

NACCHO
ANNUAL
2014

THE NEW ERA OF PUBLIC HEALTH

JULY 8-10 | ATLANTA

Science

Innovation

Policy

You Can Make A Difference

**University Students, Faculty, & Practitioners
from the US & Abroad Provide Assistance
Following the Elk River Spill**

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Public Health
Prevent. Promote. Protect.

7 Days After the Spill: We drove to West Virginia and Teamed with NGOs



*Rob Goodwin
WV Clean Water Hub*



*Maya Nye
PCACS*

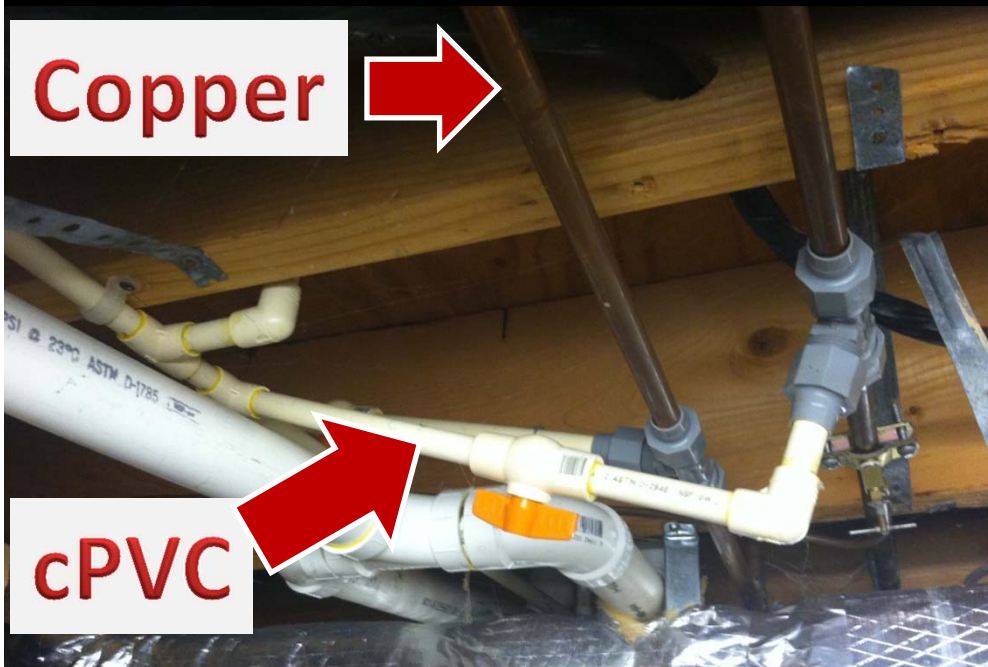
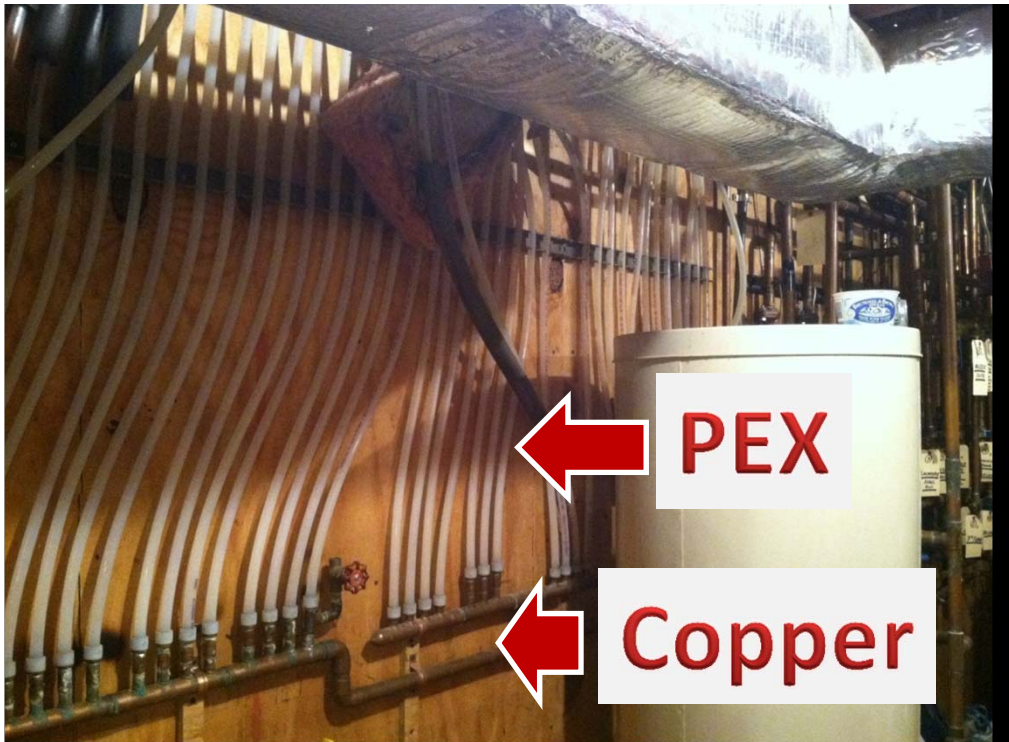
On the Ground... in Affected Homes

