ORSANCO Spill Response

Joint RRT4/5 Meeting

October 16-18, 2018

Ohio River Valley Water Sanitation Commission

- Established by Compact (1948)
- Ratified by Congress
- Eight signatory states
  - IL, IN, NY, KY,
    OH, PA, VA, WV

What We Do

- Our mission is to protect the uses of the Ohio River.
- We monitor the river to assess if it is:
  1. Safe for drinking water
  2. Safe to recreate
  3. Safe to eat the fish
  4. Safe for aquatic life
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Role in Spill Response

- Communications
- Time-of-Travel Modeling
- Water Quality Monitoring
- Analytical Support

2016 Spills Summary

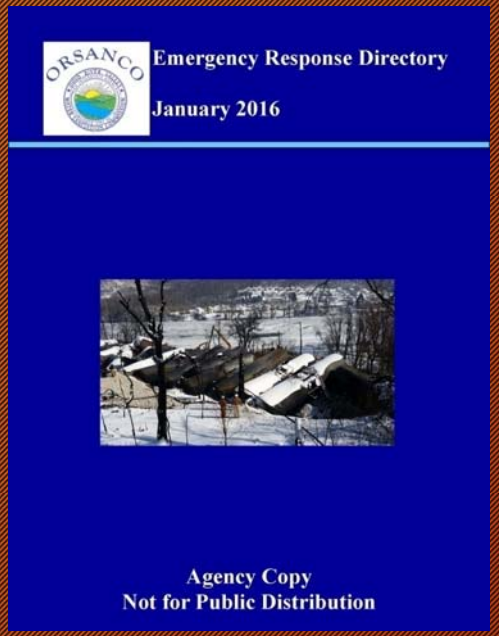
- 590 spill reports received by ORSANCO in 2016
  - Includes releases to water, air, and land
- 227 involved releases to the Ohio River or lower reaches of tributaries
  - Most were minor releases
- Most common materials released:

Material Name	# of Spills	Material Name	# of Spills
Unknown Oil	92	Motor Oil	5
Hydraulic Oil	34	Coal Slurry	3
Diesel Fuel	26	Fuel Oil	3
Crude Oil	8	Paint	3
Lube Oil	8	Bilge Slops	3
Gasoline	8	Mineral Oil	3

Communications

- Rotating 24/7 spill duty
  - Receive spill reports via National Response Center (NRC) or direct calls
- Facilitate interstate communication
  - State and Federal Agencies
  - Drinking Water Intakes
  - Industrial Intakes
  - Media

Spill Notification



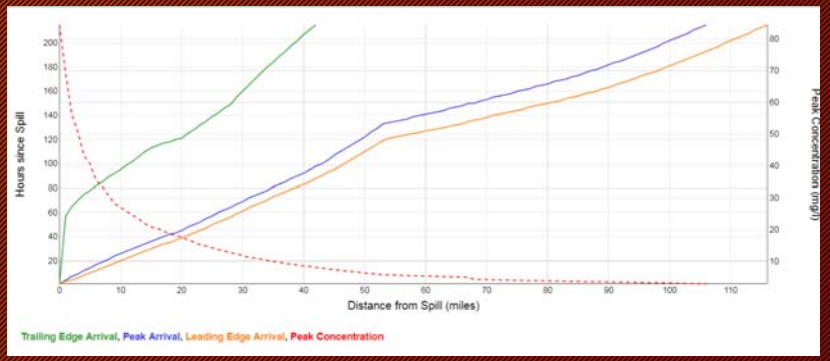
- Emergency Response Directory
  - State/Federal contacts
  - Water utilities
  - Key river features
- Spills Email Distribution List
- Phone Notifications
  - Water utilities and ER agencies
- Coordinate Conference Calls
  - Available to coordinate calls when necessary

Key Questions?

- What?
- Where?
- How much?
- Actions taken?
- Concentration?
- When will it arrive at downstream intakes?
- How long is the plume?

