

Operational Period #5

03/09 08:30 CDT - 03/10 08:30 CDT

Incident Action Plan

Incident: BNSF Galena Derailment	Prepared By: Ashley Reardon
Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT	Version Name: P005V04

Approved By

Organization

Name

Signature

Incident Photo



Included in Action Plan

<input type="checkbox"/>	Incident Forms	<input type="checkbox"/>	Period Forms	<input type="checkbox"/>	Attachments
<input type="checkbox"/>	Include Incident Cover	<input checked="" type="checkbox"/>	ICS 202 - Incident Objectives	<input checked="" type="checkbox"/>	203 Organization Assignment List
<input type="checkbox"/>	ICS 201-1 - Incident Briefing	<input checked="" type="checkbox"/>	ICS 204 - Assignment List(s)	<input checked="" type="checkbox"/>	208 Safety Message/Plan
<input type="checkbox"/>	ICS 201-2 - Summary of Current Actions	<input checked="" type="checkbox"/>	ICS 205 - Communication Plan	<input checked="" type="checkbox"/>	Traffic Control Plan
<input type="checkbox"/>	ICS 201-3 - Organization Chart	<input checked="" type="checkbox"/>	ICS 206 - Medical Plan	<input checked="" type="checkbox"/>	Site Health and Safety Plan
<input type="checkbox"/>	ICS 201-4 - Resource Summary	<input checked="" type="checkbox"/>	ICS 207 - Organizational Chart	<input checked="" type="checkbox"/>	Water Sampling Plan
<input type="checkbox"/>	ICS 201-5 - Site Safety and Control Analysis	<input checked="" type="checkbox"/>	ICS 208 - Site Safety Plan(s)	<input checked="" type="checkbox"/>	Air Sampling Plan
<input type="checkbox"/>	Reactive Phase Weather Report	<input type="checkbox"/>	ICS 211P - Check In List	<input checked="" type="checkbox"/>	Site Security Plan
<input type="checkbox"/>	Reactive Phase Notifications	<input checked="" type="checkbox"/>	ICS 230 - Meeting Schedule	<input checked="" type="checkbox"/>	Proposed Phase Laser Induced Fluorescence Investigation Work Plan
		<input type="checkbox"/>	Weather Report	<input checked="" type="checkbox"/>	Proposed Phase Laser Induced Fluorescence Investigation Work Plan
		<input type="checkbox"/>	ICS 213 - General Message(s)		

Incident Action Plan

		<input type="checkbox"/>	ICS 214 - Activity Logs		
		<input type="checkbox"/>	Incident Critique		

ICS 202: Incident Objectives

Incident: BNSF Galena Derailment	Prepared By: Ashley Reardon
Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT	Version Name: 03/08/2015 20:59 CDT
Objective(s)	
1. SAFETY OF RESIDENTS & FIRST RESPONDERS 2. PROTECT ENVIRONMENT BY CONTROLLING RUNOFF 3. STABILIZE SITE 4. MONITOR ENVIRONMENTAL CONDITIONS/IMPACTS 5. FACILITATE INVESTIGATIONS & PRODUCT SAMPLING/RECOVERY 6. RESTORE DERAILMENT SITE 7. ENSURE SAFE AND EFFECTIVE TRACK OPERATIONS	
Operational Period Command Emphasis	
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 ESTABLISH TRAFFIC CONTROL PLAN AND COMMUNICATE TO ALL RESPONDERS	
General Situational Awareness	
FIRES HAVE BEEN EXTINGUISHED WRECKING AND REMOVAL OPERATIONS CONTINUE/CONCLUDE ENVIRONMENTAL SAMPLING CONTINUES	

ICS 204 - Assignment List

Incident:	BNSF Galena Derailment	Period:	#5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT
Branch:	REMEDIATION	Division / Group:	REMEDIATION
Prepared By:	Ashley Reardon	Version Name:	03/08/2015 20:59 CDT
Unit:			

Tactical Objective

Screening site for contamination, removing contaminated soil, and backfilling soil.

Assignments

Inspection of possible soil contamination

Excavation of contaminated soil

Backfill and grading of excavated area

Resources Required

Resource Identifier	Leader	# of Units	Contact	Notes
BNSF Contractor	Greg Jefferies		612-878-7995	BNSF

Assignment Progress and Issues

All workers must read and sign ICS 208 Site Safety Plan and acknowledge worker health and safety briefing prior to work. For information about hospitals and communications, see ICS 205 Communications Plan and ICS 206 Medical Plan.

Location of Work

In the Exclusion Zone.

ICS 204 - Assignment List

Incident:	BNSF Galena Derailment	Period:	#5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT	
Branch:	RECOVERY	Division / Group:	RECOVERY	
Prepared By:	Ashley Reardon	Version Name:	03/08/2015 20:59 CDT	
Unit:				
Tactical Objective				
Conduct vacuum operations, tank car salvage, and provide/maintain containment.				
Assignments				
Utilize vacuum trucks to collect pooled/residual product and containerize in frac tanks staged in the support zone south east of exclusion zone.				
Purge and prep tank cars for salvage				
Inspect and maintain containment/soft boom				
Inspect and maintain earthen berm				
Resources Required				
Resource Identifier	Leader	# of Units	Contact	Notes
Vac Trucks		4		
Frac Tanks		14		
BNSF Contractors				
HAZMAT Contractors				
Salvage Contractors				
Assignment Progress and Issues				
All workers must read and sign ICS 208 Site Safety Plan and acknowledge worker health and safety briefing prior to work. For information about hospitals and communications, see ICS 205 Communications Plan and ICS 206 Medical Plan.				
Location of Work				
In the Exclusion Zone (land and water) and surrounding Support Zone.				

ICS 204 - Assignment List

Incident:	BNSF Galena Derailment	Period:	#5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT
Branch:	SITE SECURITY	Division / Group:	SITE SECURITY
Prepared By:	Ashley Reardon	Version Name:	03/08/2015 20:59 CDT
Unit:			

Tactical Objective

Maintain site control for the Incident Command Post and Exclusion/Support Zones.

Assignments

Scan/issue personnel badges at Trailer #1

Visually inspect badges and record entry of all personnel with out company affiliation attached to vehicles at access points

Resources Required

Resource Identifier	Leader	# of Units	Contact	Notes
BNSF Resource Protection	BNSF	6		
Local Police		4		

Assignment Progress and Issues

See Site Security Plan attachment.

Location of Work

At the Incident Command Post and access points to incident site.

ICS 204 - Assignment List

Incident: BNSF Galena Derailment	Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT			
Branch: ENVIRONMENTAL MONITORING	Division / Group: ENVIRONMENTAL MONITORING			
Prepared By: Ashley Reardon	Version Name: 03/08/2015 20:59 CDT			
Unit:				
Tactical Objective				
Conduct soil, water, and air sampling in support of operations.				
Assignments				
Soil sampling in the Exclusion Zone per Soil Sampling Plan				
Water sampling upstream and downstream per the Water Sampling Plan				
Conduct real-time air monitoring in the community and on-site in support of operations per Air Sampling Plan/Worker Exposure Plan				
Resources Required				
Resource Identifier	Leader	# of Units	Contact	Notes
BNSF Contractors	Arcadis - Fred Payne	3		
US EPA Contractors	US EPA	2		
Assignment Progress and Issues				
See attached Soil, Water, Air, and Worker Exposure Plans.				
Location of Work				
In the Exclusion Zone, Support Zone, and surrounding community.				

ICS 204 - Assignment List

Incident:	BNSF Galena Derailment	Period:	#5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT
Branch:	RESTORATION	Division / Group:	RESTORATION
Prepared By:	Ashley Reardon	Version Name:	03/08/2015 20:59 CDT
Unit:			

Tactical Objective

Conduct wrecking and track restoration operations

Assignments

Remove identified cars and stage in preparation for scraping

Resources Required

Resource Identifier	Leader	# of Units	Contact	Notes
BNSF Contractors				

Assignment Progress and Issues

All workers must read and sign ICS 208 Site Safety Plan and acknowledge worker health and safety briefing prior to work. For information about hospitals and communications, see ICS 205 Communications Plan and ICS 206 Medical Plan.