Resident interviews

In-home testing

Home flushing

Residential Plumbing Systems were Complex



OUR MODIFIED FLUSHING RECOMMENDATIONS

Shutoff hot water heater and allow to cool before flushing

Flush 1 room at a time

Use fans and open all windows to expel air

Flush, not once, but multiple times

WEST VIRGINIA WATER CRISIS

<http://westvirginiawatercrisis.wordpress.com>



Krista
Bryson

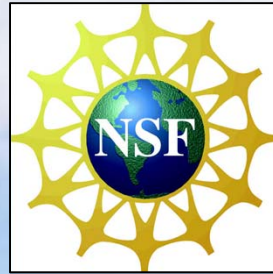


WEST VIRGINIA WATER CRISIS: EXCLUSIVE
CRUCIAL INFORMATION
ABOUT FLUSHING

YOUR QUESTIONS ANSWERED: FLUSHING
RECOMMENDATIONS, WATER AND WATER
SYSTEMS SAFETY, AND HEALTH CONCERNS



January 25, 2014



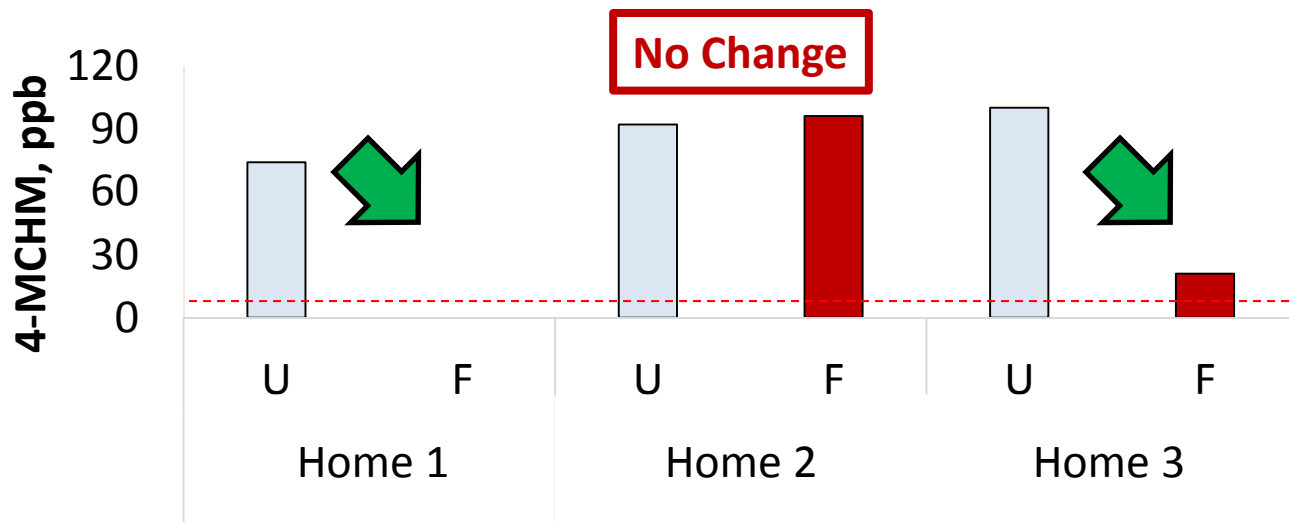
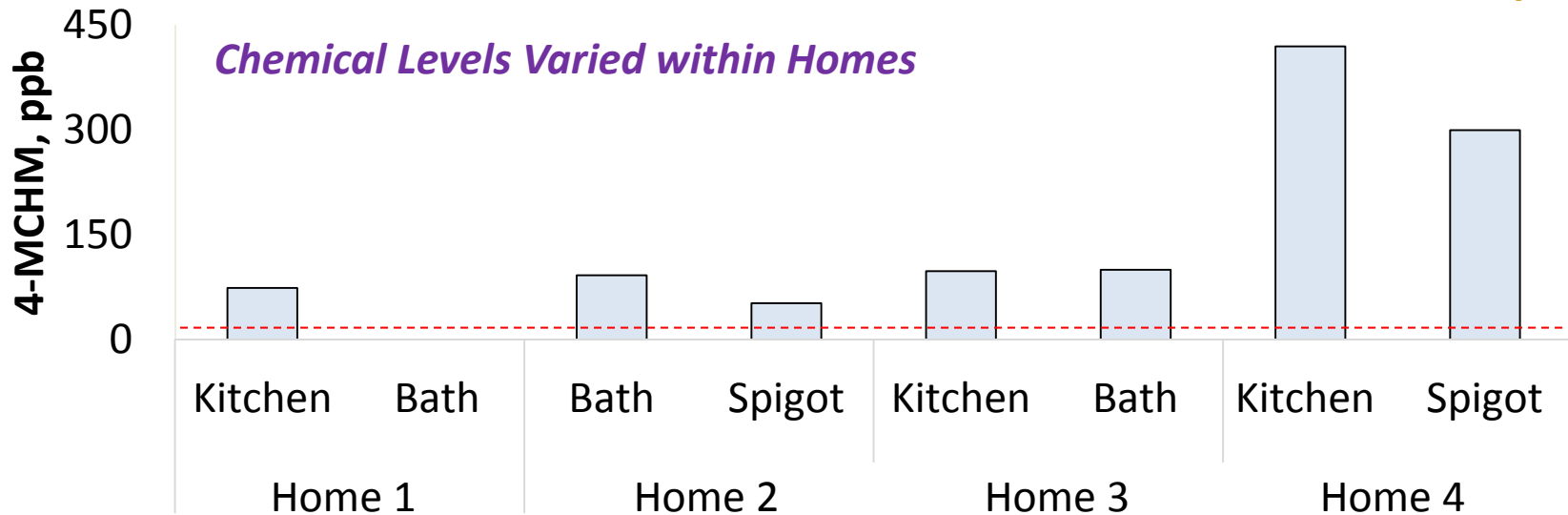
Within Days After Our Involvement:

