

# **BNSF Galena Derailment Response:**

## ***How it Played Out & Lessons Learned***



# Outline

**1) Chuck Pedersen, Director, Jo Daviess County EMA**

*Initial Response*

**2) Brian Brackemyer, Manager of Field Operations, IEMA**

*Build Up*

**3) Paul Ruesch, On Scene Coordinator, USEPA**

*Recovery/Remediation*





# Galena

- Jo Daviess County is in the far NW corner of IL
- The City of Galena population = 3600
- Over 90% of buildings on Historic Register
- Over 1 million visitors/year
- At time of derailment, Galena had largest number of crude oil unit trains ( $\geq 100$  tank cars) passing through county than any other county (55 trains/wk, 3m gallons/train)
- All volunteer FD (44)

# Incident

At approximately 1:25pm on March 5, 2015, 21 tank cars of a 105-car BNSF Railways train derailed near MP171.6 of the Aurora Sub in Jo Daviess County near Galena.

A fire resulted, involving cars which carried crude oil. Local, County, State, Federal and Railroad personnel responded to manage the event, focusing on:

- Life safety
- Incident stabilization
- Protection of the environment



# Dispatch Message

- At 1:46 pm, County Dispatch messages that Galena Fire & Haz Mat Team needed at Ferry Landing Crossing
- Train Derailment, 5 cars down, white puffy smoke
- First truck & Chief Randy Beadle arrive
- I arrive minutes later
- Temp ~ +10F

**WHERE IS  
THE TRAIN?**

# Initial Assessment & Attempt

- Re-staged to city park
- Sent team to find derailment location
- 3 mile drive on bike path to scene
- Identified 9 cars down, 21 derailed, oil leaking
- Firemen attempt to put out fire, at first they are succeeding
- Smoke turns from white to **black**
- Initial fire becomes larger and firemen retreat
- Huge fireball erupts
- Decision is made to call in additional aid & assistance





































# Staging Area



# Mutual Aid & Assistance

MABAS alarm & calls went out to all partners

Arriving on scene with personnel & resources:

- HAZMAT teams (Jo Daviess, Lafayette, Grant Co)
- Equipment (Dubuque, Carroll, Stephenson Co)
- EMS (Jo Daviess, Carroll, Naperville)
- Red Cross (Dubuque)
- Water trucks, Air Boats, ATVs
- Port-a-Johns, boom, fuel oil (via MOUs w/ private companies)
- Boom (USCG)
- Amplifiers, generators for radios
- Cell phone tower boosters

# State Incident Response Center (SIRC)

- ✦ Activated on March 5, 2015 at 1700
- ✦ Agencies include:
  - + Illinois Emergency Management Agency
  - + Illinois Commerce Commission
  - + Illinois Environmental Protection Agency
  - + Illinois State Police
  - + Illinois Emergency Service Management Association
  - + Illinois Department of Natural Resources
  - + Mutual Aid Box Alarm System
  - + American Red Cross
  - + Illinois National Guard
  - + Illinois Department of Transportation - Aeronautics





# Initial Response Activities

- Notifications
- Initial Response
- Rapid Needs Assessment
- Establish Safe Zone/Evacuations
- Establish IC
- Activate Mutual Aid Networks / SERC
- Public Information & Warning
- Public-Private Sector Integration
- Damage/Impact Assessments
- Immediate /Short Term Planning