Time-of-Travel Modeling

- Ohio River Spill Modeling System
  - Input date, time, amount, duration, decay
  - Uses daily HEC-RAS flow file from NWS
- Predicts plume time-of-travel
  - Leading edge; peak; trailing edge
- Estimates pollutant concentration
- Utilized to:
  - Inform water utilities and others of spill location
  - Inform sampling crews where to monitor



On-River Spill Tracking

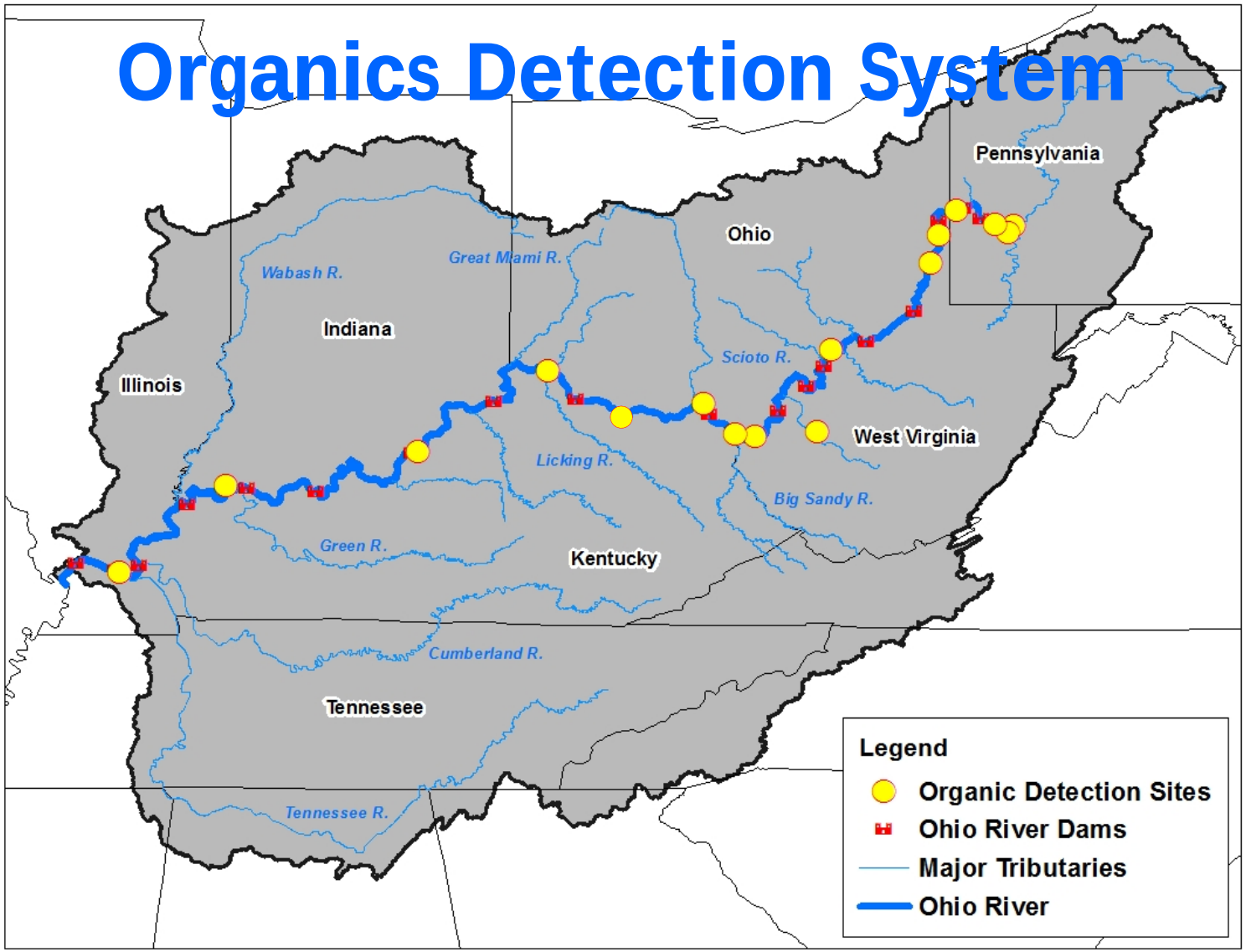
- Water quality sampling to track plume
  - Shore-based (access points, locks & dams)
  - Boat-based (safety limitations)
- Provide coordination of multi-agency sampling efforts
- Available Resources
  - Boats – flow-through monitoring
  - Multi-parameter datasondes
  - Water and sediment samplers
  - Flourometers
  - Biological sampling

Analytical Support

- Organics Detection System (ODS)
  - Daily analysis of water samples for volatile organic compounds for **spill detection**
  - 17 stations (13 mainstem + 4 tribs)
  - Detect thousands of compounds
  - Calibrated for 30 VOCs
- Provide coordination of laboratory services
  - Within ODS network
  - Contract laboratories