Location of Work

In the Exclusion Zone

ICS 205: Communication Plan

Incident: BNSF Galena Derailment	Prepared By: Ashley Reardon
Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT	Version Name: 03/08/2015 22:51 CDT

Radio Listings

Zone Grp.	Ch #	Function	Channel Name / Trunked Radio System Talkgroup	Assignment	RX Freq N or W	RX Tone / NAC	TX Freq N or W	TX Tone / NAC	Mode (A, D or M)	Remarks
			NORTH A	COMMAND					A	STARCOM ZONE AA
			VTAC11	OPERATIONS	151.1 375 N	156.7	151.13 75 N	156.7	A	ITECHS VHF BaseN Zone
			FG BLUE	FIRE/EMS	154.2 950 N	CS	154.29 50N	85.4	A	ITECS VHF FireN Zone
			JC CD W	LE PERIMETER	0	0	0	0	0	0

Phone Listings

Name	Title	Phone	Radio	Email	Other
Ashley Reardon	Documentation Unit Leader	501-247-6691	<input type="checkbox"/>	areardon@cteh.com	
Brad Benning	Operations Section Chief	312-919-0090	<input type="checkbox"/>		
Brian Brackmeyer	Liaison Officer		<input type="checkbox"/>		
Chris Thessing	GIS/Aerial Imagery	501-515-1228	<input type="checkbox"/>	cthessing@cteh.com	
Clay Reid	Manager, Hazardous Materials Safety	817-313-0592	<input checked="" type="checkbox"/>	clay.reid@bnsf.com	Day
Cory Davis	Partner/Principal Consultant	501-258-7881	<input type="checkbox"/>	cdavis@cteh.com	
Dave Estep	Manager, Sunpro	708-653-2559	<input type="checkbox"/>		
Dave Hentrich	Resources Unit Leader	630-452-9910	<input type="checkbox"/>		
Dennis Bingheim	Deputy IC	217-430-9635	<input type="checkbox"/>		Illinois IMT - Deputy IC
Derek Lampkin	Director, Hazardous Materials Safety	612-760-1365	<input checked="" type="checkbox"/>	Derek.Lampkin@BNSF.com	Night
Don Warren	CTEH PM (Onsite air monitoring)	601-278-7814	<input type="checkbox"/>	dwarren@cteh.com	
Dr. Shawn Wnek	Toxicologist, CTEH Project Technical Director	501-258-7132	<input type="checkbox"/>	swnek@cteh.com	
Eric Callahan	Data Management - CTEH	501-366-1525	<input type="checkbox"/>	ecallahan@cteh.com	
George Krebs	Incident Commander - IEPA	217-306-3537	<input type="checkbox"/>	george.krebs@illinois.gov	Illinois EPA
Jaime Brown	Incident Commander - EPA	312-802-0682	<input type="checkbox"/>	brown.jaime@epa.gov	
Jason Braun	Vac Team One	651-398-0415	<input type="checkbox"/>		
Jason Coyle	Planning Section Chief Deputy	612-965-2576	<input type="checkbox"/>	jcoyle@wenck.com	
John Pasquier	Situation Unit Leader	281-728-2004	<input type="checkbox"/>	jpasquier@responsegroupinc.com	
Kurt Merkle	Safety Officer	215-534-0435	<input type="checkbox"/>		
Kyle Bennett	CTEH Project Manager (Community Air)	501-747-6787	<input type="checkbox"/>	kbennett@cteh.com	
Nic Winslow	Incident Commander - BNSF	406-202-8051	<input type="checkbox"/>	dominic.winslow@bnsf.com	Hazmat Planning
Paul Ruesch	Planning Section Deputy	312-919-4382	<input type="checkbox"/>	ruesch.paul@epa.gov	
Ramon Mendoza	Operations Section	312-802-1409	<input type="checkbox"/>	mendoza.ramon@epa.gov	Night
Steve Faryan	Environmental Monitoring	312-802-0507	<input type="checkbox"/>		US EPA
Steve Pierson	Vac Team Two	651-785-6074	<input type="checkbox"/>		
Steve Shults	Planning Section Chief Deputy	309-840-2568	<input type="checkbox"/>		

Additional Comments

ICS 206: Medical Plan

Incident: BNSF Galena Derailment	Prepared By: Ashley Reardon
Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT	Version Name: 03/08/2015 20:59 CDT

First Aid Stations

Name	Location	EMT On Site	Phone	Radio
Incident Command Post Trailer #1	IL 84, US 20 Bridge. Near 200 Spring Street, Galena, IL			FG BLUE
Hulcher Staging Area (South/East end of derailment)	Near rail crossing at 1500 South River Road, Galena, IL			
MABAS Tent	MABAS Tent, IL 84, US 20 Bridge. Near 200 Spring Street, Galena, IL	Yes		

Transportation (Ground and/or Air Ambulance Services)

Name	Location	Paramedics	Phone	Radio
Galena Ambulance Service	217 Summit Street, Galena, IL 61036	No		JSC CD

Hospitals

Name	Location	Burn Center	Helipad	Phone	Radio
Midwest Medical Center	1 Medical Center Drive, Galena, IL	No	Yes	815-777-1340	
OSF Saint Anthony Medical Center	Rockford, IL	Yes	Yes	815-226-2000	
Dubuque Hospital	Dubuque, IA	Yes	Yes		

Special Medical Emergency Procedures

Nearest burn center is in Rockford, IL at St. Anthony's. There are helipads at both Midwest Medical Center in Galena and at St. Anthony's in Rockford. Announce location and number of injured. Report nature of injuries. Treat injured to your level of training. Request EMS if required. All injuries will be documented and reported through proper chain of command. All transported injured should bring copy of SDS (copies available in ambulance staged in work area). First report of injury forms will be completed as soon as practicable and will be turned into Safety Officer. Safety Officer will work with Operations to conduct investigation.

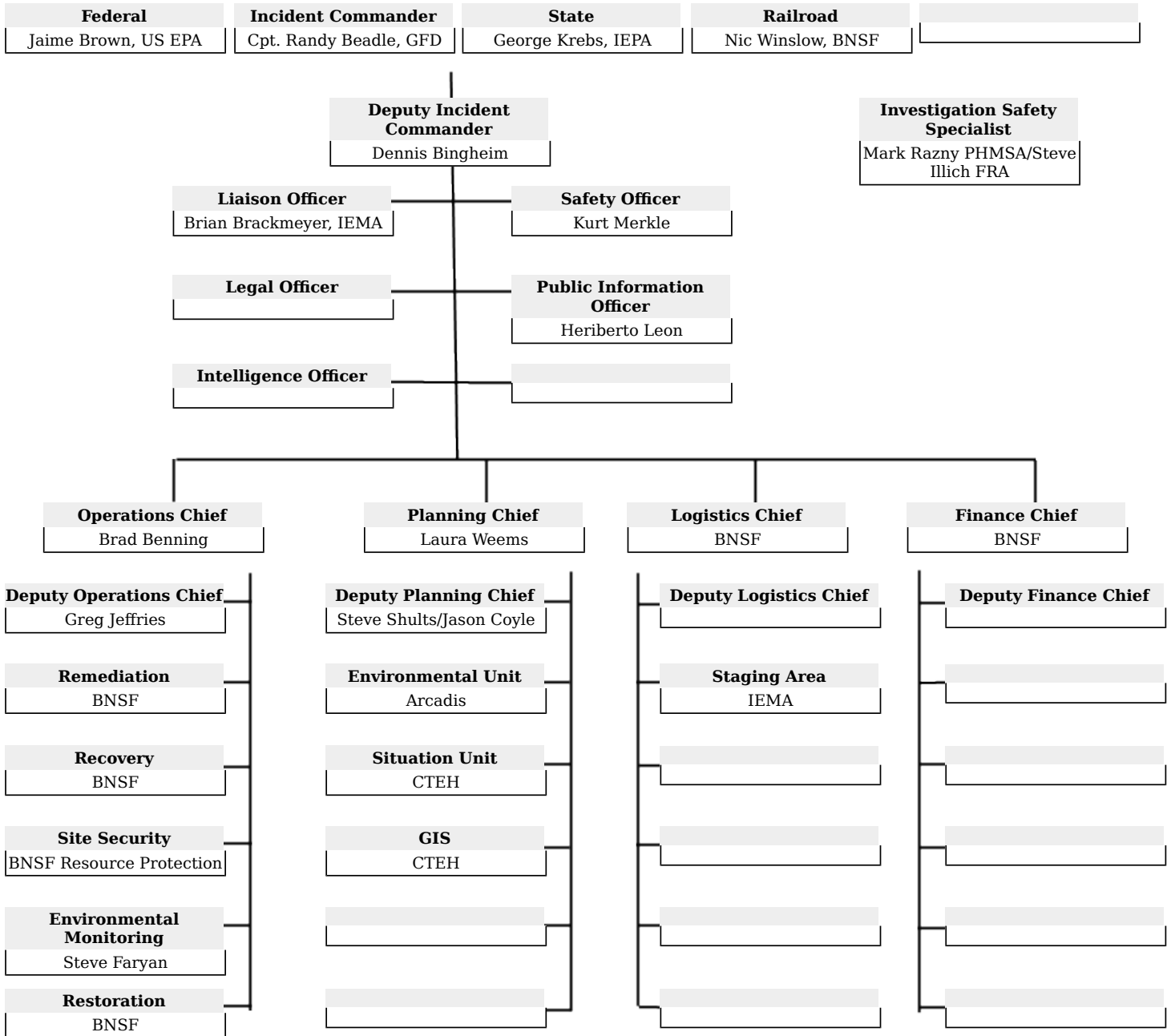
ICS 207: Organizational Chart

Incident: BNSF Galena Derailment

Prepared By: Ashley Reardon

Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT

Version Name: 03/08/2015 20:59 CDT



ICS 230: Daily Meeting Schedule

Incident: BNSF Galena Derailment			Prepared By: Jason Coyle	
Period: #5: 03/09/2015 08:30 CDT - 03/10/2015 08:30 CDT			Version Name: 03/08/2015 22:53 CDT	
Meetings				
Meeting Name	Date / Time	Purpose	Attendees	Location
Command & General Staff Meeting	03/09/2015 08:00 CDT	Define objectives	Command and General Staff (USEPA, IEPA, BNSF, FRA, Galena FD)	Incident Command Post, Trailer #3
Safety & Operations Briefing	03/09/2015 08:30 CDT	Safety & Ops to Ops personnel. Deploy next OP	Site personnel, Supervisors	Old train depot
Tactics Meeting	03/09/2015 10:00 CDT	Operation tactics planning, develop ICS 204s/215s	Operations Section Chief, Safety Officer, Logistics Section Chief, and Planning Section Chief.	BNSF meeting trailer
Planning Meeting	03/09/2015 13:00 CDT	IAP development	Command and General Staff	BNSF meeting trailer
Operations Update	03/09/2015 14:30 CDT	Discuss daily Ops objectives	Site personnel, supervisors	Old train depot
IAP & SITREP Approval	03/09/2015 17:00 CDT	Approve and sign IAP, copy and distribution	IC/UC, PSC, SITL	BNSF meeting trailer
Operations Briefing	03/09/2015 20:30 CDT	Provide update on day operations & changes for night shift	Site personnel, supervisors	Old train depot