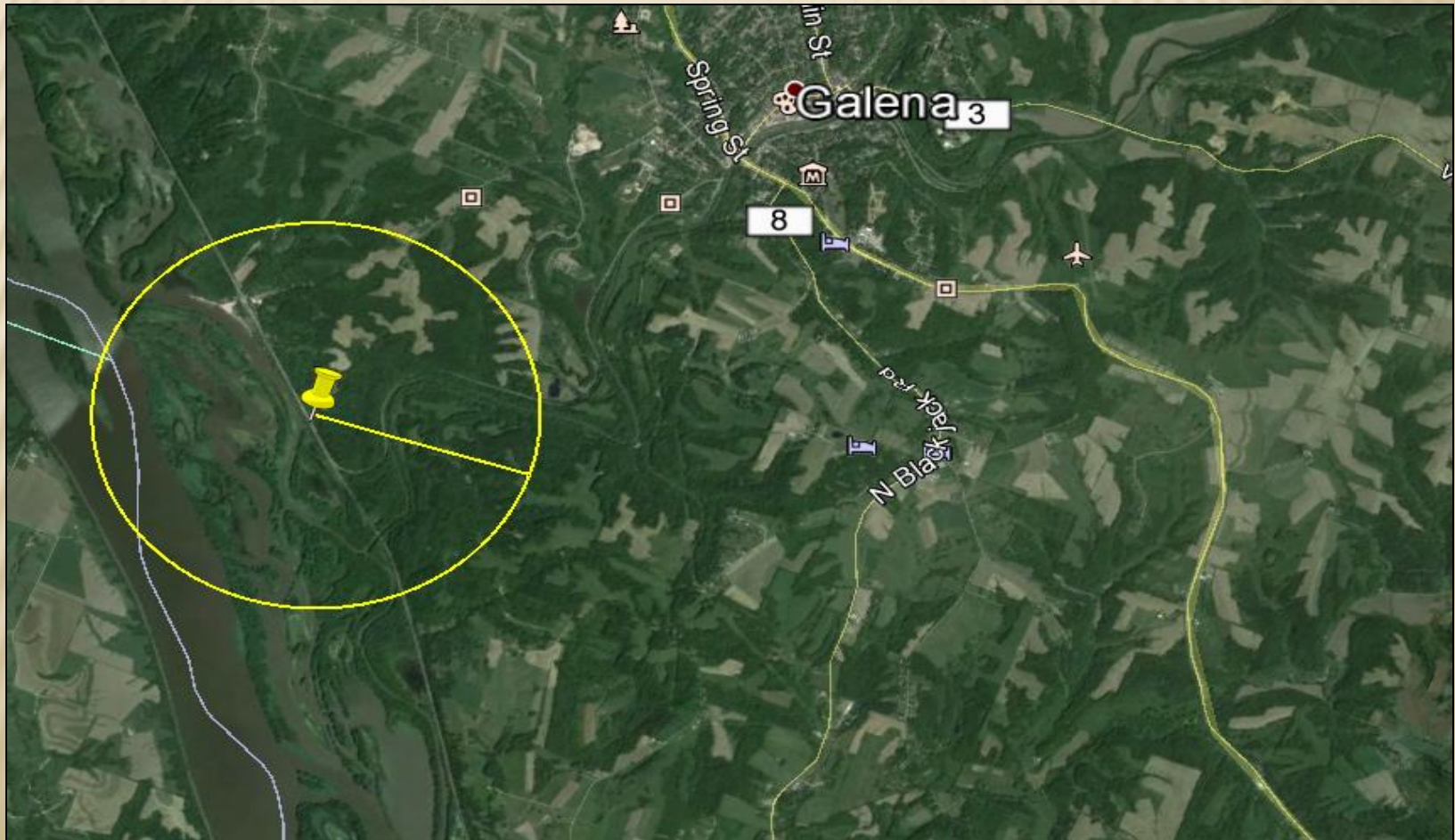


# Incident Location



# Establishment of Safe Zone/Evacuations

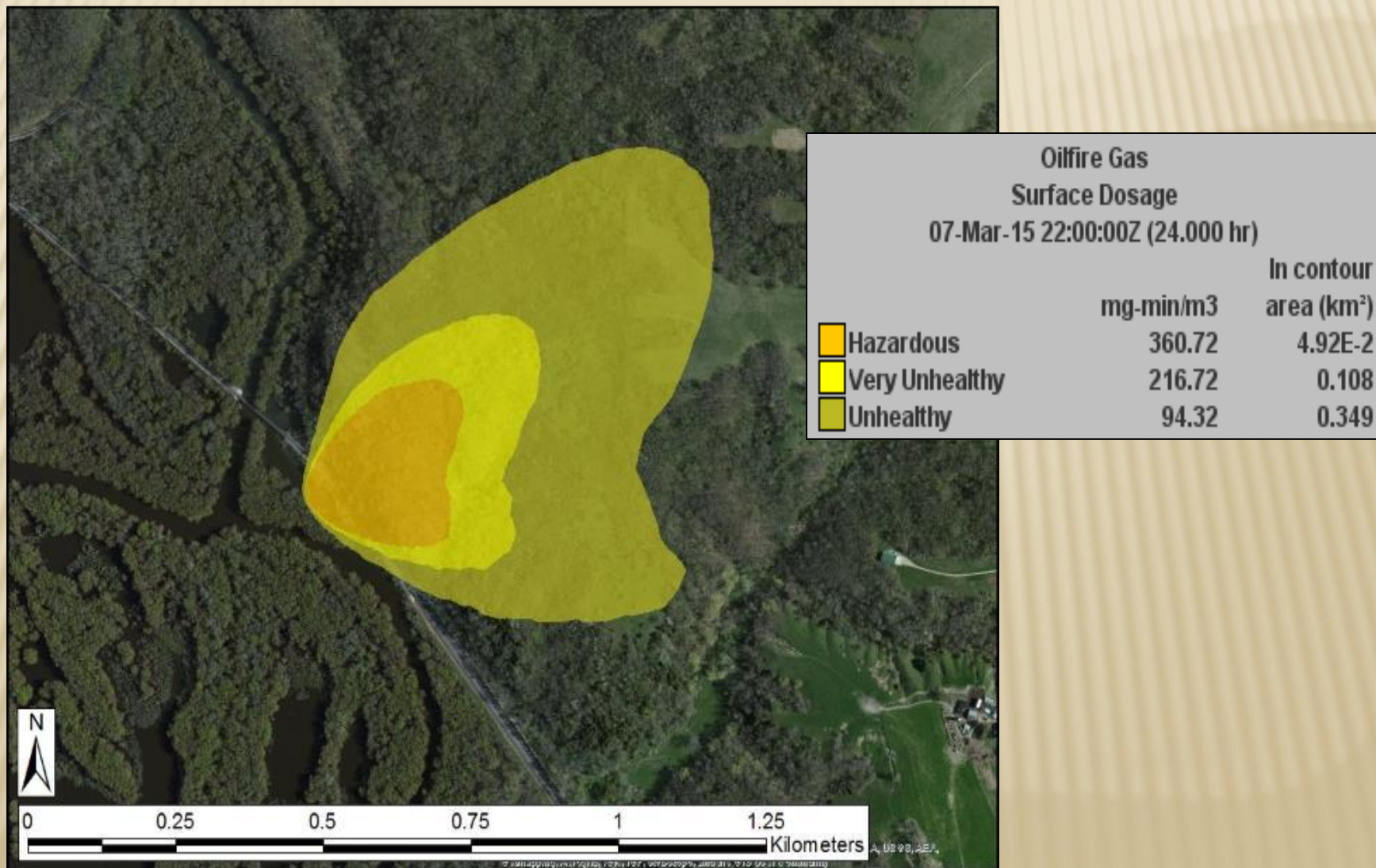
6 homes within 1 mi radius  
4 homes occupied  
2 individuals evacuated / 7 refused





# Contingency Planning – Modeling

*Threat of further tanker failure(s) – March 6th*



# EPA Monitoring & Sampling

Air  
Product Fingerprint  
SDS  
Surface Water  
Soil





# Crude Oil - Paperwork



## Report of Analysis

Client: Bakken Oil Express, LLC		Client Reference:	
Job Location: Bakken Oil Express -Eland, ND			
Job No: 35-15-00175			
Sample Number:	351500175-001	Date Sampled:	03/01/15 000
Sample ID:	Shore Tank 9101	Date Submitted:	3/1/2015
Vessel / Object:	Weekly Rail/ST9101	Date Tested:	3/3/2015
Location:	Bakken Oil Express - Eland, ND	Drawn By:	Client Submitted
Method	Test	Result	Units
ASTM D6377	Determination of Vapor Pressure of Crude Oil: VPCR <sub>x</sub> (Expansion Method)		
	VPCR 4 (37.8 C)	11.92	psi
	Vapor Pressure (RVPE)	10.91	psi
ASTM D86 MOD	Distillation		
	Initial Boiling Point	86	*F
ASTM D56 MOD	Flash Point by Tag Closed Cup Tester		
	Observed Flash Point	-50	*F
ASTM D4294	Sulfur Content in Petroleum Products by ED-XRF		
	Sample Preparation	NA	
	Sulfur Content	0.072	W
ISM TM0172	Nace Corrosion		
	Nace Corrosion Rating	A	
ASTM D7900	Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography		
	Methane	< 0.01	Vg
	Ethane	0.17	Vg
	Propane	1.17	Vg
	Isobutane	0.53	Vg
	n-Butane	2.43	Vg
	Neopentane	0.01	Vg
	Isopentane	1.34	Vg
	N-Pentane	2.49	Vg
	Cyclopentane	< 0.01	Vg
	Cyclohexane	0.54	Vg
	Methylcyclopentane	0.97	Vg
	Benzene	0.20	Vg
	Toluene	0.40	Vg
	Ethylbenzene	0.11	Vg
	Xylenes	0.44	Vg
	Total Light Hydrocarbons C1-C5	8.16	Vg
	Total Light Hydrocarbons C1-C9	35.67	Vg

