ORSANCO’s Role in Source Water Protection, Emergency Response and the Protection of Drinking Water Utilities

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Source Water Protection and Emergency Response
Ohio River Valley Water Sanitation Commission
5735 Kellogg Avenue, Cincinnati, OH 45228
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Length – 981 miles
Area – 220,000 mi.²
Flow: 46 – 268 KCFS
Stage: 13 – 39 ft

Flow: 3 – 20 KCFS
Stage: 13 – 26 ft

Pop. 25,000,000
Ohio River – Industrialized River

- >600 permitted discharges
- 1350 combined sewage overflows
- Hundreds of tank farms, pipelines and chemical barges
- 144 industrial intakes
- 33 drinking water intakes
- Provide drinking water to >5,000,000
ORSANCO Source Water Protection
Program Integration

WATER QUALITY MONITORING & ASSESSMENT

INTER-AGENCY COMMUNICATION

EMERGENCY RESPONSE
Organics Detection System

- Established 1978 after carbon tetrachloride release
- ORSANCO worked with water utilities to develop system to detect volatile organic chemicals
- 7 initial stations developed
- 13 stations by 1985
- 16 active stations today monitor more than 1,000 mi. of river
- >4,500 raw river water samples analyzed in 2013
- Congressionally directed funds appropriated in 2008 to upgrade entire system
Drinking Water Intakes

ORSANCO
Organics Detection System Installations

NY
PA
IL
IN
OH
KY
WV
VA
NY PA

ORSANCO
Organics Detection System Installations

 PITTSBURGH

 Allegheny R.
 Monongahela R.

 Wheeling

 Allegheny R.
 Monongahela R.

 Drinking Water Intakes

 ODS DW/IW intakes GC/MS capability DW ODS Intakes Online Process GC ODS sites w/ existing instrumentation

 Allegheny R.
 Monongahela R.

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 Allegheny R.
 Monongahela R.
Thermo Gas Chromatograph with Mass Spectrometer Detector (GC/MS)
Inficon CMS 5000
## New ODS Analyte List

- Methylene Chloride
- 1,1 Dichloroethylene
- 1,1 Dichloroethane
- Chloroform
- 1,1,1 Trichloroethane
- Carbon Tetrachloride
- Benzene
- Trichloroethylene
- 1,2 Dichloropropane
- Dichlorobromomethane
- Toluene
- Tetrachloroethylene
- Dibromochloromethane
- Ethylbenzene
- Chlorobenzene

- Styrene (co-elutes with o,p xylenes)
- Bromoform
- 1,3 Dichlorobenzene
- 1,4 Dichlorobenzene
- 1,2 Dichlorobenzene
- Acrylonitrile
- 1,2 Dichloroethane
- trans-1,2 Dichloroethylene
- cis-1,3 Dichloropropene
- trans-1,3 Dichloropropene
- Hexachloro-1,3-butadiene
- 1,1, 2,2 Tetrachloroethane
- 1,1,2 Trichloroethane
- Trichlorofluoromethane
- Napthalene
Elk River/MCHM Spill
January 9th- 23rd, 2014
Elk River Spill Timeline

- **8:15 am, Jan. 9th**, West Virginia Department of Environmental Protection officials received air complaints concerning odor around Freedom Industries Storage Tanks

- **10:30 am, Jan. 9th**, employees with Freedom Industries discovered coal processing chemical 4-methylcyclohexane methanol (MCHM) has leaked from a steel storage tank into the Elk River, just 1.5 miles upstream of the intake for West Virginia American Water

- **12:00 pm, Jan. 9th**, WV DEP personnel arrive on site to investigate

- **12:05 pm, Jan. 9th**, Freedom Industries called state hotline to report leak
Elk River Spill Timeline

- By 4 pm, Jan. 9th, West Virginia American Water’s carbon filtration system was not able to remove the MCHM.
- At 5:45 pm, Jan. 9th, West Virginia American Water issued a “do not use except for toilet flushing and fire fighting” order.
- 300,000 people in 9 counties are impacted.
- The ban lasts as long as 10 days for some residents.
- 10,000 gallons of crude MCHM were released into the Elk River.
4-methylcyclohexane methanol (MCHM)

- A chemical foam used to wash coal and remove impurities that contribute to pollution during combustion.
- Very strong licorice-like odor.
- MCHM is not considered a "hazardous chemical".
- Minimal health and safety data on the chemical.