ORGANIZATION ASSIGNMENT LIST (ICS 203)

1. Incident Name: BNSF GALENA DERAILMENT		2. Operational Period: Date From: 3/9/15 Date To: 3/10/15 Time From: 0830 HRS Time To: 0830 HRS		
3. Incident Commander(s) and Command Staff:		7. Operations Section:		
IC/UCs	Jaime Brown, EPA Region 5	Chief	US EPA	Brad Benning
IEPA	George Krebs	Deputy	BNSF	Greg Jefferies
BNSF RR	Nic Winslow			
FRA	Steve Illich	Staging Area		
Galena FD	Chief Randy Beadle	Branch	Remediation	
		Branch Director	BNSF	Greg Jeffries
Safety Officer	Kurt Merkle, Arcadis	Deputy		
4. Agency/Organization Representatives:		Division/Group		
Agency/Organization	Name	Division/Group		
US F&WS	Russell Engelke	Division/Group		
Illinois IMT	Dennis Bingheim/Steve Shults	Division/Group		
Illinois DNR	Cpt. Laura Petreikis	Division/Group		
OSHA	Eric Christensen	Branch	Recovery	
City of Galena	Mark Moran	Branch Director		
Jo Daviess Sheriff	Kevin Turner	Deputy		
5. Planning Section:		Division/Group		
Chief	Laura Weems	Division/Group		
Deputy	Steve Shults/Jason Coyle	Division/Group		
Resources Unit	John Pasquier	Branch	Site Security	
Situation Unit	Dave Hentrich	Branch Director	BNSF Resource Protection	
Documentation Unit	Ashley Reardon	Deputy		
Demobilization Unit		Division/Group		
Technical Specialists	Shawn Wnek, PhD (Tox)	Division/Group		
USCG Strike Team	Rich Forte	Branch	Environmental Monitoring	Steve Faryan
		Division/Group	Soil	Arcadis
		Division/Group	Air	CTEH
6. Logistics Section:		Division/Group	Water	Pinnacle/TRC
Chief	BNSF RR	Division/Group	Oversight	EPA/IEPA
Deputy		Air Operations Branch		
Support Branch	COML	Air Ops Branch Dir.		
Director	IEMA			
Supply Unit				
Facilities Unit		8. Finance/Administration Section:		
Ground Support Unit		Chief	BNSF RR	

ORGANIZATION ASSIGNMENT LIST (ICS 203)

1. Incident Name: BNSF GALENA DERAILMENT		2. Operational Period: Date From: 3/9/15 Date To: 3/10/15 Time From: 0830 HRS Time To: 0830 HRS	
Service Branch		Deputy	IL-IMT BOB DOTY (T)
Director		Time Unit	
Communications Unit		Procurement Unit	
Medical Unit		Comp/Claims Unit	
Food Unit	ARC, LESLIE MASTERONI	Cost Unit	
9. Prepared by: Name: <u>Mike Rosdahl</u>		Position/Title: <u>Staff Scientist</u> Signature: _____	
ICS 203	IAP Page _____	Date/Time: <u>3/8/2015 1219 HRS</u>	

SAFETY MESSAGE/PLAN (ICS 208)

1. Incident Name: BNSF GALENA DERAILMENT	2. Operational Period: Date From: 3/9/2015 Date To: 3/10/2015 Time From: 0830 Time To: 0830
3. Safety Message/Expanded Safety Message, Safety Plan, Site Safety Plan: -Tracks to reopen at midnight 3/9/2015. There are approximately 84 trains that have been delayed. -The first two trains to transit the tracks will be restricted to 10 MPH. The follow on trains will be restricted to 25 MPH. -Notification Procedures for trains transiting the incident site: EIC will notify the ASO of inbound train. ASO will ensure the work area is cleared. ASO will notify EIC once work area is cleared. EIC will notify ASO when clear to continue operations. EIC Points of contact: Primary-Dan Rankin: 817-308-6900 Secondary-Brian Ferencak: 817-701-8181 ASO Point of contact: SOFR Kurt Merkle: 215-534-0435 On site ASO Eric Tomaszewski: 609-351-8521 IC ASO Rich Forte: 609-439-3220 -An updated HASP will be available for the 0830 Ops Briefing. The HASP has been updated as a result of comments and concerns brought forth by the UC. -As temperatures continue to rise be cautious of the increased slip hazards as a result of heavy mud conditions at the site. -Sunrise: 0724 -Sunset: 1900	
4. Site Safety Plan Required? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Approved Site Safety Plan(s) Located At:	
5. Prepared by: Name: Rich Forte Position/Title: ASO Signature: _____	
ICS 208	IAP Page _____ Date/Time: 3/6/2015 1522

ICS 208

Safety Message/Plan

Purpose. The Safety Message/Plan (ICS 208) expands on the Safety Message and Site Safety Plan.

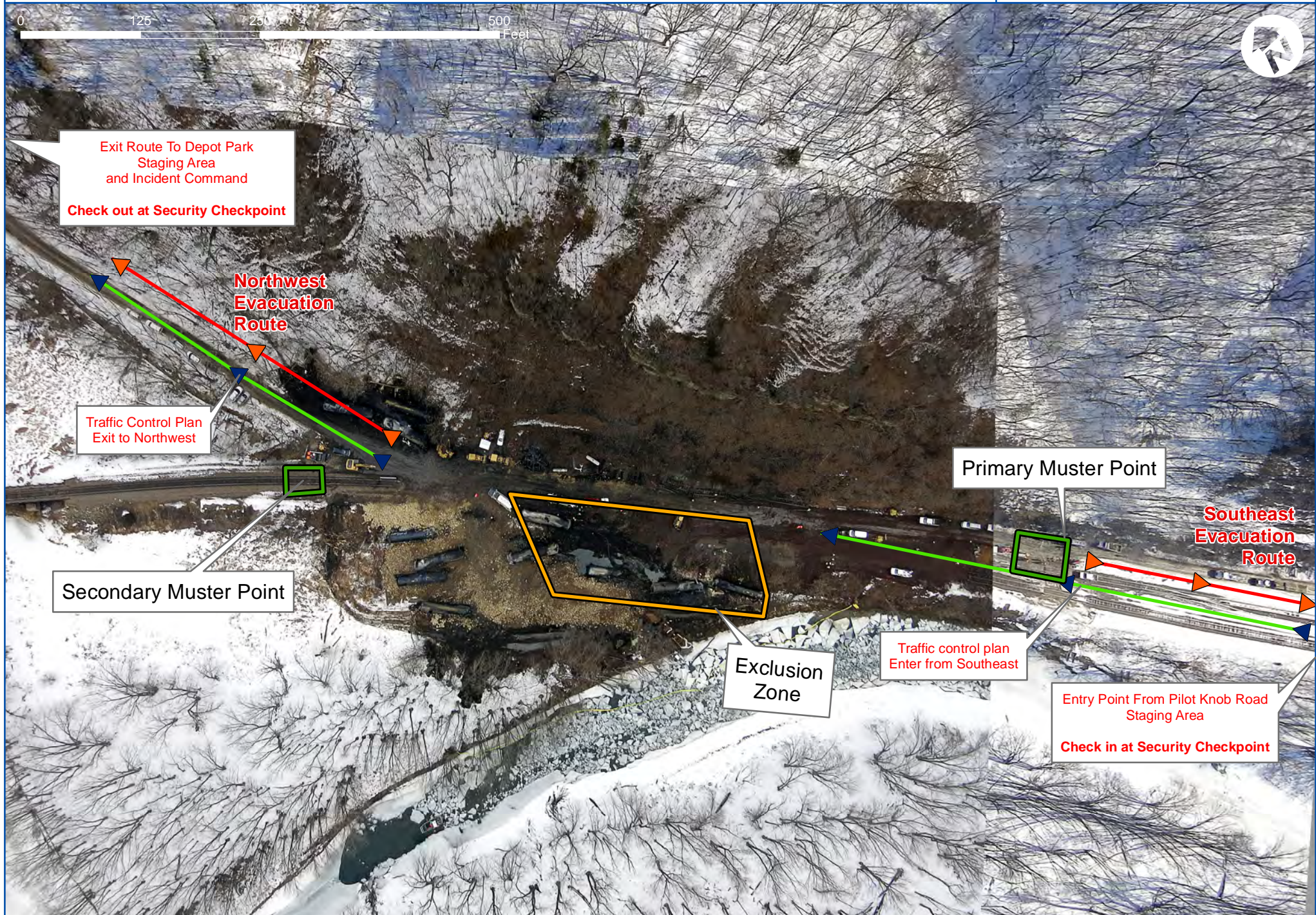
Preparation. The ICS 208 is an optional form that may be included and completed by the Safety Officer for the Incident Action Plan (IAP).

