



1,4-Dioxane: Connecticut's Perspective

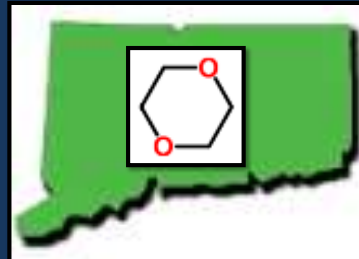
December 10, 2015
Presented by Shannon Pociu, Environmental Analyst 3
NEWMOA 1,4-Dioxane Assessment & Remediation Workshop
Lebanon, NH



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1,4-DIOXANE IN CT

- CT's Experience so far...
- Where we're finding it
- How we're treating it
- Connecticut Case Studies
- Next Steps



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1,4-DIOXANE HISTORY IN CT

2001

- White Paper by Thomas Mohr

2003

- EPA Region 1 brings it to CT's attention

2004

- CT DPH Comparison Value of 20 $\mu\text{g/L}$ for private wells

2011

- CT DPH establishes Action Levels based on IRIS updates, 3 $\mu\text{g/L}$ – Ingestion, 50 $\mu\text{g/L}$ – Dermal Contact



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1,4-DIOXANE HISTORY IN CT

2012

- CT DPH Fact Sheet produced and CT DEEP outreach at Remediation Roundtable meeting

2013

- CT DPH Lab develops new drinking water method with MDL of 0.5 µg/L – for use by DEEP and local health depts.

2013-2015

- UCMR 3 testing of Public Water Supplies

July 2015

- Question added to Completion of Investigation Form



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PROPOSED 1,4-DIOXANE CRITERIA

Preliminary Draft Criteria to be available for use upon request as Additional Polluting Substance Criteria in the near future.

Criterion Type	Preliminary Draft Criteria
Groundwater Protection Criterion	3 µg/L
Surface Water Protection Criterion	960 µg/L
Residential Direct Exposure Criterion	6.1 mg/kg
Industrial/Commercial Direct Exposure Criterion	57 mg/kg
GA Pollutant Mobility Criterion	0.1 mg/kg
GB Pollutant Mobility Criterion	0.6 mg/kg



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1,4-DX Cancer Risk in Perspective

- Range of drinking water guidelines and cleanup targets across states reflects uncertainty in underlying toxicology
- However, clear consensus that it's a carcinogen
- Toxicologists at state/fed level have closely evaluated its cancer potency
 - Two USEPA IRIS assessments in recent years
 - Dourson et al. 2014 presents one view we are well aware of
- CT DPH Action Level remains 3 µg/L
- Further questions: gary.ginsberg@ct.gov



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WHERE HAS CT FOUND IT?

Industrial Sites

Landfills

NPL sites

State Superfund sites
(CT program)

RCRA CA sites

Potable Wells –
Private &
Public



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HOW ARE WE TREATING IT?

- GAC Filter Systems + Bottled Water
- In-situ Thermal Remediation (ISTR)
- SVE
- UV/OX
- Soil Removal
- Monitoring
- ???



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CT CASE STUDIES – POTABLE WELLS

Durham Meadows NPL site

- Merriam Mfg. – 27 filters for TCE,
10 Bot Wat for 14DX
 - TCE max >200 ppb in 1990s, now 120 ppb
 - 14DX max 58 ppb in 2005, now <15 ppb
- Durham Mfg. – 25 filters for TCE & 14DX
 - TCE max 2 mg/L, now 1.3 mg/L before air stripper
 - 14DX max 7 ppb, now <3 ppb
- Soil remediation completed
- Water Main planned, 2018 completion



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CT CASE STUDIES – POTABLE WELLS