[Poster saying: AT LEAST MY COAL IS CLEAN]
Affected Counties

2014 Elk River chemical spill affected areas
Elk River/Freedom Industry Release
Elk River/Freedom Industry Release
Elk River/Freedom Industry Release
Freedom Industries Storage Tanks
Elk River/Freedom Industry Release

Winfield Locks and Dam
KRM 31.1
Winfield Locks and Dam
MCHM Concentrations

- **Winfield**
- **Winfield Est.**

Winfield first detection: Jan 11, 0230; last detection: Jan 11, 1600.
Est. 50 hour duration

Kanawha River, Winfield L & D
Kanawha River Mile 31 = 29 river miles
Winfield – Huntington Comparison

KRM 31    ORM 304 = 99 river miles

MCHM Concentrations

- Winfield
- Winfield Est.
- Huntington

Concentration, ppm

Elapsed Time from Initial Detection (hours)
Winfield – Huntington Comparison

KRM 31   ORM 304 = 99 river miles

MCHM Concentrations

Huntington first detection Jan 12, 1630; last detection Jan 14, 0355.
35 hour duration
Huntington - Cincinnati
ORM 304 ORM 463 = 159 river miles

MCHM Concentrations

Cincinnati first detection
Jan 15, 0700; last detection
Jan 16, 0300.
20 hour duration
Huntington - Cincinnati - Louisville
ORM 304 ORM 463 ORM 600 = 296 river miles

MCHM Concentrations

Louisville first detection Jan 17, 2015; last detection Jan 17, 2015.
10 hour duration
MCHM Plume Behavior

MCHM Concentrations

- Huntington
- Cincinnati
- Louisville

Concentration, Ppb

Elapsed Time from Initial Detection (hours)
MCHM Plume Behavior

MCHM Dilution and Decay

Elapsed Time from Initial Detection (hours)
Tracking MCHM in the Ohio River
ODS and Threshold Odor Detections

Wednesday, Jan 16th, 0700

Sunday, Jan 12th, 1300

Friday, Jan 17th, 0530

Saturday Jan 11th, 0230

Sunday, Jan 19th, 2330

Thursday, Jan 9th, 1200

Wednesday, Jan 16th, 0700

Sunday, Jan 12th, 2139

Tuesday, Jan 15th, 0600

Monday, Jan 13th, 0300

Monday, Jan 13th, 1400

Thursday, Jan 23rd, 1000

Huntington – Portsmouth = 14 hrs @ 2.7 mph
Emergency Response Cooperation

- WVDEP
- WV American Water
- WV DHHR
- PA AM Water
- KY DOW
- KY Office of DW/ER
- OH EPA
- OH Office of DW/ER
- Cincinnati Water Works
- Louisville Water Co.
- IDEM DW/ER
- Evansville Water
- ILEPA/ER
- IL American Water
- USCG Huntington
- USEPA 3, 4, 5
- ODS & H2O utilities
Ohio River Focus Groups
Four Ohio River Focus Groups

- Upper River
  - Regions 3 - 5
  - Together 14 years!

- Huntington Area Spill Coordination Group
  - Newest, one meeting so far, second one scheduled

- Cincinnati Area Focus Group
  - 3 years, incident action plan

- Great River Spill Response Group
A Spill of National Significance

ENROLLED
COMMITTEE SUBSTITUTE
FOR
COMMITTEE SUBSTITUTE
FOR
Senate Bill No. 373

Passed State Legislature
March 8, 2014

AN ACT to amend and reenact §16-1-2 and §16-1-9a of the Code of West Virginia, 1931, as amended; to amend said code by
Senator Manchin

S. 1961

To protect surface water from contamination by chemical storage facilities, and for other purposes.

April 3, Senate Environment and Public Works Committee - unanimously!

To protect surface water from contamination by chemical storage facilities, and for other purposes.
113th Congress
2d Session

H. R. 4024

To protect navigable waters from contamination by chemical storage facilities, and for other purposes.

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In the House of Representatives

February 10, 2014

Mrs. Capito introduced the following bill, which was referred to the Committee on Transportation and Infrastructure

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A BILL

To protect navigable waters from contamination by chemical storage facilities, and for other purposes.
What do they do?

- Directs States to establish new oversight and inspection programs aimed at chemical storage facilities.
  - Unfunded
- Notification of downstream public water supplies
- All chemical inventory information to state agency
  - Make available to drinking water utilities