Gas Chromatograph Mass Spectrometer

Organics Detection System



Urea Ammonia Nitrate Barge Incident

December 19, 2017

Downstream of Cincinnati, OH

UAN Barge Incident – Initial Report

- Notification – December 19 (8:51)
  - NRC report indicated barge "cracked in half" while offloading (ORM 478.7)
  - Urea ammonia nitrate was discharging into the river
  - Amount of release initially not reported
- Offloading facility located in Ohio (Region 5)
- Ohio River owned by KY (Region 4)
- Initial response included OEPA, KY DEP, US EPA (R5) and USCG

ORSANCO Role

- ORSANCO received phone notifications from OEPA, KY DEP, USCG
- ORSANCO notified Louisville Water Company
  - Sent notification via spills distribution list
  - Additional discussions with emergency response and drinking water agencies (KY DOW, IDEM, IL EPA)
- Time-of-Travel modeling requested by KY DEP, LWC, USCG, Clifty Creek Power Plant
- Assisted with initial WQ monitoring plan development
- Conducted/coordinated WQ sampling
- Hosted daily conference focused on water quality issues

Initial Water Quality Sampling

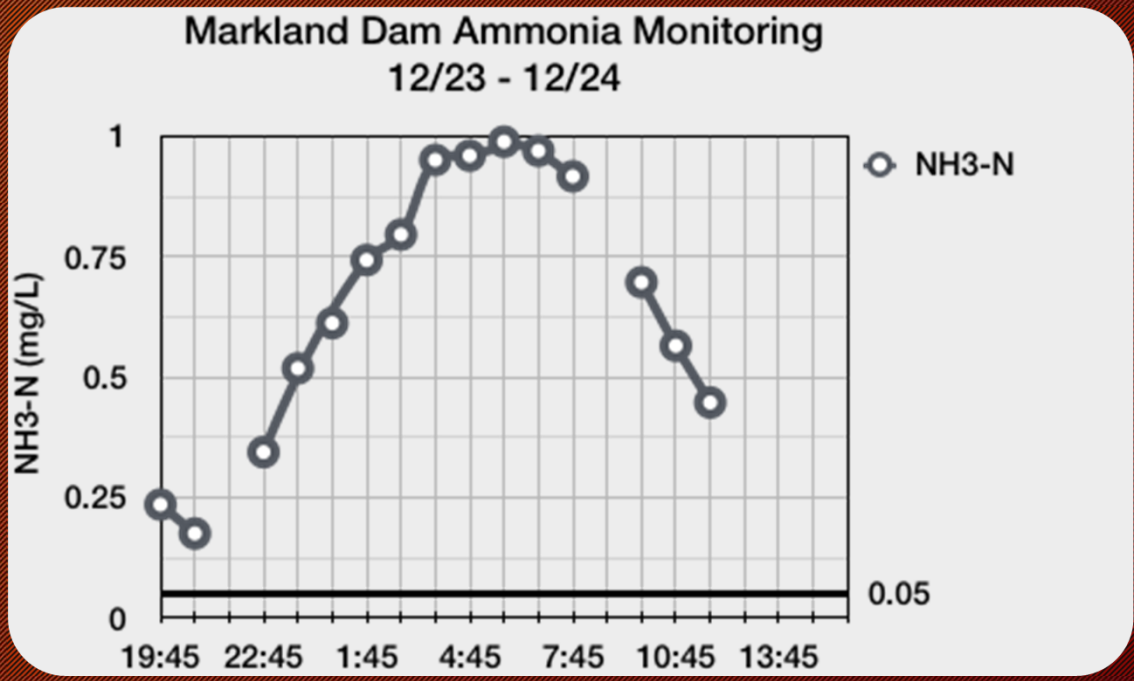
- RP's Contractor – CTEH
  - Collected WQ samples for certified analysis daily at four locations
    - Upstream, at incident location, peak locations, leading edge
    - Approached followed daily from 12/19 thru 12/23
- ORSANCO / Louisville Water Company
  - LWC raised concerns regarding ability to maintain treatment
  - Requested assistance to conduct longitudinal field screening
  - Longitudinal surveys conducted 12/20 and 12/21
  - Peak concentration dropped from 3.1 to 1.4 mg/L

