Chemical Spill Case Study: Wake-Up Call for Drinking Water Protection

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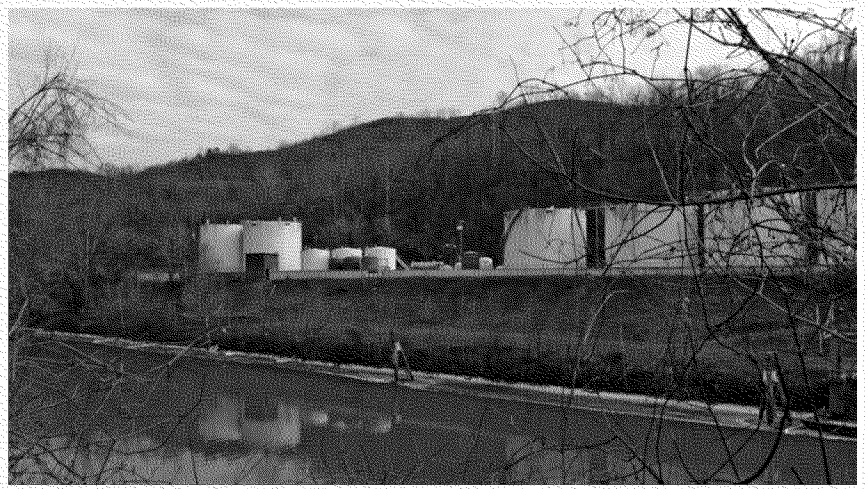
Case Study—Spill Event

- Release of estimated 10,000 gallons of MCHM* to Elk River discovered 1/9/14
- MCHM detected at intake and post-filters at Kanawha Valley water treatment plant—1½ miles downstream
- Water system already stressed by winter weather issues, determines closing intake would cause pressure loss, compromise sanitation & fire-fighting capacity
- WV American issues Do Not Use instructions to customers
- Governor Tomblin declares State of Emergency affecting 9-county area



*On 1/21/14, est. 750 gals PPH & di-PPH reported to have been in released fluid mixture

Immediate Chemistry, Toxicology & Logistical Challenges

- Very limited toxicological information available to assess human health risks and aquatic life impacts of MCHM
- CDC/ATSDR advises WV Bureau for Public Health, develops provisional health protection screening level for short-term MCHM exposure (1 ppm)
- Quantitative analytic methods developed collaboratively (industrial, water, public health sectors)
- Numerous laboratories engaged and trained to analyze distribution system water samples with rapid turnaround
- National Guard organizes sampling and analysis effort, bottled and bulk water distribution in 3,000-sq mi service area

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* CDC/ATSDR later develops screening level of 1.2 ppm for PPH and di-PPH

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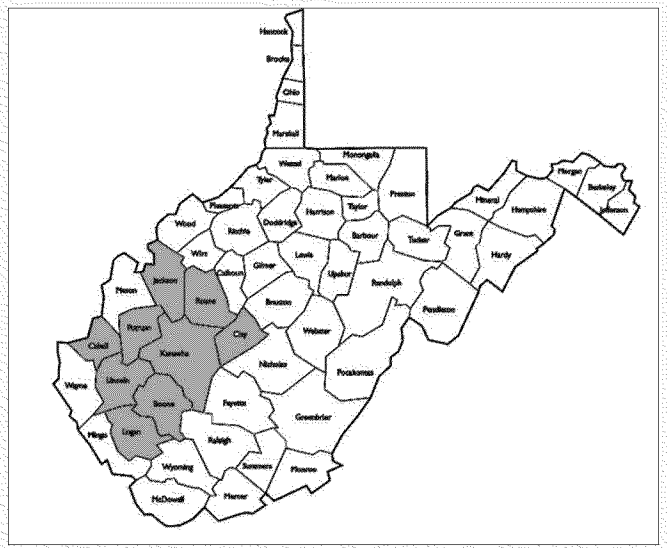
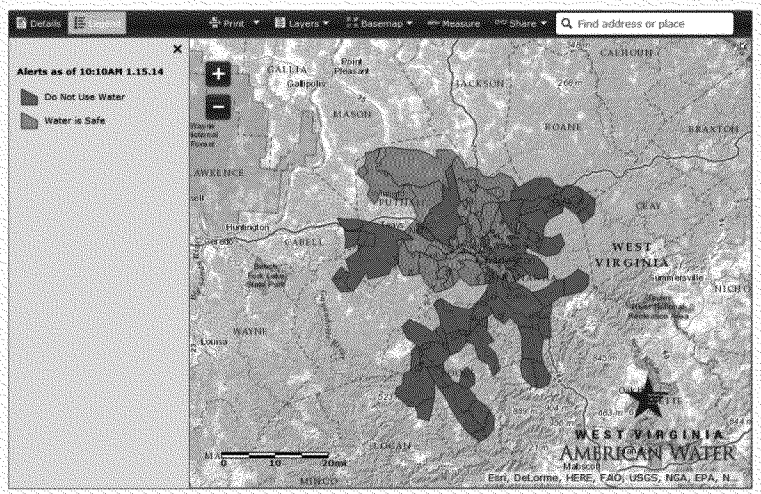
Response Actions and Reactions