Distribution. The ICS 208, if developed, will be reproduced with the IAP and given to all recipients as part of the IAP. All completed original forms must be given to the Documentation Unit.

Notes:

- The ICS 208 may serve (optionally) as part of the IAP.
- Use additional copies for continuation sheets as needed, and indicate pagination as used.

Block Number	Block Title	Instructions
1	Incident Name	Enter the name assigned to the incident.
2	Operational Period <ul style="list-style-type: none">• Date and Time From• Date and Time To	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
3	Safety Message/Expanded Safety Message, Safety Plan, Site Safety Plan	Enter clear, concise statements for safety message(s), priorities, and key command emphasis/decisions/directions. Enter information such as known safety hazards and specific precautions to be observed during this operational period. If needed, additional safety message(s) should be referenced and attached.
4	Site Safety Plan Required? Yes <input type="checkbox"/> No <input type="checkbox"/>	Check whether or not a site safety plan is required for this incident.
	Approved Site Safety Plan(s) Located At	Enter where the approved Site Safety Plan(s) is located.
5	Prepared by <ul style="list-style-type: none">• Name• Position/Title• Signature• Date/Time	Enter the name, ICS position, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).



BNSF Health and Site Safety Plan

Effective: 03-06-15
(Date)

For: Galena, Illinois
(site location)

BNSF HAZMAT Manager: _____

Primary ER Contractor: _____

BNSF Environmental Manager: _____

BNSF Health and Site Safety Plan

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A. Site Description

Location: Galena, Illinois Latitude: 42.375590 Longitude: -90.445291

City: Galena State: Illinois

Railroad Milepost: Division: Subdivision:

Situation Description: Derailment of crude oil tank cars (amount released TBD)

B. Emergency Communications

All site emergencies will be communicated through an air horn.

3 short blasts on the air horn = Stop Work and Evacuate

Each contractor foreman or crew leader will check out a STARCOM Radio from the IEMA Unified Command (UC) Tent located at the intersection of Illinois Route 20 and the Galena River. The IEMA UC radio frequency in use is North A.

Primary Communication Method

Two Way Radios - Identify yourself Name and Company at the Galena Train derailment site
“EMS Requested in Work Zone or ICP” Repeat “EMS Requested in Work Zone or ICP”

Secondary Communication Method

911 – Identify yourself Name and Company
“We have an emergency at the Galena Train Derailment site or ICP and request immediate assistance”
Answer any questions asked by 911 dispatcher

Alternate Communication Methods

EMT direct cell phone call: **815-266-1719**
Identify yourself Name and Company at the Galena Train derailment site
“EMS Requested in Work Zone or ICP” Repeat “EMS Requested in Work Zone or ICP”

C. Evacuation and Muster Procedures

Each contractor foreman/crew leader is responsible for maintaining a sign in/sign out sheets for personnel and subcontractors in their respective work groups. In the event of an onsite emergency, air horns will be used to signal all site personnel to proceed along the evacuation route to the muster location(s).

The evacuation routes and muster locations are highlighted on the attached map

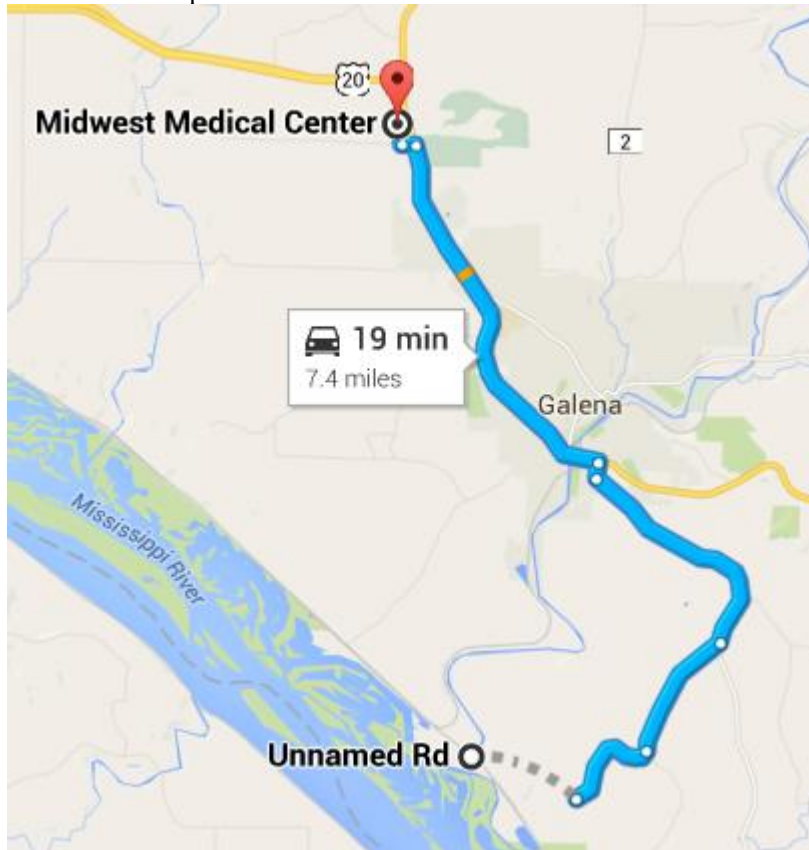
For removal of injured or ill personnel at the Galena Derailment Site, a dedicated ATV is staged at the site with a backboard for transport to the EMS standing by.










D. Emergency Medical Information

Is there an ambulance on-scene? Yes ☒ No ☐ If yes, state location: _____

Nearest hospital: Midwest Medical Center Telephone No.: 815-777-1340

Directions to hospital:



1. Head east toward N Pilot Knob Rd

2. Turn left onto N Pilot Knob Rd

3. Turn left onto N Blackjack Rd

4. Turn right onto 4th St

5. Turn left at the 1st cross street onto IL-84 N/US-20 W/Decatur St

 Continue to follow IL-84 N/US-20 W
6. Turn left onto W Norris Ln

7. Turn right onto Medical Center Drive

 Destination will be on the left

 **Midwest Medical Center**
1 Medical Center Drive, Galena, IL 61036

E. Hazard Evaluation

The following substances are known or suspected to be on the work site. Further information can be found in Section D of this plan. (ATTACH copies of Material Safety Data Sheets to this plan)

Substance Name	Physical State	Primary Hazard	Amount Released
Bakken Crude Oil	Liquid, thick dark yellow to brown or greenish black	Skin, inhalation, ingestion	TBD
See Attached SDS (Safety Data Sheet) for additional product specific details)			

Environmental Hazards

(I.e. Extreme heat or cold, rough terrain, high water, etc.)

Description of Hazard	Location	Protective Actions
Steep hilly, rough terrain	Adjacent to right of way on either side	Always be aware of footing, walk on level surfaces, use designated walking paths at all times
Extreme cold temperatures	Entire Area of Operations (AOR)	Wear proper cold weather gear, dress in layers (see attached cold stress and hypothermia prevention plan)
Slippery icy surfaces	Entire Area of Operations (AOR)	Use spike over boot traction device
Frozen waterways	River and creek surrounding wreck site	Do not walk or drive equipment over iced water ways.

The following additional hazards have been identified:

Hazard	Location	Description
Heavy equipment	Around rail	Side booms, dozers, track hoes, cranes, vac trucks
High rail and potential train traffic	On rail	Re-railed cars, high rail heavy equipment operations
Boating Operations	Surrounding waterways	Boom deployment, sampling
Hot Work	On derailed cars at wreck site	Cutting of couplers, wheel sets, etc...
For additional hazards, see below task specific hazard analysis and attached individual contractor HASP's		

Use the space below to describe any special hazards or procedures for this site:

Flash fires from crude oil flare-ups – FRC (Fire-Retardant Clothing) will be required when working in the Hot Zone of operations. In addition, full bunker gear will be required to be donned while performing any and all cutting, brazing, and transferring operations.

F. Hazardous Substance Information

See attached Bakken Crude Oil SDS (Safety Data Sheet) for all hazardous substance information.

G. Standard Operating Practices

The following standard operating policies apply and will be observed at this site:

- Corporate Policies and Procedures regarding emergencies
- Operating Rules and applicable Notices and Bulletins
- Safety Rules and Safe Job Procedures

- Job Briefing Policy
- Chemical Hazard Information Program
- Occupational Exposure Monitoring Program

These policies and rules outline the procedures applicable to normal railroad operations. Additional guidance regarding site-specific hazards and procedures will be provided verbally during Job Briefings and in writing as appendices to this plan.