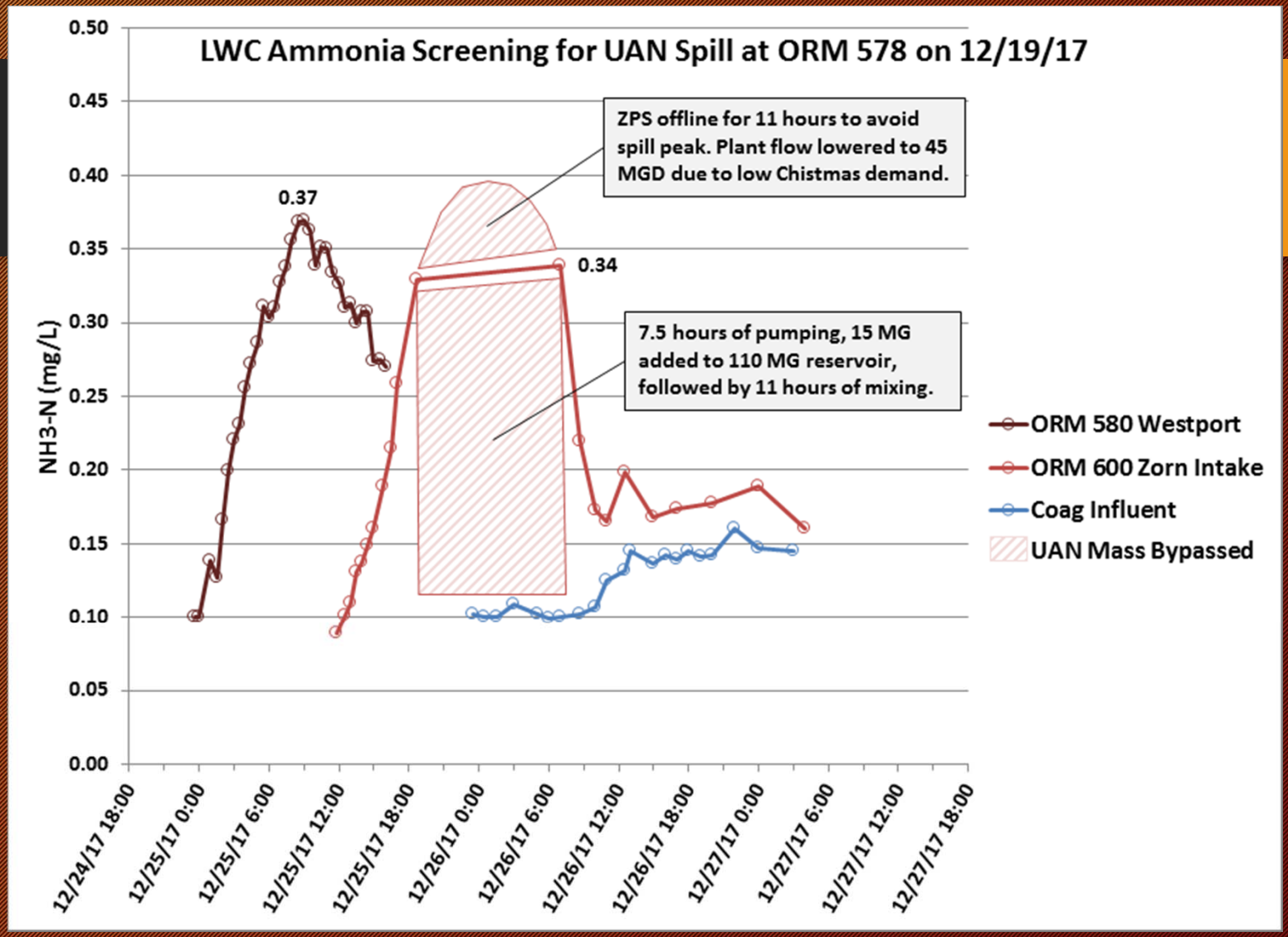
Fixed Station Monitoring

- Initial time-of-travel model estimated travel time to Louisville at 9 days (i.e. 12/28)
- Precipitation increased river velocities significantly.
  - Moved up projected arrival at Louisville by 2.5 days (i.e. mid-day on 12/25)
- Transitioned to fixed station monitoring at Markland Locks & Dam
  - CTEH sampled overnight from 12/23 to 12/24

Markland Results

- Sampling initially from lock wall; repositioned to hydro side
- First detection: 19:45 on 12/23
- Collected samples hourly
- Peaked near 1 mg/L
- Discontinued mid-day on 12/24 to transition equipment to Westport site




