  - Nondomestic wastewater discharges
- Groundwater discharge permits include a provision to sample for 1,4-dioxane as they are renewed
- 1,4-Dioxane has been sampled at approx. 50% of sites







# Groundwater Discharges Additional Info

- Car wash on Septic
  - 1.0-4.1 ppb groundwater Up to 7.0 ppb effluent
  - 50 ppb in soap/water mixture
  - 10s ppm in soap (higher in base surfactant oil)
  - \*\*\*Need to sample drinking water wells near car washes\*\*\*
- Large Municipal WWTF (NPDES Discharges)
  - 2 samples, 1-3.3 ppb (consistent w/ literature)

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## **Laboratory Services**

- Participated in small study of analytical methods
- Maintains list of labs accredited for <u>low level</u> 1,4-dioxane analysis

EPA 522

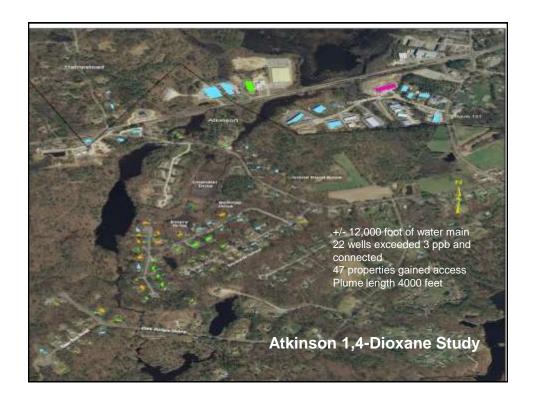
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- 14 labs currently accredited (as of 9/15/15)
  - http://des.nh.gov/organization/divisions/water/dwgb/nhelap/documents/ ow-level-dioxane-lab-list.pdf

## Case Study

- Discovered by contaminated well program
  - 4 residential bedrock wells w/ MTBE and CVOCs (2002)
  - Concentrations decreased ready to remove treatment systems (carbon)
  - Sampled for 1,4-dioxane in November 2011
  - 1,4 dioxane detected over AGQS
  - Expanded sampling



# Case Study (cont)

- March 2012 detected extensive 1,4-dioxane plume
- Focus on waterline extension
   Treatment unreliable for 1,4-dioxane
- Over 100 wells/400 samples
- No known source
  - 3 areas of industrial development
  - Quick inspection of 50 facilities

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## Case Study

- Summary
  - +/- 12,000 foot of water main
  - 22 wells exceeded 3 ppb and connected
  - 47 properties gained access
  - Plume length 4000 feet