H. Job Briefing Procedure

Prior to performing any task requiring the coordination of two (2) or more employees, those employees involved must hold a “job briefing” to insure all have a clear understanding of the task to be performed and their individual responsibility and must discuss the following:

1. Discuss the sequence of basic job steps.
2. Discuss the potential hazards related to the job.
3. Check equipment and tools before using, even if they are thought to be in good condition.
4. What protective equipment is required on this job?
5. Do you understand the instructions? Is it clear how the job is to be performed?
6. Follow up with fellow employees to ensure compliance with safe work practices.

Chemical Hazard Job Briefing

In addition to the normal job briefing procedure, the following information must also be included in briefings at derailment sites where hazardous materials are involved:

1. The chemicals involved.
2. The fire and health hazards, including symptoms of exposure, of the chemicals involved.
3. The personal protective equipment required and instruction for use.
4. The type, frequency, and equipment to be used for environmental monitoring.
5. Action levels for emergency egress of work areas.
6. Description of incident control zones (e.g. Hot, Warm, Cold Zones)
7. Other appropriate safety and health precautions to assure protection of all personnel on the site.

Whenever possible, this briefing shall be given to all personnel on-site including both BNSF and contractor employees. However, if only the foreman of BNSF or contractor personnel is given this briefing, the foreman must acknowledge that none of their employees will commence work around hazardous materials until those employees have been properly briefed and apprised of the site hazards.

I. On-Site Coordination and Organization

This section can be viewed on the ICS 207 or 203 form in the IAP. It is updated for each operational period.

J. Site Control

General Site Access

Site access points will be determined by BNSF Law Enforcement personnel and may be supported by local/state police if access points need to be restricted to derailment support staff only.

Work Zones

Work areas and exclusion zones relating to chemical hazards will initially be established by BNSF Supervisory personnel. These areas will be communicated to personnel on-site by standard Job Briefings and/or by radio communications. These areas may be modified and identified upon the arrival of skilled personnel (e.g. hazardous materials contractors). Any zones so established are identified on the *Site Map* included in this plan.

Standard Operating Procedures

Standard BNSF Operating Practices utilized at this site are identified in Section E. of this plan.

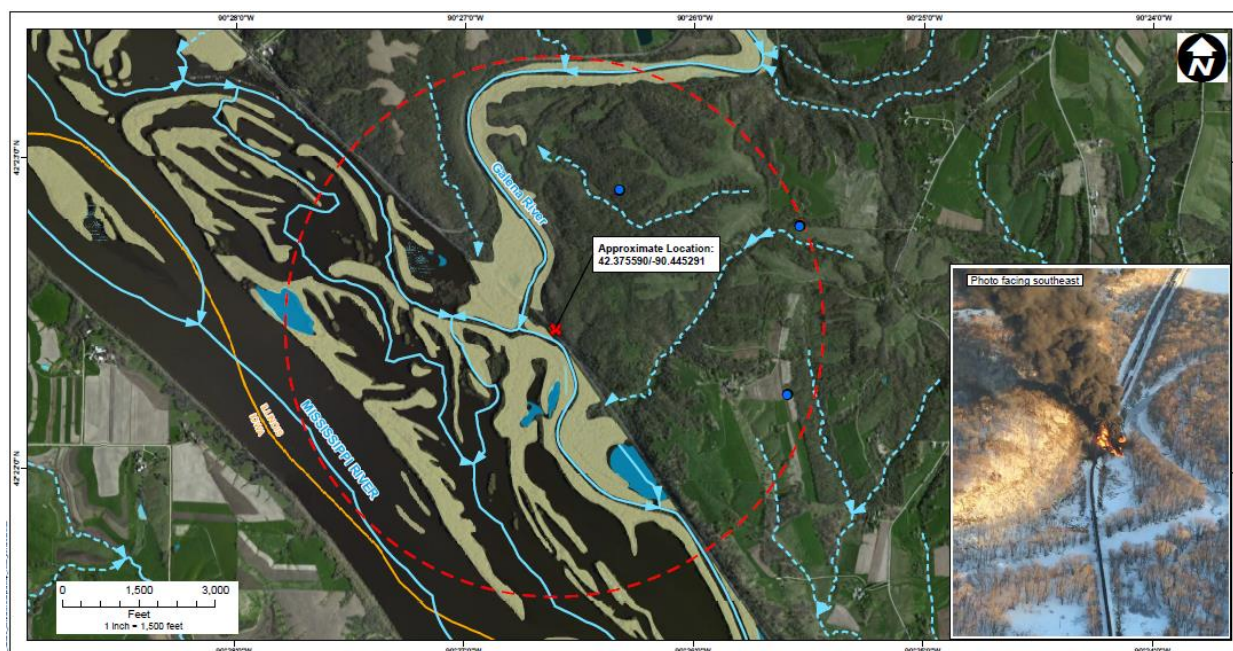
Medical Assistance

The location of medical assistance at this job site is described in Section B. of this plan. BNSF will have the appropriate level of care available on the site as warranted by site hazard and work function.

On Track Safety

A dedicated EIC from BNSF will be available when the tracks are restored and will communicate with the ASO at the derailment site to clear all personnel and equipment prior to train movements. When the train has passed the derailment site, the EIC will give an all clear to the ASO and will communicate work can commence again.

Site Map



K. Personal Protective Equipment

Personal Protective Equipment

Use of personal protective equipment (PPE) by BNSF employees and their contractors will be consistent with existing Operating Rules, policies, and practices. Specialized PPE requirements for this site are described below:

Job Function	PPE LEVEL	Modifications/Specifications
Vacuum Truck Operations in Exclusion Zone	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D	FRC, Face Shields, Hearing Protection
Hot Work/Transfer Operations	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D	Full Bunker Gear with Face Shield
Boat Operations	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D	USCG approved Survival Suits, GPS beacons, strobes or PMLs (personal; marker lights)
Re-Rail/Wrecking Operations	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D	FRC, and any additional PPE as needed
Cleaning and Purging of Cars	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Level B and possible downgrade to Level C depending on air monitoring data.
Assessment Operations	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D	Full Bunker Gear
See attached contractor HASP's for additional task specific PPE requirements	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D	

L. Decontamination Procedures

Standard Decontamination Procedures

Where appropriate, BNSF and other personnel requiring decontamination measures, will utilize the appropriate materials and equipment as provided. All personnel will observe good personal hygiene practices and wash with the materials provided prior to eating or smoking.

Any soiled or dirty PPE must be removed and left in the Contamination Reduction Zone. PPE that is to be disposed of will be put into drums at decon locations for proper disposal.

Site-Specific Decontamination Procedures

Location(s) of Decontamination Area:	TBD
Job Function	Decontamination Procedure
All associated derailment activities	Dry Decon. However, wash hands with a mild soap and warm water prior to eating, drinking, or using any tobacco products.

M. Personnel, Air, and Environmental Monitoring

Personal Medical Monitoring

Medical monitoring of personnel will be conducted as required both as a pre and post-entry function. Those persons exhibiting physical conditions outside the normally accepted parameters will not be allowed to make entry into hazardous areas nor wear physically demanding PPE. Provisions will be made to have trained medical personnel on the site to perform the required medical monitoring.

Personal Exposure Monitoring

An air monitoring plan as described below will be utilized to provide data regarding the exposure of individuals to airborne and environmental contaminants. Devices that measure individual exposure (e.g. dosimeters, colorimetric badges, etc.) will be utilized as required to monitor and record personal exposure.

Air and Environmental Monitoring

Air monitoring may be conducted by BNSF and it's contractors for the purpose of site safety, worker exposure protection, and public safety. This may include both on and off-site monitoring. The specific types of monitoring to be used for worker protection are described below:

Type of Contaminant	Device	Frequency
Flammable Vapors	CGI	<input checked="" type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Oxygen Deficiency	Oxygen Sensor/Meter	<input checked="" type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Toxicity	Colorimetric tubes	<input checked="" type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Organic Vapors	PID	<input checked="" type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Corrosivity		<input type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Particulates		<input type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
Other (list):		<input type="checkbox"/> C <input type="checkbox"/> H <input type="checkbox"/> D Other (specify):
		KEY: C=Continuously, H=Hourly, D=Daily

CTEH is performing air monitoring. Monitoring levels and action levels are outlined in the CTEH's their air monitoring plans.

N. Site Emergency Plan

Prevention

Job briefings will be held prior to initiating specific work activities (e.g. re-railing or moving hazmat cars, cutting or welding on or near hazmat cars) at this site. Consistent with standard BNSF policy for job briefings, such briefings will include specific measures to be taken in the event of any unusual situation, such as the need to evacuate the site work area.