LWC Ammonia Screening for UAN Spill at ORM 578 on 12/19/17
ZPS offline for 11 hours to avoid spill peak. Plant flow lowered to 45 MGD due to low Chistmas demand.
7.5 hours of pumping, 15 MG added to 110 MG reservoir, followed by 11 hours of mixing.
0.37
0.34
NH3-N (mg/L)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
12/24/17 18:00
12/25/17 0:00
12/25/17 6:00
12/25/17 12:00
12/25/17 18:00
12/26/17 0:00
12/26/17 6:00
12/26/17 12:00
12/26/17 18:00
12/27/17 0:00
12/27/17 6:00
12/27/17 12:00
12/27/17 18:00
ORM 580 Westport
ORM 600 Zorn Intake
Coag Influent
UAN Mass Bypassed

Silver Linings

- Significant rain diluted ammonia concentration
- Low water demand on Christmas Day allowed LWC intake to be shut down much longer than normally possible
- Lots of time-of-travel data to calibrate spill model.

- Louisville Water, through proactive treatment management, met all compliance requirements
- Evansville also able to provide adequate treatment (peak 0.26 mg/L on 12/29)

Lessons Learned - Notification

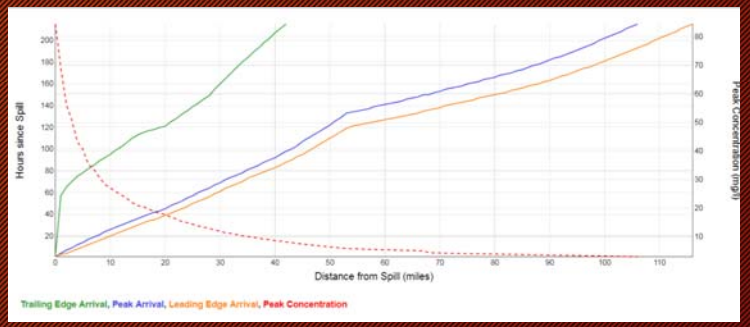
- Notifications to ORSANCO are sometimes delayed or fail to occur
- Reasons:
  1. ORSANCO is not automatically notified unless NRC report is generated.
  2. Notification for fires and transportation incidents reported to 911, but not always NRC
  3. Barge sinkings do not automatically result in generation of NRC report
  4. Reporting to NRC is requirement of responsible party. The RP may not be immediately known or notified.

Lessons Learned – On-Scene Response

- On-scene presence by ORSANCO can be helpful in some situations
- Reasons:
  1. Receive latest information first-hand from Incident Command (IC)
  2. On-site for further discussions outside of regularly scheduled IC meetings
  3. Represent water user interests at IC
  4. Visual observation of conditions and incident status can lead to improved communications and on-river response when necessary.

Lessons Learned – Modeling

- Limitations of ORSANCO spill model identified.
- Spill time-of-travel model performed very well during UAN spill incident.
- Reasons:
  1. Low-flow conditions during Parkersburg fire incident highlighted model limitation to 9-day simulation.
  2. UAN release first opportunity to validate model
  3. Estimated time-of-arrival at LWC within 1 hour of actual arrival



Lessons Learned – WQ Sampling

- Collecting WQ samples early in response is critical.
- Non-hazardous/Unregulated ≠ Not a problem
- ORSANCO resources can add to overall response capabilities.
- Reasons:
  1. Need to characterize location and magnitude of the release to determine potential severity (eliminate unknowns)
  2. Downstream users need information to make management decisions
  3. In the absence of information, decisions will be made on assumptions
  4. Assumptions may be overly conservative to ensure readiness for worst case

Lessons Learned – WQ Analysis

- Consider split-sample analyses for quicker data turn-around to inform decision making.
- Utilization of ODS labs or field methods can speed-up data turn-around
- Reasons:
  1. Certified lab analysis is typically required for spill responses
  2. Turn-around times are often measured in days
  3. Water users need information to make management decisions
  4. Split-sample analyses for certified results and screening methods can provide timely data to inform management decisions.

Lessons Learned – Communication/Coordination

- Communicating early in a response with state drinking water personnel can improve effectiveness.
- ORSANCO can play a vital role in communicating and coordinating efforts with responders and affected users.
- Reasons:
  1. Early engagement of drinking water personnel can eliminate duplication of efforts and ensures everyone is on the same page.
  2. ORSANCO can serve as the link between response personnel and affected water users.


Questions?
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