## Oil Sample Analysis Report

U. S. EPA Region V  
Case Number E15510

Marine Safety Laboratory  
Case Number 15-091



### SAFETY DATA SHEET

#### SECTION 1 - IDENTIFICATION

Product Name: **Bakken Crude Oil, Sweet**  
SDS Manufacturer Number: 823378  
Synonyms: Crude Oil, Sweet; Field Crude, Petroleum Crude, Petroleum Oil, Rock Oil, Separator Crude, Sweet Crude, Crude Oil  
Product Use/Function: Refinery Feed  
Manufacturer Name: ConocoPhillips  
Address: 600 N. Dairy Ashford Houston, Texas 77079-1175  
General Phone Number: 833-244-0762  
Emergency Phone Number: 800-424-9380 (24 Hours)  
Website: www.conocophillips.com  
SDS Creation Date: May 19, 2014  
SDS Revision Date: May 19, 2014



#### SECTION 2 - HAZARD(S) IDENTIFICATION

##### GHS Pictograms:



##### Signal Word:

Danger

##### GHS Class:

Extremely flammable liquid and vapor Category 1.  
Aspiration Hazard, Category 1.  
Eye Irritant, Category 2.  
Specific Target Organ Toxicity, Single Exposure, Category 3.  
Specific Target Organ Toxicity, Repeated Exposure, Category 2.  
Carcinogen, Category 1B.  
Hazardous to the aquatic environment, long-term, chronic, Category 2.

##### Hazard Statements:

H224 - Extremely flammable liquid and vapor  
H252 - May be fatal if swallowed and enters airways.  
H312 - Harmful if swallowed.  
H332 - Irritating to eyes.  
H334 - May cause respiratory irritation.  
H335 - May cause respiratory irritation.  
H373 - May cause damage to health or the environment through prolonged or repeated exposure.  
H411 - Suspected of harming aquatic life.  
H412 - Risk to aquatic life with long lasting effects.

##### Hazards not otherwise Classified

May contain or release poisonous hydrogen sulfide gas.

##### Precautionary Statements:

Keep away from heat/sparks/open flames/hot surfaces - No smoking.  
Ground/Bond container and receiving equipment.  
Use explosion-proof electrical/ventilating/lighting equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
In case of fire: Use dry chemical, carbon dioxide to extinguish small fires. Use water for large fires.  
Do not breathe dust/fume/gas/aerosol/vapors/spray.  
Wash hands thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Keep container tightly closed. Store in a well-ventilated place. Keep cool.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, Get medical attention.  
Get medical attention if you feel unwell.  
If swallowed: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/hospital if you feel unwell.  
If on skin: Wash with plenty of soap and water.  
Avoid release to the environment.  
Dispose of contents/container in accordance with Local, State, Federal and Provincial regulations.

##### Emergency Overview:

DANGER! Extremely flammable. Pulmonary aspiration hazard if swallowed.  
Eye and skin irritant.

##### Route of Exposure:

Eyes, Skin, Inhalation, Ingestion.

##### Potential Health Effects:

Eyes, Skin, Inhalation, Ingestion.

##### Eyes:

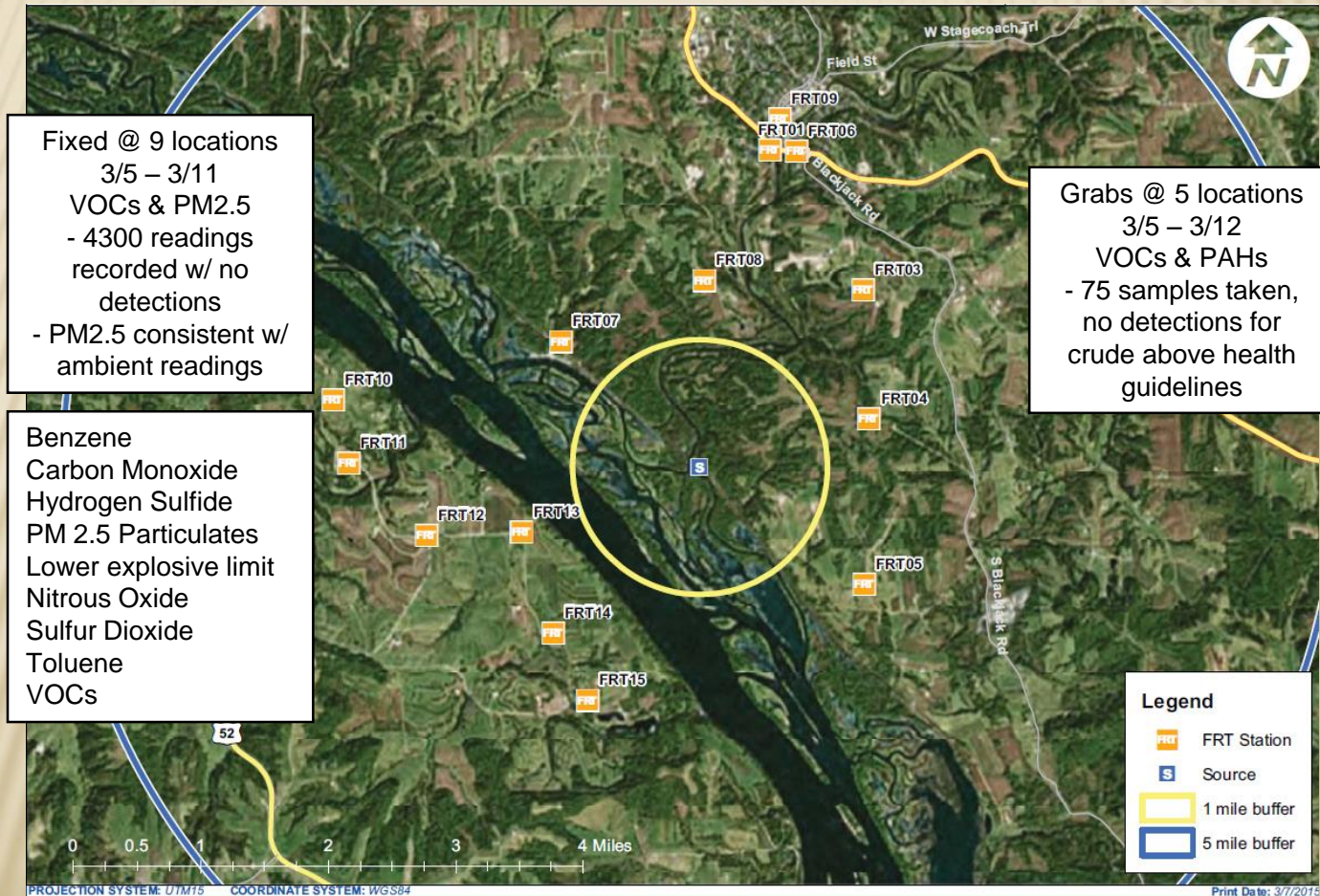
Causes serious eye irritation.