- WV American conducted aggressive flushing program to clear system (MCHM < 1 ppm)
- Customers instructed to flush premise plumbing as pressure zones were cleared & Do Not Use status was sequentially lifted
- Sampling results:
  - <1 ppm throughout system by 1/18/14
  - < 0.010 ppm by 2/20/14
  - < 0.002 ppm by 3/3/14
- Characteristic MCHM odor threshold much lower than health-based target levels, resulting in continuing customer concern
- State of Emergency ends 2/28/14





Answers to Frequently-Asked Questions

- Source water assessment completed by WV BPH in 2002:
  - identified site as potentially significant source of contaminants (at the time, characterized as a petroleum manufacturing site)
  - recommended next steps in source protection planning, including Contingency Plan, Alternative Source plan, and Management Plan
  - 2006 update by WVAMCo outlined activities associated with emergency/contingency planning
- Regulatory coverage of above-ground storage tank through NPDES stormwater permit (general permit)
  - Secondary containment existed, was compromised
- Sampling results published to website on daily basis
- MCHM has specialized and relatively broad use, but information is lacking on toxicology, some aspects of chemistry

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Response Actions and Reactions (continuing)

- Governor announces Tap Assessment Project (WV TAP) 2/11/14
  - Residential sampling program
  - Independently evaluate toxicology information, safety factor
  - Development of MCHM odor threshold
- Governor signs Water Resources Protection Act – 4/1/14
- Drinking water system monitoring continues, and sampling occurs as follow-up to customer complaints
- Customer concerns persist about water safety and potential health impacts
- Business, industry and government have suffered financial impacts
- Social impacts include disruption in normalcy, basic services, routine; loss of confidence in public institutions and services

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WV Water Resources Protection Act

- Requires updated source water protection plans for water systems with surface water intakes (or ground water under the influence of surface water) by 7/1/16, to include:
  - Public engagement
  - Response plan to contamination of supply
  - Assessments of current and potential water storage capacity; alternative sources/intakes/emergency inter-connections; ability to close intake, duration
  - List of potential sources of significant contamination within zone of critical concern (provided by WV DEP, WV BPH, and WV DHSEM)
  - Feasibility of implementing an early warning system monitoring system
- Bureau for Public Health to hold public hearing, act on each source water protection plan within 180 days of submittal
- Systems must update plans every 3 years
- Utility monitoring for highest risk contaminants in water supply: salts or ions; metals; polar organics; nonpolar organics; VOCs, oils & other hydrocarbons; pesticides; biotoxins

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WV Water Resources Protection Act (cont'd)

- Potential study of long-term health effects of exposure
- Creates requirements for above-ground storage tanks (>1320 gallons, with some exemptions)
  - Inventory and registration of all ASTs (location, capacity, age, distance to well/intake); identify applicable existing requirements
  - State to develop AST program, including standards/requirements for design, construction, maintenance, leak detection, reporting, and corrective action; annual inspections; spill prevention response plan

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Considerations for Source Water Protection
"Now that we have your attention…."

- Demonstrated fundamental dependence on safe water for health, normal community functions/operations (e.g., hospitals, schools), commerce, security
- Source water quality is basic raw material & can't be taken for granted
- Consider source water assessments/protection plans living tools
  - changes from baseline, newer tools & technology
  - Use all tools available (GIS, databases, communications)
  - Search wide, dig deep; consider regulated & unregulated sources
  - Collaborate, share information at all levels
- Establish protection priorities (e.g., geography, threat, sector)
- Consider "what if" scenarios in protection strategies, response and contingency plans

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Starting the Brainstorm: Potential SWC Actions

- Develop case study synopses to illustrate impacts and costs when contaminants impact water quality (include catastrophic and routine, less notorious examples)
- Emphasize value of collaboration at multiple levels (local, state), and beyond CWA-SDWA Toolkit (RCRA, Superfund, EPCRA, etc.)
- Enhance “How-to-Collaborate” Toolkit with examples of specific actions to achieve protection (e.g., BMPs, chemical inventories and water treatment options, communication networks, etc.)
- Investigate potential effort/campaign with/for specific target groups (utilities, local governments, LEPCs)
- Investigate broad-based threats with potentially significant risk (e.g., transportation, pipeline integrity) – white papers?

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