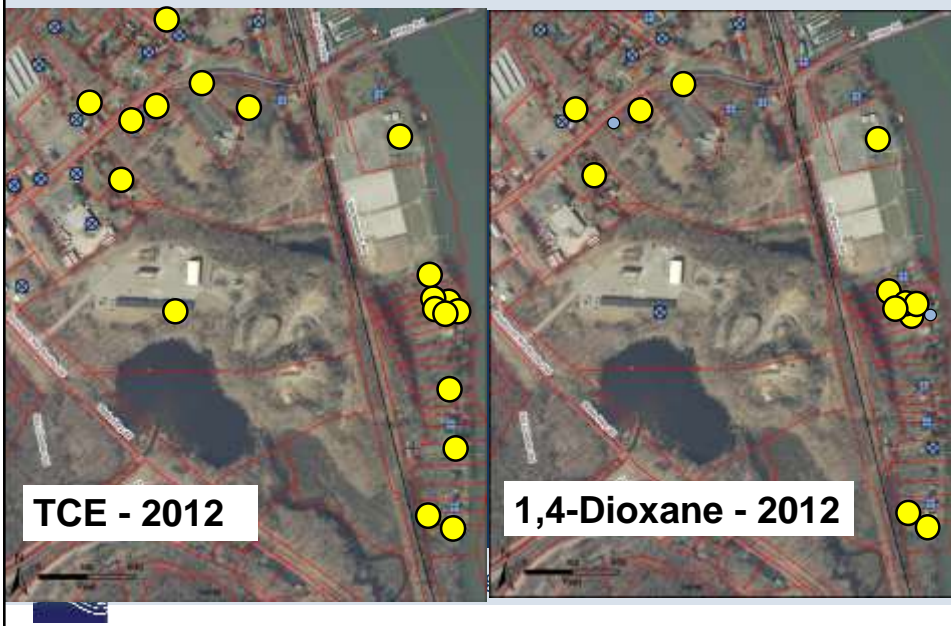
Tylerville State Superfund Site, Haddam

- 18 wells with TCE (330 µg/L)
- 11 also have 14DX up to 65 µg/L
- Both GAC filters + Bot Wat to 7 houses – rapid breakthrough a problem
- Multiple potential source areas – Phase II almost done
- Draft Water Supply Study



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TYLERVILLE – TCE vs. 1,4-DIOXANE



CT CASE STUDIES - LANDFILL

Beacon Heights Landfill Beacon Falls, NPL site

- 14DX first sampled selected MWs in 2013 for Five Year Review
 - 790 ppb 14DX in leachate discharge
 - 860 ppb max onsite
 - 65 ppb overburden offsite
 - 730 ppb bedrock offsite
- Found with 11DCA 0.7 ppb & 800 ppb chloroethane (TCA daughters)
- Future work - 3 new MWs and sample ALL wells



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CT CASE STUDIES – ISTR REMEDY

Solvents Recovery Service NPL site, Southington

- Distilled used solvents & disposed still bottoms onsite
- 4.3 mg/L 14DX in source area + VOCs, THF, PCBs, metals
- ISTR completed in 3/2015, removed almost 500,000 lbs. of VOCs in 10 months.
- Upcoming GW sampling will include 14DX. Effectiveness TBD.
- GW Pump & Treat uses UV/OX.



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CT CASE STUDIES – ISTR REMEDY

Upjohn/Pfizer/Pharmacia, RCRA CA site, North Haven

- Pharmaceutical manufacturer
- 305 µg/L 14DX
- Other COCs: 2-chloroaniline, 1,2-dichlorobenzene, PCBs, PCE, benzene, toluene, chlorobenzene
- ISTR with multiphase extraction underway.
- Effectiveness for 14DX TBD.



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CT CASE STUDIES - SVE

Henlopen, Watertown

- Manufactured plastic cosmetic cases
- **Surprise!** 14DX found in SVE effluent treating solvent releases under building
- Max in dry soil 65 mg/kg under building
- Max soil vapor 2,670 ppbv (SVE)
- Wetland: 204 µg/L in OB, 31 µg/L in BR
- CVOC NAPL in BR, site remediated to extent prudent, public water present
- **Likely 14DX source(s):** Degreaser or maybe used alone as release agent in injection molding



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NEXT STEPS FOR CT

New Additional Polluting Substance Criteria available soon

Add 1,4-Dioxane info on Remediation Division's website

Continue working with CT DPH toxicologists on standards, future Science Advisory Board

Look at more sites

Evaluate need for Industrial WW Discharge & POTW monitoring & standards



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Questions?

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1,4-Dioxane???
Oh, no!



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