Bakken Crude Oil, Sweet  
Revision: 5/19/2014

Product Code: 823378

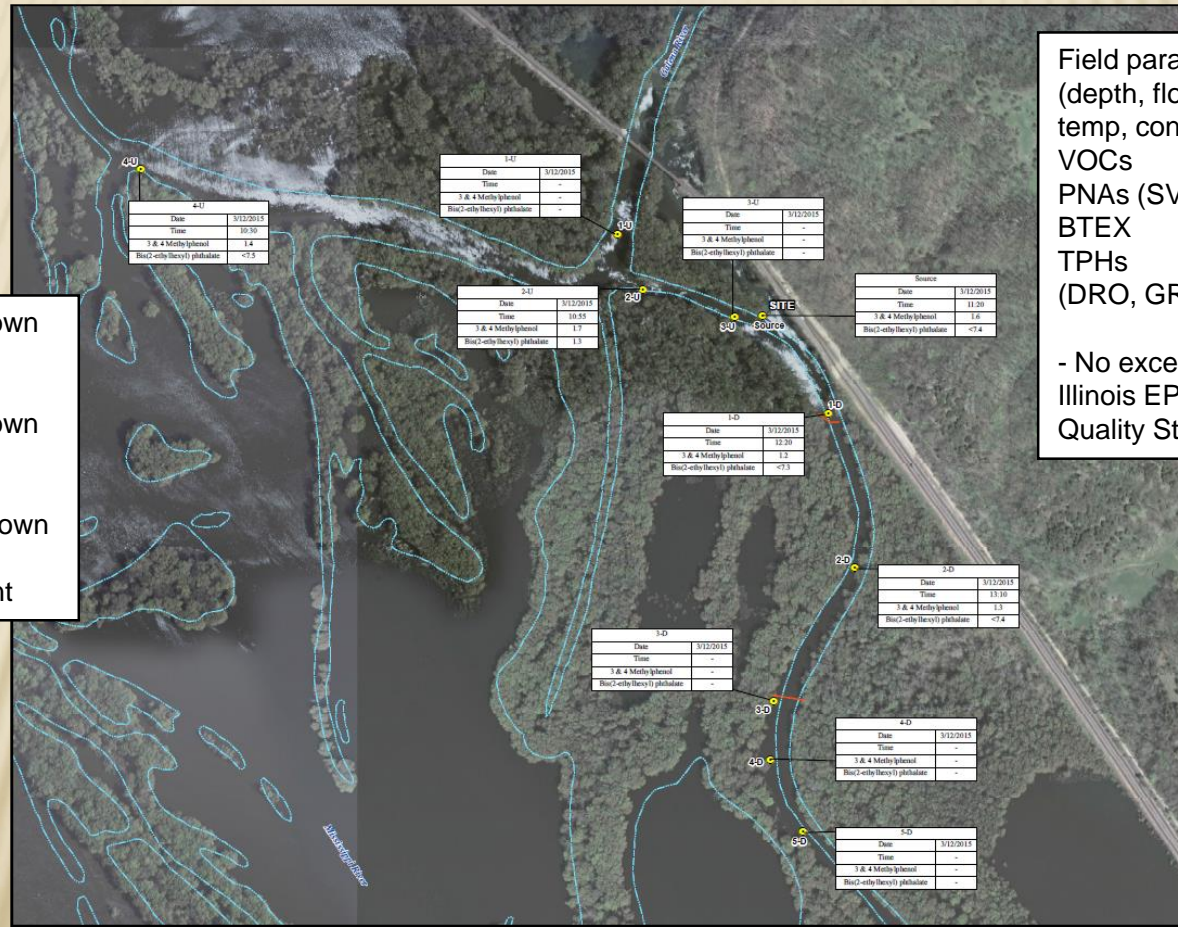


# Air Monitoring





# Surface Water Monitoring & Sampling



4 up, source, 5 down  
3/7 to 3/11

2 up, source, 2 down  
3/11 to 3/27

2 up, source, 2 down  
If > 1" rain  
3/27 to present

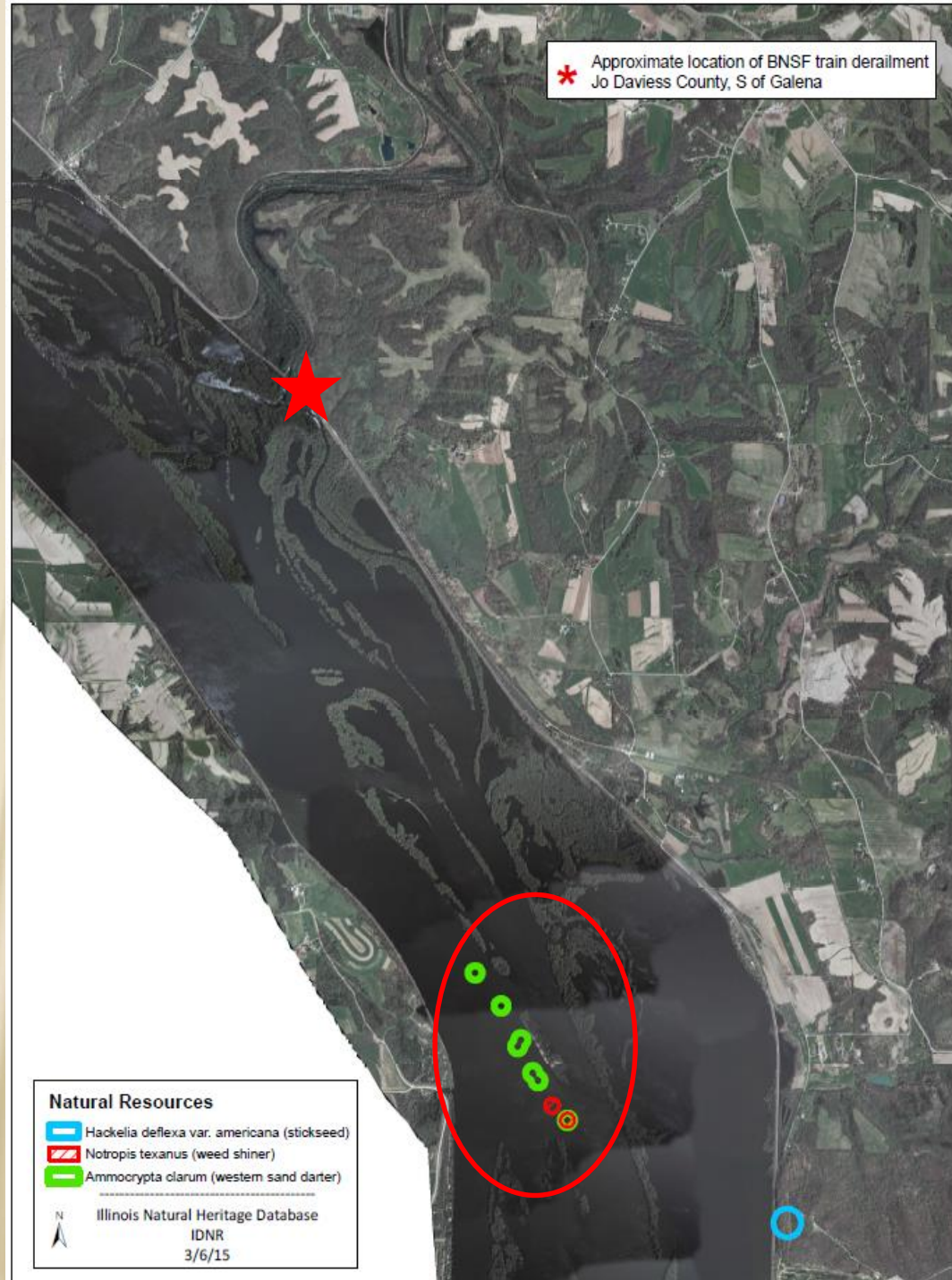
Field parameters:  
(depth, flow, DO, ORP,  
temp, cond, pH)  
VOCs  
PNAs (SVOCs)  
BTEX  
TPHs  
(DRO, GRO, ORO)

