

1,4-Dioxane

New Hampshire's Experience

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NEWMOA 1,4-Dioxane Assessment & Remediation Workshop - December 2015

Overview

- History/role of programs
- Case studies
 - Illustrate characteristics/challenges

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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 0.25 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

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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)



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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

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Town of North Walpole

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

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Location of Community Water Sources with Sample Results Reported from the UCMR Sampling Program as of July 2015

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

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Unlined Wastewater Lagoons

3 out of 17 sites (0.39 ppb to 3.8 ppb)



Rapid Infiltration 3 out of 7 sites
(0.53 ppb to 0.83 ppb)



Large Septic Systems
6 out of 18 sites (0.26 ppb to 3.3 ppb)
Primarily Associated with Industrial or Long-Term Health Care Facilities



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 low level 1,4-dioxane analysis
 - EPA 522
 - SW-846 8260 SIM
 - SW-846 8270 SIM
- 14 labs currently accredited (as of 9/15/15)
 - <http://des.nh.gov/organization/divisions/water/dwgh/nhelap/documents/low-level-dioxane-lab-list.pdf>

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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

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- Analyzing for 1,4-D routine (emerged as COC)
- Experience
 - Larger plumes
 - Some impacted water supplies
 - Some remedies revised/some closures delayed
- Integrate programs to solve some of the challenges
- Various standards
- Monitor development of treatment technology



Contact information

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