Procedures

- 1) Upon discovery of a situation or occurrence that presents a danger to personnel at or near the site, the person making the discovery shall:
 - (a) Initiate the emergency signal for personnel on-site
 - (b) Take measures to control or abate (if safe to do so) the condition causing the emergency
- 2) All persons not involved in controlling the hazardous condition will retreat to the pre-designated muster area
- 3) Designated Supervisors will take a head count and verify the safety of all personnel under their charge
- 4) If outside assistance (i.e. fire department or EMS) is required, the designated supervisor will notify the local emergency 911 center for assistance
- 5) When all personnel have been accounted for, the Incident Command and Safety Officer will assess the situation and authorize site re-entry as conditions warrant or permit

Emergency Signal

Describe the site emergency signal below:

Audible: Three short blasts of an air horn

**The emergency radio procedure described in the BNSF Operating Rules will be in effect for BNSF employees and is NOT superseded by the signal described above.*

O. Confined Space Entry Procedures

When required, documentation of confined space entry procedures will be attached to this plan.
See attached CSE permit form

P. Medical Surveillance

Medical surveillance for BNSF Employees at this site will be conducted in accordance with guidelines established by the BNSF Medical Department. Contractor employees will be governed by their employing company policies.

Review and Approval

I have reviewed and approve of the Site Safety and Health Plan

_____, BNSF Hazardous Material Manager / Safety Manager

Date: _____ Signature: _____

On-Site Supervisor Acknowledgement

Supervisors for this site must read and understand the contents of this plan. It is incumbent upon the site supervisors to properly brief and update the employees under their direction of the site hazards and procedures.

By signing below, I acknowledge that I have reviewed and understand the contents of this plan.

Position	Signature
Senior Transportation Officer	
Senior Mechanical Officer	
Senior Engineering Officer	
Hazmat Emergency Response Contractor	
Environmental Consulting Contractor	
Wreck Clearing Contractor	
Fire Department Incident Commander	
Site Personnel not listed above (Please print name & position)	

Job Safety Analysis:

Each contractor shall hold and document a Job Safety Analysis with their specific crew prior to work commencement. This JSA will include a Task Description, Hazard Analysis, and necessary Control Measures.

STANDARD OPERATING PROCEDURES ARE INCLUDED IN EACH INDIVIDUAL CONTRACTOR'S ATTACHED HEALTH AND SAFETY PLANS.**Appendices**

Attach additional information here.

Information for appendix may include:

- Individual Contractor Health and Safety Plans
- MSDS/SDS
- Cold Stress and Hypothermia Prevention Plan (Draft from CTEH)
- Hot Work Permit Example (contractors specific permit may differ. However, will need approval from site safety officer before accepted as an approved permit)
- Confined Space Entry Permit Example (contractors specific permit may differ. However, will need approval from site safety officer before accepted as an approved permit)
- Completed Daily Tailgate Safety Briefings for each Contractor

Surface Water Sampling and Monitoring Plan
Prepared for: BNSF Galena, IL Derailment
Date: March 9, 2015 0830

Purpose

The following Surface Water Sampling and Monitoring Plan for the BNSF Galena, IL derailment has been prepared for implementation beginning March 7, 2015. The Surface Water Sampling and Monitoring Plan is being established to generally guide monitoring efforts and document conditions in the Galena vicinity of the release.

Monitoring/Sampling Locations and Parameters

The sampling locations will be field located prior to commencing sampling activities. Four up-stream sampling locations, one sample at the derailment site, and five down-stream sampling locations will be taken. The locations will be staked and GPS located for reproducibility. The sample locations will be monitored for water quality parameters (Temperature, Specific Conductance, Dissolved Oxygen, pH) using a multi-meter. Sampling locations are subject to change based on site conditions. Iced locations will be accessed if safe to do so. Augers will be used to create access to surface water in locations where persistent ice is present.

Sampling Frequency

Routine samples will be collected from each river site at a minimum frequency of once daily, weather and river conditions permitting, until this plan is amended with concurrence from the IEPA and USEPA.

Should a “critical event” occur (such as loss of natural or engineered containment, migration of visible sheen downgradient of the incident location, or a secondary release to surface water), non-routine sampling will be initiated as soon as practical and will be conducted at a frequency and for a duration to be determined in conjunction with the IEPA or USEPA.

Surface Water Sampling

In order to assess the potential migration of crude oil into surface waters, samples will be collected for laboratory analysis. Collected samples will be analyzed at TestAmerica’s Cedar Falls, IA laboratory for the parameters listed below, using the noted laboratory methods. Field blanks and blind duplicates will be collected and analyzed at a 5% frequency.

- Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) – Method 8260
- Polycyclic aromatic hydrocarbons (PAHs) – Method 8270
- Gasoline Range Organics (GRO) Diesel Range Organics (DRO) C-10 to C-34– Method 8015

Sample Collection and Handling

It is anticipated that samples will be collected approximately one foot below water surface using a laboratory supplied container that is decontaminated between sampling sites. Preserved containers will be filled by first filling an unpreserved container and then decanting the desired volume of sample into the preserved container. Samples are expected to be collected by boat and will be collected with the sampler positioned upwind of the boat's motor and facing upstream, whenever possible. Special care will be taken to minimize any bubbles or headspace in samples collected for VOC analysis. Trip blanks will accompany VOC samples and be analyzed using the same procedure as collected samples. Samples will be labeled using sampling site name followed by a dash and the date of sample collection. All samples will be preserved in accordance with analytical method requirements, sealed in coolers, and couriered to TestAmerica's Cedar Falls, IA laboratory under chain-of-custody protocols and within recommended holding times. All work will be performed under the site overall Health and Safety Plan (HASP), and the individual contractors site specific HASP. Samplers will wear fresh nitrile gloves at each location, and may be required to wear additional personal protective equipment (PPE), as directed by the BNSF Hazardous Materials Manager and/or Site Safety Officer.

Authorization

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

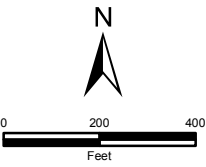
Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____



- Legend**
- Sample Location
 - Water Body
 - Boom

Sources:
Aerial Imagery: Illinois Department of Transportation (IDOT) - 2011
Water Bodies: USGS - National Hydrography Dataset (NHD)

Base Map

Emergency Response
Galena Train Derailment
Galena, Illinois



11541 95th Ave N.
Minneapolis, MN 55369
(763) 315-4501
www.pineng.com

DATE: March 2015	PROJECT MANAGER: Jim Holland	PROJECT NUMBER: R015144.000
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Galena IL Derailment

Galena, IL

Air Sampling and Analysis Plan

Version 1.0

Prepared On Behalf Of:

BNSF

Prepared By:





Center for Toxicology and Environmental Health, L.L.C.

5120 North Shore Blvd

Little Rock, AR 72118

501-801-8500

3/5/2015

Version 1.0			
	Name/Organization	Signature	Date Signed
Prepared by:	Shawn M Wnek, Ph.D. Proj. Tech. Director		3/5/2015
Reviewed by:	Kyle Bennett, Project Manager		3/5/2015
Approved by:	Shawn M Wnek, Ph.D. Proj. Tech. Director		3/5/2015
Approved by:	Kyle Bennett, Project Manager		3/5/2015
Approved by:			
Approved by:			



CENTER FOR TOXICOLOGY
AND ENVIRONMENTAL HEALTH, LLC

Approved by			
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Air Monitoring and Sampling Strategy

CTEH® is focusing on the mixtures, chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of spilled or burning crude oil. The possible hazards of crude oil vary by the source and type of the crude as well as with the environmental conditions associated with the spill. Monitoring and sampling for some chemicals or indicators of the presence of crude oil may be conducted less frequently or even discontinued as product-specific information becomes available or as initial monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly defined monitoring plans: **1) Worker Exposure Monitoring; 2) Community Exposure Monitoring; 3) Site Characterization.** Workers may be designated as the individuals actively or sporadically involved in remediation and/or normal work activities within a Work Area generally with established site control zones (exclusion zone, contaminant reduction zone, support zone) where remediation activities are taking place. The Community may be designated as those areas including residential and commercial locations immediately surrounding the Work Area. Site Characterization may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. worst case determination, container head space, etc.) rather than monitoring for potential exposures.

Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release, and site conditions. Fixed-location handheld real-time locations may be established in the Community Area in order to provide concentration averages that may be observed and analyzed over time in distinct geographic locations in the community.

Radio-telemetering RAE Systems® AreaRAE/MultiRAE Pro units may be deployed in all monitoring plans to allow for continuous air monitoring in multiple areas. AreaRAE/MultiRAE Pro readings may be received and monitored in a centralized location by CTEH® personnel to allow for recognition, communication, and response to changing conditions. A Particulate Monitoring Network may be deployed to record longer term concentration levels.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH Site-Specific Action Levels

CTEH® site-specific action levels may be employed in all exposure sampling plans to provide information for corrective action to limit exposure. These values do not replace occupational or community exposure standards or guidelines, but are intended to be a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practice may be assessed and then altered if necessary. Site-Specific Action Levels are not utilized for Site Characterization monitoring.