- No exceedances of  
Illinois EPA Surface Water  
Quality Standards

# Endangered Species Act

NOAA initiated consults

IDNR & US FWS did not identify endangered species at derailment site





# Bakken Crude



# Recovery Activities - Overview

- Extinguish fire, investigate, assess scene
- Vacuum out crude from impacted cars & off ground
- Remove damaged cars from right-of-way
- Excavate contaminated soils from ballast
- Replace damaged track & resume track ops
  - Over 100 trains were backed up
- Empty, clean, purge, cut up & scrap cars
- Sheet pile off impacted area (~500') to keep river out & contamination in
- Excavate contaminated soils and dispose
- Backfill & restore area (+roads, parks, trails)



# Assessment - Friday, March 6





**Saturday, March 7**







LD LMT 211500 LB 95950 KG  
LT WT 74500 LB 33800 KG  
35202







# Personnel Totals - Local/State

▪ Jo Daviess County	79
▪ Illinois Emergency Management	4
▪ Illinois State Police	3
▪ Illinois Environmental Protection Agency	4
▪ <b>MABAS</b>	<b>74</b>
▪ Out-of-State Mutual Aid	39
▪ ILEAS	1
▪ IMT	12
▪ SIRC	12
<b>TOTAL</b>	<b>228</b>

# MABAS



- 74 - personnel
- 1 – mobile support unit
- 1 – western shelter
- 4 – light towers
- 4 – utility vehicles
- 7 – engines
- 13 – tenders
- 7 – ambulances



# Personnel Totals - Federal

American Red Cross	6
United States EPA	11
OSHA	5
USDOT/PHMSA	2
USDOT/FRA	5
USCG Atlantic Strike Team	4
United States Fish & Wildlife Service	2
<b>TOTAL</b>	<b>35</b>

# Personnel Totals - Private Sector

BNSF and Contractors (12+)	152
<b>TOTAL</b>	<b>152</b>

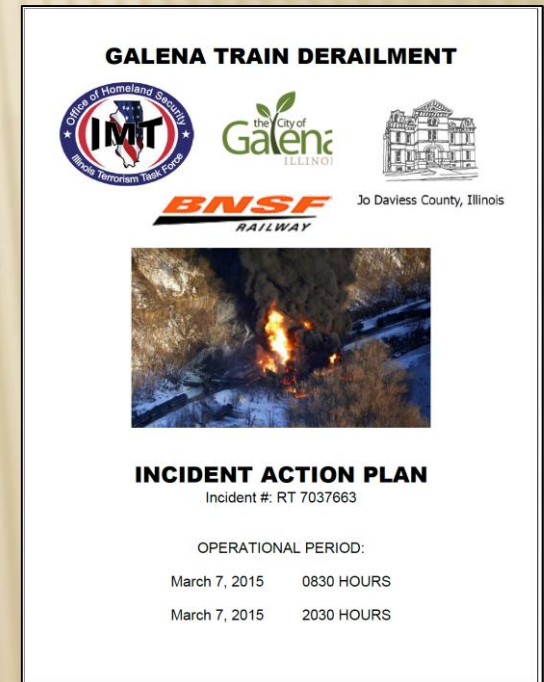


# Personnel Totals - Collective Total

Local/State	228
Federal	35
Private Sector	152
Total	<b>415</b>

# Managing the Build Up

- × IEMA/Galena FD used NIMS from the onset
  - + 2 separate 'IAPs' being developed
    - × BNSF & IL IMT
  - + 'Notice of Federal Interest'
    - × Issued to BNSF by US EPA
  - + IEPA & USEPA coordinated from Day 1
- × US EPA / IEMA established UC on day 4
  - + US EPA
  - + IEPA
  - + Galena FD / Jo Daviess County EMA
  - + BNSF Railway
- × 1<sup>st</sup> combined IAP developed for OP#4





# Transition

- × IL-Incident Management Team (IMT) met with USEPA to discuss integration
- × UC selected based on:
  - + Responsibility
  - + Authority
  - + Expertise
- × Day 3 Incident Action Plan (IAP) was a combination of the BNSF IAP & IL-IMT IAP from Day 2
- × IL-IMT worked together with USEPA to establish transition plan
- × IL-IMT steps back to support role for Day 5 IAP
- × IL-IMT steps out of command structure

# Transition Issues

- ✖ Composition of UC
  - + PHMSA, FSA, OSHA - investigators left off
  - + IEMA, IL IMT - transitioning out
- ✖ Selection of 1 individual for KLPs challenging
  - BEFORE = AFTER**
    - + 1 IC = 4 UC
    - + 5 PSCs = 1 (CTEH)
    - + 6 SOs = 1 (BNSF)
    - + 4 OPSs = 1 (BNSF)
    - + 3 ENVLs = 1 (ARCADIS)
- ✖ Strategy was to populate KLPs with qualified personnel w/ longevity on site
- ✖ CTEH's IAP software utilized successfully