National Science
Foundation Awarded
us *RAPID* Funding,
CBET # 1424627



Our In-Home Tap Water Test Results

[At the time, No other in-home data publicly available]



*Flushing
Had
Mixed
Effectiveness*

31 Days after Spill: *An Emergency Authorization* by West Virginia Governor Tomblin and Bureau of Public Health



\$762,000

<http://www.WVtaprogram.com>

15+ independent experts from USA, Israel, and the UK

Environmental engineers, statistician, microbiologist, chemists, toxicologists, information systems/data manager, water utility representative, professors, commercial laboratories, environmental lawyer, drinking water odor, water treatment, and materials experts, plumbing system specialists

Designed approach to answer public questions

Evaluate the [health] safety factor for MCHM



Conduct in-home tap water testing pilot program

Determine the odor threshold for MCHM (and breakdown prod)

Health Effects Expert Panel Review of Drinking Water Screening Levels

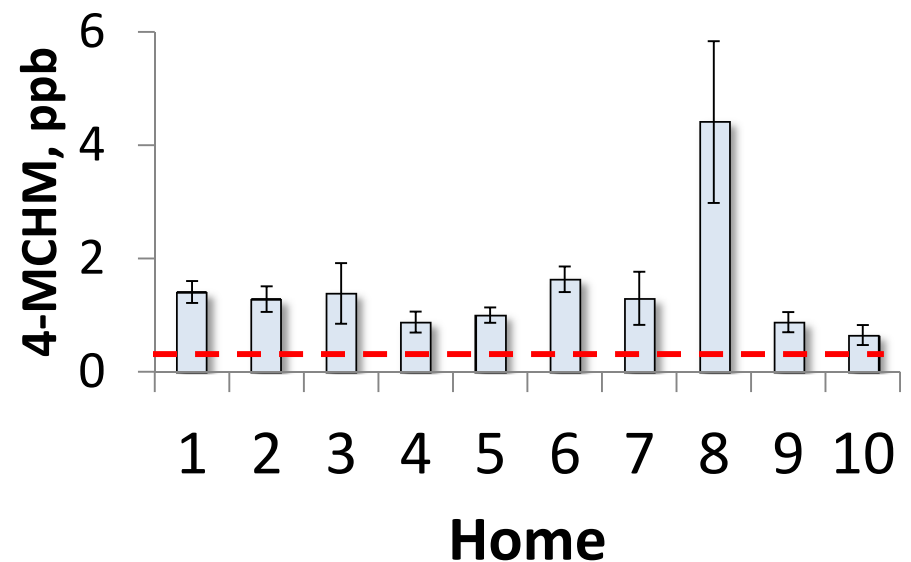


Based on very limited toxicity data; no chronic studies

Compound & Assumption	 (January 2014)	 (March 2014)
4-MCHM	1,000	120
PPH	1,200	850
DiPPH	1,200	250
Duration	14 days	28 days
Most sensitive population	1 year old child	Formula fed infant
Exposure routes	Assumed ingestion most conservative	Ingestion, inhalation, dermal