Plan 1: Worker Exposure Monitoring

Objective: Report air levels before they reach those requiring respiratory protection

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	30 ppm	Assess for the presence of benzene/toluene/hexane, Report reading to PM	To avoid over exposure to benzene/toluene/hexane - Reading sustained for 5 minutes	MultiRAE AreaRAE	0.1 ppm	Measuring range: 1 – 200	NA
Benzene	0.5 ppm	Confirm reading with secondary instrument, Exit Area or don air purifying respirator; report reading to PM	OSHA PEL Action level – Reading sustained for 5 minutes	UltraRAE	0.05 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 to 65 Volume: Variable	Var.
Benzene	2.5 ppm	Exit Area or don air purifying respirator; report reading to PM	ACGIH STEL Action level – Reading sustained for 5 minutes	UltraRAE	0.05 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 to 65 Volume: Variable	Var.
Toluene	20 ppm	Sample only as requested, Report reading to PM	ACGIH® TLV	Gastec tube #122L	0.5 ppm	Range: 1 to 100 Volume: Var.	Var.
Hexane	50 ppm	Sample only as requested, Report reading to PM	ACGIH® TLV (n-hexane)	Gastec tube #102L	1 ppm	Range: 4 to 1200 Volume: Variable	Var.
Hydrogen Sulfide	1 ppm	Exit Area, report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MR Sensor	1 ppm	MultiRAE - Measuring range: 0 – 100 ppm	NA
				MR Pro Sensor	0.1 ppm	MR Pro - Measuring range: 0 – 100 ppm	NA
				Gastec tube #4LL	0.1 ppm	Range: 0.25 to 120 Volume: Variable	Var.

Combustion Products							
Analyte	Instrument Reading	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter (PM _{2.5} or PM ₁₀)*	351 µg/m ³ sustained for 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510	0.001 mg/m ³	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
PM	200 µg/m ³ for 8 hrs	Report reading to PM	See above - 8 hr guideline	SidePak AM510	0.001 mg/m ³	See above	NA
Carbon monoxide	25 ppm	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MR Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100	1
Sulfur dioxide	0.2 ppm	Exit area - Report reading to PM	ACGIH® STEL – Reading sustained for 5 minutes	MR Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #5Lb	0.05 ppm	Range: 0.05 – 10 ppm Volume: Var.	Var.
Nitrogen dioxide	0.2 ppm	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE PID	1 ppm	Measuring range: 1 – 5,000	16
				MR Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.
Formaldehyde	0.3 ppm	Sample only as requested, Exit area - Report to PM	ACGIH® Ceiling – confirmed with secondary instrument	Gastec tube #91L	0.05 ppm	Range: 0.1 – 40 ppm Volume: Var.	Var.

*Monitoring for combustion products may be discontinued when the fire is extinguished.

Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
LEL	1 %	2.5 %	Notify PM	Elevated LEL sustained 1 min	MultiRAE AreaRAE	1 %	Measuring range: 1 – 100%	2.5*
LEL	4 %	10 %	Exit area and Notify PM		MultiRAE AreaRAE	1 %	Measuring range: 1 – 100%	2.5*

*Rough estimate based on common crude oil volatiles.

Plan 2: Community Exposure Monitoring

Objective: Report air levels before they reach those causing nuisance issues

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	0.5 ppm	Report reading to PM. Assess for the presence of benzene/toluene/hexane, if requested	Approximate background level - Reading sustained for 5 minutes	MultiRAE AreaRAE	0.1 ppm	Measuring range: 1 – 200	NA
Benzene	Detection	Sample only as requested, Report reading to PM	Inform PM/PTD of potential off-site issues	UltraRAE	0.05 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 to 65 Volume: Variable	Var.
Toluene	Detection	Sample only as requested, Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #122L	0.5 ppm	Range: 1 to 100 Volume: Variable	Var.
Hexane	Detection	Sample only as requested, Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #102L	1 ppm	Range: 4 to 1200 Volume: Variable	Var.
Hydrogen Sulfide	Detection	Exit Area, report reading to PM	Inform PM/PTD of potential off-site issues	MR Sensor	1 ppm	MultiRAE - Measuring range: 0 – 100 ppm	NA
				MR Pro Sensor	0.1 ppm	MR Pro - Measuring range: 0 – 100 ppm	NA
				MultiRAE PID	0.1 ppm	Measuring range: 0 – 100 ppm	3.3
				Gastec tube #4LL	0.1 ppm	Range: 0.25 to 120 Volume: Variable	Var.

Combustion Products							
Analyte	Instrument Reading	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter (PM _{2.5} or PM ₁₀)*	138 µg/m ³ Sustained for 5 minutes	Report reading to PM	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy for sensitive groups AQI	SidePak AM510	0.001 mg/m ³	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
PM	79 µg/m ³ for 8 hrs	Report reading to PM	See above - 8 hr guideline	SidePak AM510	0.001 mg/m ³	See above	NA
Carbon monoxide	25 ppm	Report reading to PM	Inform PM/PTD of potential off-site issues	MR Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100	1
Sulfur dioxide	0.1 ppm	Report reading to PM	Inform PM/PTD of potential off-site issues	MR Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #5Lb	0.05 ppm	Range: 0.05 – 10 ppm Volume: Var.	Var.
Nitrogen dioxide	0.2 ppm	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID	1 ppm	Measuring range: 1 – 5,000	16
				MR Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.
Formaldehyde	Detection	Sample only as requested, Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #91L	0.05 ppm	Range: 0.1 – 40 ppm Volume: Var.	Var.

*PM_{2.5} is especially prone to interference from high humidity, in cases of high humidity, PM₁₀ impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
LEL	1 %	2.5 %	Notify PM	Elevated LEL sustained 1 min	MultiRAE AreaRAE	1 %	Measuring range: 1 – 100%	2.5*
LEL	4 %	10 %	Exit area and Notify PM		MultiRAE AreaRAE	1 %	Measuring range: 1 – 100%	2.5*

*Rough estimate based on common crude oil volatiles.

Plan 3: Site Characterization Monitoring

Objective: Characterize nature and extent of release

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	NA	Report reading to PM	NA	MultiRAE AreaRAE	0.1 ppm	Measuring range: 1 – 5,000	NA
Benzene	NA	Report reading to PM	NA	UltraRAE	0.05 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 to 65 Volume: Variable	Var.
Toluene	NA	Report reading to PM	NA	Gastec tube #122L	0.5 ppm	Range: 1 to 100 Volume: Variable	Var.
Hexane	NA	Report reading to PM	NA	Gastec tube #102L	1 ppm	Range: 4 to 1200 Volume: Variable	Var.
Hydrogen Sulfide	NA	Report reading to PM	NA	MR Sensor	1 ppm	MultiRAE - Measuring range: 0 – 100 ppm	NA
				MR Pro Sensor	0.1 ppm	MR Pro - Measuring range: 0 – 100 ppm	NA
				MultiRAE PID	0.1 ppm	Measuring range: 0 – 100 ppm	3.3
				Gastec tube #4LL	0.1 ppm	Range: 0.25 to 2.5 Volume: 1,000 ml	Var.

Analytical Methods*			
Analyte	Media/Can	Method	Notes
VOCs	Mini - Cans	EPA TO-15 with TICs	
Benzene	Charcoal tube	NIOSH 1501	
BTEX (+Hexane)	3M 3520 Badge	Modified NIOSH 1500/1501	
PAHs (18 PNAH Profile - Galson)	37PTFE 2.0/Treated Amberlite XAD-2	Method 5506	

*Determination of analytical samples collected for analysis will be based on site conditions.

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Guardian Network	A Guardian network may be established with AreaRAEs equipped with electrochemical sensors will be positioned at established locations around the work zone. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAE Pros may also be used in the network. The data will be visible in real-time at the computer console and will be monitored 24 hours per day by CTEH personnel.
Hand-held Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAE Plus; ppbRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these hand-held instruments primarily to measure for potential breathing zone exposures. Additionally, measurements can be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions. CTEH may also use these techniques to verify detections observed by the AreaRAE network.
Fixed Real-Time Monitoring locations	Multiple community locations may be identified and monitored at the same location approximately once per hour using hand-held instruments. This allows use statistical analysis more effectively than with a random approach.
Analytical sampling	Analytical sampling may be used to validate the fixed station and hand-held data monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media, and sent to an off-site laboratory for further chemical analysis.
Particulate Monitoring Network	A network of data-logging particulate monitors may be set up and positioned around the Community Area.

Monitoring Plans

Sampling Plans	Description
Worker Exposure Monitoring	Potential Worker breathing zone exposures in the area directly surrounding the incident site and occupied by workers actively or sporadically involved in remediation and/or normal work activities.
Community Exposure Monitoring	Potential Community breathing zone exposures in residential and commercial locations in the area immediately surrounding the Work Area.
Site Characterization	During the course of the response, some additional tasks may require unique sampling (e.g. worst case determination, container head space, etc.)



Quality Assurance/Quality Control Procedures

Method	Procedure
Real-time	<ul style="list-style-type: none">• Real time instruments may be calibrated in excess of the manufacturer's recommendations.<ul style="list-style-type: none">○ At a minimum whenever indicated by site conditions or instrument readings.• Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field.• Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	<ul style="list-style-type: none">• Chain of custody documents may be completed for each sample.• Level IV data validation may be performed on the first sample group analyzed.• Level II data validation may be performed on 20% of all samples.• Level IV data validation may be performed on 10% of all samples.
Other	

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds a ACGIH® TLV reading by 3 times (if the chemical does not have a STEL or Ceiling based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.