# Investigation

- USDOT Pipeline & Hazardous Materials Safety Administration (PHMSA) inspected & sampled product inside cars
- USDOT Federal Railroad Administration (FRA) inspected track & rail infrastructure to determine cause of the derailment
- USCG Atlantic Strike Team & OSHA provided assistance with Health & Safety during response operations

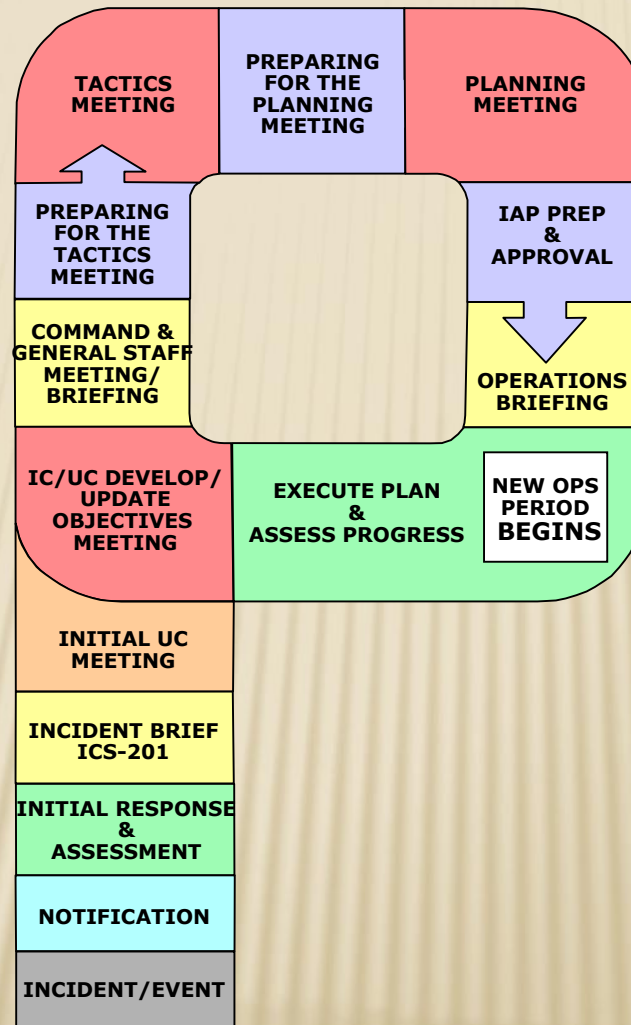
# VIP Briefing – Day 5 (Monday)





# Media – Day 5







# IMT Meeting Progression



# Planning Meeting – Day 6





# Incident Action Plans

## Incident Action Plan

Incident: BNSF Galena Derailment 03/25/2015 0700 CDT  
 Period: #10: 03/17/2015 07:00 CDT - 03/25/2015 07:00 CDT  
 Prepared By: Anton Avguchenko  
 Version Name: P010V02

### Approved By

Organization	Name	Signature
U.S. EPA REGION 5	PAUL RUECH	<i>[Signature]</i>
BNSF	Charles Thomas	<i>[Signature]</i>
TD DAVIES EHA	CHARLES PEDERSEN	<i>[Signature]</i>

### Incident Photo



### Included in Action Plan

II	Incident Forms	II	Period Forms	II	Attachments
<input type="checkbox"/>	Include Incident Cover	<input checked="" type="checkbox"/>	ICS 202 - Incident Objectives	<input checked="" type="checkbox"/>	208 Safety Message/Plan
<input type="checkbox"/>	ICS 201-1 - Incident Briefing	<input checked="" type="checkbox"/>	ICS 203 - Organization Assignment Lists	<input checked="" type="checkbox"/>	205a - Communications List
<input type="checkbox"/>	ICS 201-2 - Summary of Current Actions	<input checked="" type="checkbox"/>	ICS 204 - Assignment List(s)	<input checked="" type="checkbox"/>	Oil Spill Contingency Plan
<input type="checkbox"/>	ICS 201-3 - Organization Chart	<input checked="" type="checkbox"/>	ICS 205 - Communication Plan	<input checked="" type="checkbox"/>	Water Influx Contingency Plan
<input type="checkbox"/>	ICS 201-4 - Resource Summary	<input checked="" type="checkbox"/>	ICS 206 - Medical Plan	<input checked="" type="checkbox"/>	209 Situational Update
<input type="checkbox"/>	ICS 201-5 - Site Safety and Control Analysis	<input checked="" type="checkbox"/>	ICS 207 - Organizational Chart	<input checked="" type="checkbox"/>	Site Map
<input type="checkbox"/>	Reactive Phase Weather Report	<input checked="" type="checkbox"/>	ICS 208 - Site Safety Plan(s)	<input checked="" type="checkbox"/>	ICS 203 OP10
<input type="checkbox"/>	Reactive Phase Notifications	<input type="checkbox"/>	ICS 211P - Check In List	<input checked="" type="checkbox"/>	Site Road map
		<input type="checkbox"/>	ICS 213 - General Message(s)	<input checked="" type="checkbox"/>	Plan Tracker
		<input checked="" type="checkbox"/>	ICS 214 - Activity Logs	<input checked="" type="checkbox"/>	ICS 233 - Open Action Items
		<input type="checkbox"/>	ICS 215 - Operational Planning Worksheet		
		<input checked="" type="checkbox"/>	ICS 230 - Meeting Schedule		
		<input type="checkbox"/>	Weather Report		
		<input type="checkbox"/>	Incident Critique		

## ICS 202: Incident Objectives

Incident: BNSF Galena Derailment  
 Period: #10: 03/17/2015 07:00 CDT - 03/25/2015 07:00 CDT  
 Prepared By: Anton Avguchenko  
 Version Name: 03/17/2015 08:25 CDT

### Objective(s)

1. SAFETY OF RESIDENTS & RESPONDERS
2. PROTECT ENVIRONMENT AND CONTROL RUNOFF
3. STABILIZE SITE
4. MONITOR ENVIRONMENTAL CONDITIONS/IMPACTS
5. FACILITATE INVESTIGATIONS & PRODUCT RECOVERY/REMEDIATION
6. RESTORE DERAILMENT SITE
7. ENSURE SAFE AND EFFECTIVE TRACK OPERATIONS
8. ENSURE CONSTRUCTION OF SITE CONTROLS

### Operational Period Command Emphasis

INITIATE TRANSITION OF REGULATORY OVERSIGHT FROM USEPA TO ILEPA  
 RELOCATE COMMAND POST  
 COMMUNICATE HEALTH AND SAFETY PLAN TO ALL RESPONDERS  
 TRAIN RESPONDERS ON-TRACK SAFETY  
 COMMUNICATE CONTINGENCY PLAN TO ALL RESPONDERS  
 CONTINUE COMMUNICATIONS AMONG RESPONDERS AND RESPONSE AGENCIES  
 IMPROVE COMMON OPERATING PICTURE AT THE SITE AND THE ICP  
 UPDATE THE CONTAINMENT/CONTINGENCY PLAN

