Responding to an Upstream River Spill
GCWW’s Approach to the Elk River WV Spill

August 27, 2014
One Water Conference

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Greater Cincinnati Water Works
Spill Summary

- Thursday January 9, 2014: At least 10,000 gallons of an industrial chemical 4-Methylcyclohexanemethanol (MCHM) are spilled into the Elk River, a secondary tributary of the Ohio River

- The MCHM was taken into the Kanawha Valley Drinking Water Plant (1.5 miles downstream) where it was subsequently distributed to drinking water customers

- “Do Not Use” orders are issued for roughly 300,000 people

- Because of the Do Not Use order, media coverage was intense

- Spill continued over 200 miles downstream to Cincinnati passing 8 other drinking water intakes along the way before reaching Cincinnati.
Elk River, Charleston, WV
Kentucky
Ohio
West Virginia

Cincinnati to
Beckjord – 10 miles
Meldahl – 25 miles
Huntington – 157 miles
Elk River – 250 miles

Beckjord Power Station
Meldahl Dam
Huntington, WV
Elk River, Charleston, WV
RMTP Treatment Today

Plant Capacity: 240 MGD
Average Pumping: 110 MGD

Clarification
Turbidity / Microbial Removal

Natural and Synthetic Organics Removal

Disinfection, Fluoridation, Corrosion Control Inhibitors
GCWW Initial Response

- GCWW was notified by ORSANCO of the spill on the Evening of Thursday January 9 (the same day as the spill).

- Preliminary Estimated Time of Arrival – middle of following week

- On Friday morning an internal task team (Primarily Water Quality and Supply Divisions) was formed to respond.

- We initiated further communication with ORSANCO and Northern Kentucky Water District.

- Friday we received a sample of the actual “crude” MCHM

- Our Public Information Officer coordinated interaction with the Media
So What Did We Know?

- **MCHM – 4-Methylcyclohexanemethanol**
  - Used as chemical foaming agent
  - Removes impurities from coal
  - Not Regulated in Drinking Water
  - Smells like Licorice
  - There were several thousand gallons of it headed our way!
So What Did We Need to Know?

- When would it get to us?
- Treatment Information?
- Toxicity Information?
- Reactivity with treatment chemicals (could that make it more dangerous)?
- Degradation products (what will it degrade to)?
- How to analyze for it?
- Odor thresholds?
- Other chemicals mixed with it?
Incident Report Excerpt

*Report taken by: CIV KEVIN WILLIAMS at 19:16 on 09-JAN-14
Incident Type: STORAGE TANK
Incident Cause: UNKNOWN
Affected Area: ELK RIVER
Incident occurred on 09-JAN-14 at 10:47 local incident time.
Affected Medium: WATER  ELK RIVER

REPORTING PARTY
Name: WILLIAMS
Organization: NATIONAL RESPONSE CENTER
WASHINGTON, DC

PRIMARY Phone: (800)4248802
Type of Organization: FEDERAL GOVERNMENT

SUSPECTED RESPONSIBLE PARTY
Name: UNKNOWN
Organization: WEST VIRGINIA AMERICAN WATER

INCIDENT LOCATION
ELK RIVER  County: KANAWHA
1015 BARLOW DRIVE
State: WV

RELEASED MATERIAL(S)
CHRIS Code: MCY  Official Material Name: METHYLCYCLOHEXANE
Also Known As: METHYLCYCLOHEXANE
Qty Released: 0 UNKNOWN AMOUNT
Qty in Water: 0 UNKNOWN AMOUNT
Intense Media Coverage and the Phones Kept Ringing!
Response Strategy

- Work closely with NKWD and ORSANCO
- Treat water from the reservoirs and suspend raw water intake while the “slug” passed on Ohio River.
- Determine treatment options
- Develop analytical methods with detection limits as close as possible to the odor threshold
- Refine time of arrival and estimate the concentration
- Use upstream monitoring to indicate when to stop raw water pumping
- Monitor water quality at the GCWW intake to determine when slug passed
Continued Treatment While Raw Water Pumping Suspended

Approximately 300 Million Gallons
Preparing for Intake Shutdown

- Method Development
- Laboratory Analysis
- Odor Testing
- Jar Testing
- Ohio River Sampling Plan
Jar Tests - PAC

- Researched Treatability with PAC
- Initial anticipated MCHM concentrations: > 500 ppb.
- Performed jar tests over the weekend to determine effective dose of powdered activated carbon
  - Tested MCHM @ 40 ppb, 400 ppb
  - Multiple PAC doses
- Results:
  - PAC effectiveness – independent of MCHM concentration.
  - Need
    - 100 lbs/MG for 80% reduction
    - PAC contact time with water is critical.
Response Summary

- GCWW Received initial notification on Thursday (Jan 9th). Conducted initial evaluation in accordance with spill response SOP.
- Organized Response Task Team. Developed initial strategy and commenced research and preparation.
- Refined analytical methods to 4 ppb detection limit, conducted treatability analysis.
- Refined arrival time estimates; continued to refine as new information became available.
- Started upstream monitoring. Detected MCHM at a point 25 miles upriver from intake on Tuesday. Started PAC feed prior to first detections as precaution.
- Stopped raw water pumping for 38 hours; continued monitoring.
- Fed PAC for 5 days after last detection as a precaution.
What Made GCWW’s Spill Response Successful?

- Existing response plan for river spills
- Excellent cooperation between GCWW, NKWD, ORSANCO, and others
- Well-trained, qualified & dedicated staff
- Advanced in-house analytical capabilities
- Time to prepare
Things All Utilities Can Do.....

- Implement a Source Water Protection Program
- Develop a spill response plan
- Create and/or strengthen relationships with upstream industries and utilities
- Develop relationships with local health departments, and local and regional experts
More Things All Utilities Can Do

- Prepare for Media Inquiries, try to keep the public informed!
- Pre-identify sources for chemical information (regulatory limits, health advisories, toxicity, treatment techniques, chemical properties)
- Understand your analytical resources/capabilities
Some Pointers....

- Be prepared for inaccurate spill information
- Always assume you have less time than you think you have
- Ensure an adequate supply of emergency sampling bottles
- Document, Document, Document
- If Spill is high profile, prepare for media attention
- Prepare for “round the clock” staffing needs
- Contact the OEPA, they may be able to provide ideas for resources
Don’t forget the People Part!
Fallout from the Spill

- New State Law in West Virginia:
  - West Virginia Senate Bill 373 passed 3/8/14
    - AST Registration by 10/1/2014
    - New AST permitting
    - AST inspections
    - Requirement for PWS to conduct Inventory of potential sources of significant contamination in ZOCC
    - PWS *must* submit source water protection plans for review
    - Notification and monitoring requirements
At the National Level.....
A Few Web Resources

- Resources on health effects and health advisories
  - [www.CDC.gov](http://www.CDC.gov)

- Treatability
  - [http://iaspub.epa.gov/tdb/pages/general/home.do](http://iaspub.epa.gov/tdb/pages/general/home.do)

- Regulatory Limits/Health Advisories
  - [http://water.epa.gov/drink/contaminants/index.cfm](http://water.epa.gov/drink/contaminants/index.cfm)
QUESTIONS??