Odor, Breakdown Products, & The 10 Home Study

- ✓ Crude MCHM odor found at ≤ 0.15 ppb
- ✓ Mystery GCMS chromatogram peaks
- ✓ All homes had 4-MCHM ≤ 6.1 ppb
- ✓ Temp, Location = No difference
- ✓ Lab selected mattered
- ✓ Water plant filters still tainted 2.5 months after spill



Final Report: Key Recommendations



In-Home Sampling Plan

Of >90,000 buildings.... 720 homes (0.82% of total) needed to be sampled

Statistically defensible

Recommendations

Additional in-home testing
State and local agencies must train

Research needed

- Chronic toxicity determination
- Upstream chemical threat inventory
- Plumbing system decon and flushing guidance
- And more..



WV TAP FINAL REPORT

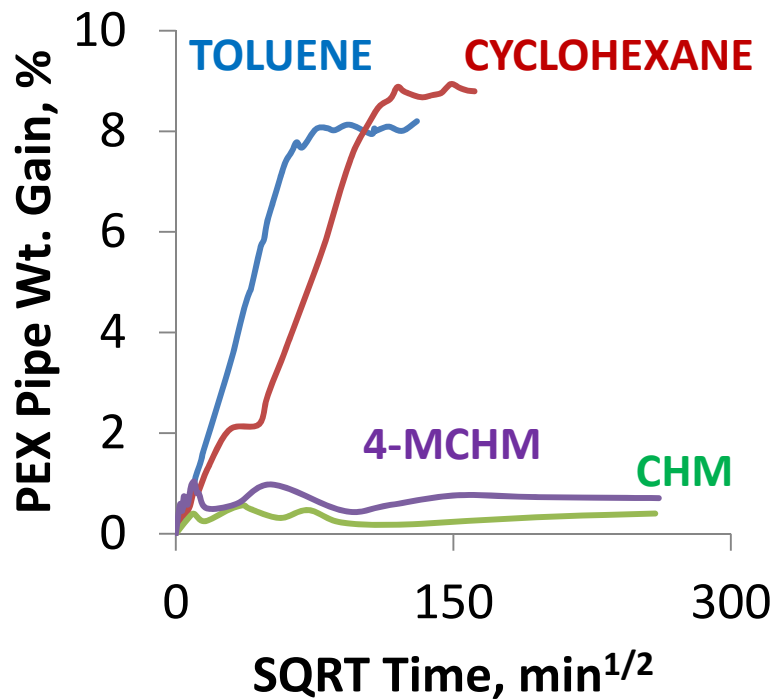
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Today, We Can Report New Results

Some, but Limited, Plastic Pipe Permeation



Plumbing systems contain a host of other plastics: gaskets, pipes, coatings...

CRUDE MCHM More Toxic than Reported

Eastman D. magna Results

Document	EC ₅₀ , mg/L	NOEC, mg/L
2011 MSDS	98.1	40
2005 MSDS	98.1	40
1998 Tox report	98.1	50

South Alabama	~50	6.25
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How Much Faith Should We Put in Existing Toxicity Results?

CRUDE MCHM 48-hr

D. Magna Acute Toxicity Test

Parameter	Eastman (1998)	Novy & Whelton (2014)
Water Chemistry		
Water pH	7.90	7.80-8.00
Alkalinity (mg/L as CaCO ₃)	89.8	89.8 ± 5
Hardness (mg/L as CaCO ₃)	123	123 ± 5
Method Description		
Species Tested	<i>Daphnia magna</i>	Same
Replicates	2	Same
Sample Size	20	Same
Photo Period	16 hrs light/ 8 hrs dark	Same
Length of Tox Test	48 hrs	Same
Number of Tox Tests Performed	1	3
Concentrations Tested*	100, 50, 25, 12.5, 6.25	Same
Reported Results		
EC ₅₀ (mg/L)**	98.1	Approximately 50
NOEC (mg/L)***	50 (1998), 40 (2005)	6.25

How Can You Plan to Respond to a Similar Drinking Water Disaster?

- ✓ **Conduct legitimate exercises** with nearby water utilities
- ✓ **Identify your hazards** upstream and nearby
- ✓ **Remain flexible**, adapt to the situation and questions
- ✓ **Immediately test** in-home exposure locations
- ✓ **Pilot flush buildings** *before* directing others to do so
- ✓ **Find or generate** toxicity data, chemical properties
- ✓ **Don't be afraid to ask** non-Government experts

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You Can Make a Difference!

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