### LIMITATIONS/CONSTRAINTS

TRACK WINDOWS

### General Situational Awareness

ENVIRONMENTAL SAMPLING CONTINUES (SURFACE WATER ONLY)  
 INSTALLATION OF SHEETPIILING WALL  
 DELIVERY OF WATER TREATMENT SYSTEM  
 COMMAND SITE HAS NIGHTTIME SECURITY ONLY  
 WORK SITE STILL HAS 24HR SECURITY

# Operations Briefing





# Field Operations Briefing



# Recovery / Remediation

- ✖ Remove crude (mass balance)
- ✖ Sheet pile impacted area
- ✖ Excavate impacted soils
  - + Disposed of at Subtitle D landfill
- ✖ Flush ballast / ramp & recover oil
  - + Water Treatment
  - + FOSC exercised NCP, CWA Sect. 311(c) & NPDES Section 122.3(d) authority to exempt NPDES permit until state issued permit
- ✖ Backfill & restoration (USACOE)
- ✖ Long term monitoring - GW





# Remediation Related Work Plans

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Health & Safety Plan  
Emergency Evacuation & Personnel Injury Plan  
Oil Spill Contingency Plan  
Post Excavation Soil Sampling Plan  
Sheet Wall & Drainage Trench Plan  
Site Security Plan  
Site Decontamination Plan  
Surface Water Sampling & Monitoring Plan  
Waste Management & Handling Plan  
Water Influx Contingency Plan  
Water Treatment Plan

# **BNSF Resources**

- Large amount of heavy equipment
    - Transport trucks
  - HAZMAT Team
  - Security Police
  - Medical Staff
  - Food Service
  - Command Trailer
  - Communications Trailer
  - Contractors
- 
- Replaced 810' of track, switch and bridge within 36 hrs



# Staging Area





# MCP / ICP





# Park Restoration



# Area Most Significant Impact 12 cars





# PPE Planning

- Zone delineation
- VOCs
- LELs





# Staging & Clearing Wreck





**Wednesday, March 18**





# Tight Spot













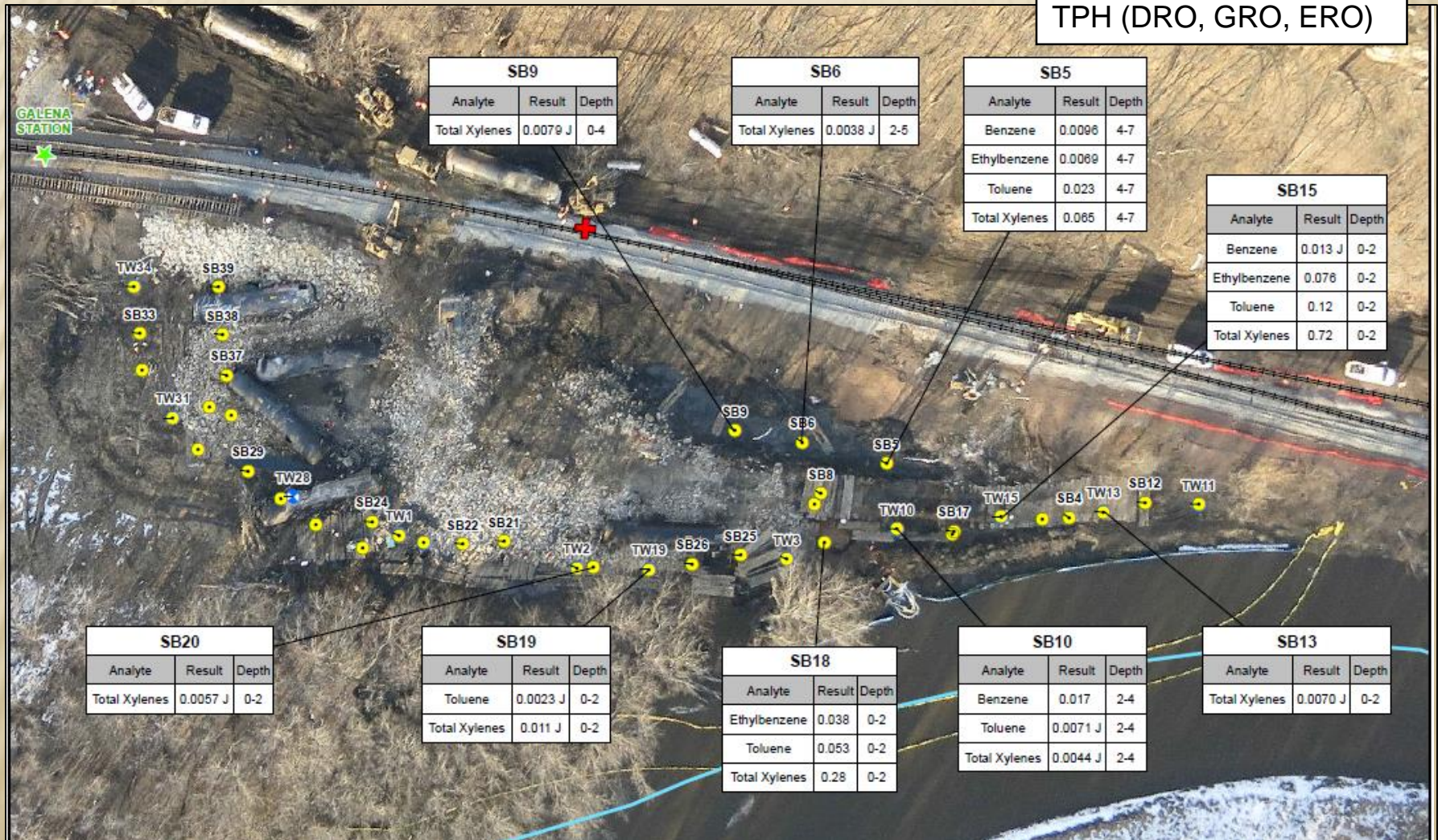
# Soil Sampling

- 143 samples from 35 borings screened  
39 samples to lab

PNAs n(0'-3', 4'-8')

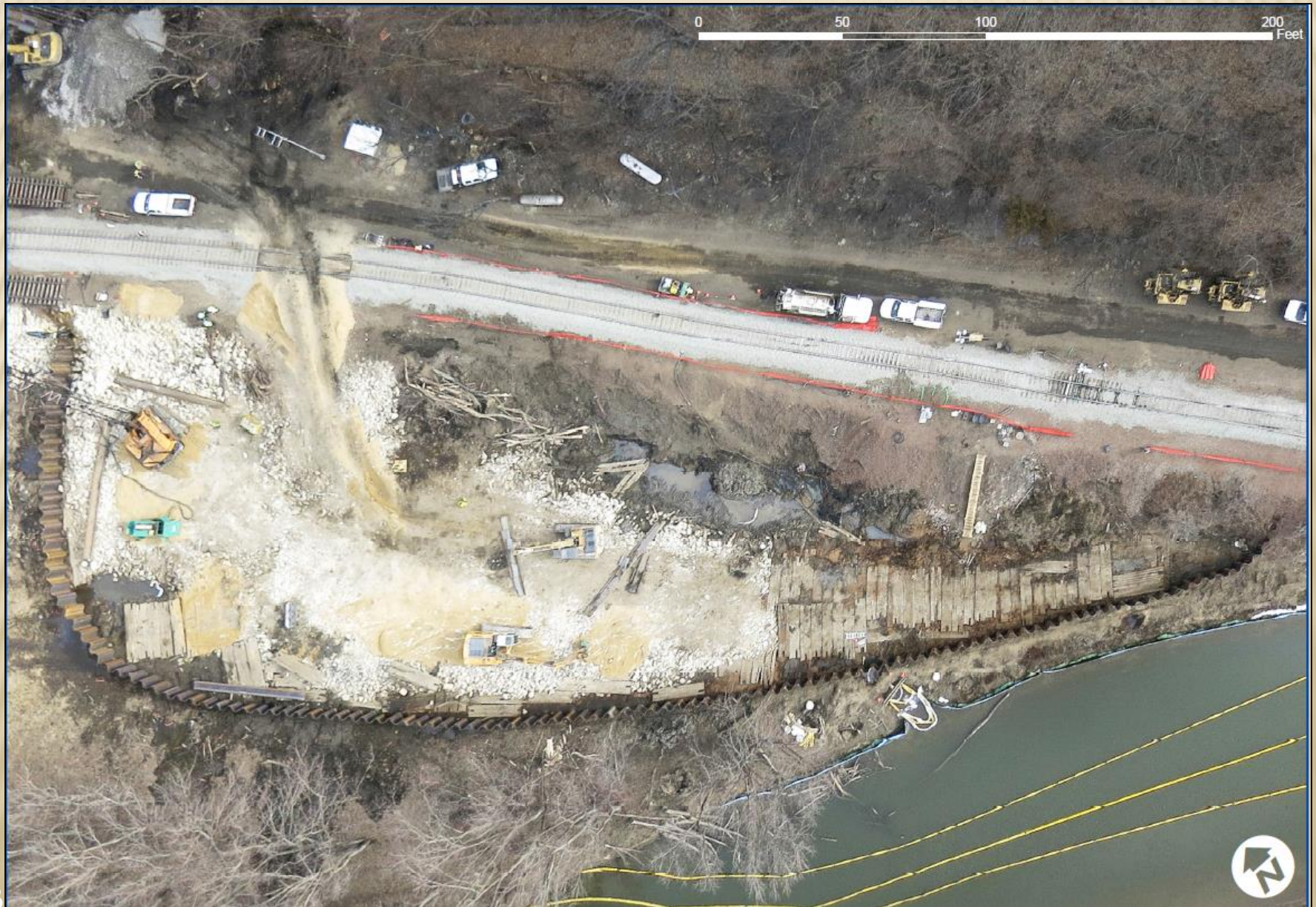
BTEX

TPH (DRO, GRO, ERO)





# Sheet Pile Containment





# Metrics

Product	Total
Crude Oil (recovered)	221,421 gal
Contact Water (treated)	2,100,000 gal
Contaminated Soil	4,748 tons
Tankers wrecked	12





to



Transition

- × Transition plan/schedule developed w/ IEPA (3/19)
- × US EPA memo to IEPA SRP Unit Leader (3/20)
- × UC dissolution memo (3/24)
- × NPDES Permit
  - + Water Treatment Unit - US EPA FOSC email exercising NCP, CWA Section 311(c) & NPDES Section 122.3(d) authority to exempt NPDES permit (3/24)
  - + Construction Site – General permit issued by IEPA (3/27)
  - + Water Treatment Unit – NPDES permit issued by IEPA (7/1)
- × IEPA continues to oversee long-term monitoring & remediation
- × US ACE is responsible to restoration plan



# Last Fall





# Local Roadways To & From Site





# After Action Report

- ✖ Operational objectives analyzed:
  - + Notification
  - + Initial Response
  - + Incident Stabilization
  - + Transfer of Command
  
- ✖ Analysis of core capabilities:
  - + Public information & warning
  - + Environmental response / H&S
  - + Operational Coordination
  - + Situational Assessment
  - + On-Scene Security & Protection
  - + Operational Communications
  - + Planning
  - + Intelligence & Information Sharing



## Galena Train Derailment

After-Action Report/Improvement Plan

March 27, 2015

The After-Action Report/Improvement Plan (AAR/IP) aligns exercise objectives with preparedness doctrine to include the National Preparedness Goal and related frameworks and guidance. Exercise information required for preparedness reporting and trend analysis is included; users are encouraged to add additional sections as needed to support their own organizational needs.

Rev. April 2013  
HSEEP-IP01

# After Action Report

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- × Ratings:
  - + Performed w/o challenges, w/ some challenges, w/ major challenges
  - + Unable to be performed
- × For each objective & core capability:
  - + Strengths
  - + Areas for improvement
    - × Reference & analysis
- × Appendix A – Improvement Plan
  - + For each objective, core capability & area for improvement –
    - × Corrective action
    - × Primary responsible organization & POC
    - × Start & completion date



# **Action Items Identified**

## **Lessons Learned**

- Staging
- Credentialing
- Security
- Communications
- Public Information Officer
- Social Media
- Media
- Test
- Code Red
- Town Hall Meeting

# Improvement Plan - Highlights

- × Policies and procedures
  - + EOP Updates
    - × Declaration of a disaster
    - × Chain of Command
    - × Decision-making & spending authority
    - × Train derailment annex
  - + Release of information to the public
    - × Emergency notification system
    - × Facebook & Twitter accounts established
- × Training
  - + Galena FD attended SERTC (PER-327)
    - × <http://sertc.org/courses/crude-by-rail-emergency-response-cbr/>
  - + Coalition-building with surrounding counties
- × Equipment
  - + Cell phones, comms tower, light tower
  - + MCP upgrades
  - + Updated inventory of resources county-wide



**Understanding**  
the CodeRED Notification System





# Main Street Galena





# Bike Trail





# Q & A