Change from version 1.0 to 1.1

- *In the section titled:*

	Name/Organization	Signature	Date Signed
Prepared by:			
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Change from version 1.1 to 1.2

- *In the section titled:*

	Name/Organization	Signature	Date Signed
Prepared by:			
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Site Security Plan – Galena Train Derailment

In effect 0830 09 March 2015

Roaming Patrol of Incident Command Post area

- Verify personnel at the Incident Command Post are either badged or authorized contractors. If unsure, ask for photo identification and verify employer.
- Escort non-authorized personnel from site.
- For emergencies, call 9-1-1 for local response agencies.

Site Control – Entry into site on River Road and Ferry Landing Road, milepost 173

- Verify personnel entering site are either badged or contractors.

Site Control – Exit from site on bike path

- Verify no personnel enter the site from the exit point. Exceptions are emergency response personnel such as an ambulance responding to an immediate emergency.

Proposed Phase Laser Induced Fluorescence Investigation Work Plan

Prepared for: BNSF Galena, IL Derailment Site

Date: March 6, 2015

Introduction

On March 5, 2015 a BNSF unit train carrying crude oil from North Dakota derailed in Galena, IL. The derailment occurred near the confluence of the Galena River and the Mississippi River and release of an undetermined volume of crude oil to the ground surface occurred. Liquid phase hydrocarbons (LPH) have been observed in the vicinity of the derailment.

Purpose

The purpose of this phase I investigation is to delineate both the horizontal and vertical extent of LPH in the subsurface of the derailment site.

Technical Basis for Laser Induced Fluorescence (LIF) Investigation

LIF investigations are conducted by advancing an ultraviolet optical sensing tool (UVOST®) probe in areas of known or suspected LPH impact. The UVOST® probe emits an ultraviolet excitation light and captures returning fluorescence. Polycyclic aromatic hydrocarbon (PAH) compounds, which are a component of common petroleum fuels, readily fluoresce when exposed to ultraviolet light. The UVOST® probe detects four distinct fluorescent light wavelengths; the relative returns of each wavelength at a given depth are collectively referred to as a waveform. Differences in waveform patterns may indicate differences in LPH composition.

The return (fluorescent) light signal is analyzed in real time by on-site equipment. As the probe is advanced downward, the fluorescence data form a vertical profile of LPH impact present at the soil boring location. Results are reviewed after completing each LIF boring and considered when selecting subsequent locations.

Hydraulic permeability and electrical conductivity (EC) will also be recorded as the UVOST® probe is advanced. A hydraulic profiling tool (HPT) measures permeability by injecting water into the formation as the probe is advanced. The pressure required to inject the water provides a direct indication of the soil grain size and permeability of the surrounding formation. The HPT data collected provides additional evidence of potential migration pathways and confining units when evaluated in conjunction with the UVOST® data.

EC is the measure of the soils ability to conduct an electrical current measured on the UVOST® probe. Each boring log includes the vertical profile of the EC data recorded in millisiemens per meter (mS/m) in addition to the fluorescence and HPT data. The soil type can be interpreted from the EC data since soil is in the pathway of the electrical current flow. The lithology can thus be determined by comparing the EC log to previously completed boring logs and the corresponding HPT data.

LIF Investigation Scope

The proposed number LIF borings required to delineate the extent of LPH in the subsurface within the derailment area will be determined in the field.

The LIF borings will be advanced using track mounted direct-push drill rig to a total depth of 15 to 20 feet below ground surface (BGS) or to a depth of 5 feet below the last LIF response in a LIF boring or to refusal. LIF data will be collected from ground surface to the bottom of each boring.

Site Safety Provisions

LIF probes may be collected in the vicinity of the Galena River bank; any personnel working within 10 feet of the water's edge are required to wear Coast Guard approved PFDs.

All other provisions of the site-wide health and safety plan apply to the segmented barge assembly and subsequent use of the work deck.

Authorization

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____

Signature_____ Date_____

Affiliation/Agency_____



CENTER FOR TOXICOLOGY
AND ENVIRONMENTAL HEALTH, LLC



Galena, IL Derailment Worker Exposure Monitoring Plan

Prepared on Behalf of:
BNSF

Prepared By:

Center for Toxicology and Environmental Health, L.L.C.
5120 North Shore Blvd
Little Rock, AR 72118

March 7, 2015

	Name/Position	Signature	Date Signed
Prepared By:	Scott Skelton, MS, CIH		03/06/2015
Reviewed By:	Kyle Bennett, BS Proj. Manager		03/06/2015
Approved By:	Shawn Wnek, Ph.D		03/06/2015

UNIFIED COMMAND APPROVAL SHEET – CTEH WORKER EXPOSURE MONITORING PLAN

Galena, IL Derailment

This Worker Exposure Monitoring Plan was prepared on behalf of BNSF by CTEH supporting Unified Command to establish written documentation of air monitoring and sampling activities.

Prepared By:
Scott Skelton/Shawn Wnek_____

Date: __3/7/2015__

Submitted by:
Shawn Wnek_____

Date: _3/7/2015__

Approved by BNSF:

Date: _____

Approved by SOSC:

Date: _____

Approved by FOSC:

Date: _____

Approved by City OSC:

Date: _____

Document	Organization	Sector	Electronic Filename
Worker Exposure Monitoring Plan	CTEH	Health & Safety	Worker Exposure Monitoring Plan 07-Mar-2015

1 Introduction and Objectives

On March 5, 2015, Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by BNSF to initiate air monitoring in support of response activities following a crude oil train derailment near Galena, IL. Air monitoring consisted of manually-logged real-time air monitoring and analytical air sampling in the surrounding community and associated work areas. This plan covers worker exposure monitoring within the work area.

This Worker Exposure Monitoring Plan is in addition to the CTEH Air Sampling and Analysis Plan, titled: “*Air Sampling and Analysis Plan V 1.0*”. The objectives of this worker exposure monitoring plan are as follows:

- 1) To perform a comprehensive characterization of operations intended to identify: work tasks, work environments, and potential chemical hazards associated with the response and remediation operations.
- 2) To establish Similar Exposure Groups (SEGs) designed to stratify the work force based on exposure potential to the chemicals of primary concern (COPCs). Defining SEGs will provide guidance for the collection of representative worker exposure samples to ensure the various exposure profiles are determined based on the nature of the work being performed.
- 3) To use real-time air sampling methods to identify areas of interest regarding the potential for overexposure to the COPCs.
- 4) To collect worker exposure samples in the worker’s breathing zone and provide exposure profile information for each SEG identified.

2 Basic Characterization of Operations

This section is a basic characterization of the work operations for the response and remediation activities intending to describe: work tasks, work environments, potential chemical hazards, and SEGs. The work operations data was collected from site observations, work area surveys, and operational briefings at incident command.

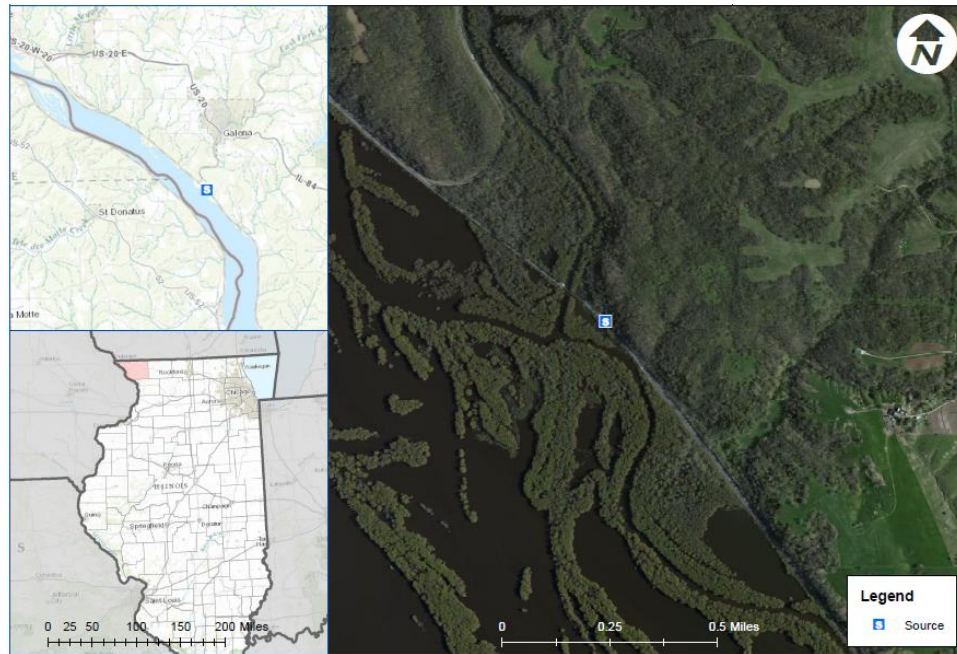
2.1 Description of the Work Area

Response and remediation efforts will take place at the site of the derailment and associated work areas. The derailment area is confined to the track, ballast, and service work area that has been impacted by derailed cars or may support derailment operations. The primary operations in the derailment area include, but may not be limited to: incident investigation, train wrecking, bridge demolitions, product transfers, track removal and repair, track-bed excavation or remediation, track re-construction and track survey, bridge construction and survey.

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The work area includes may include areas on either side of the railway at the incident site. The primary operations in the work area include, but may not be limited to: incident site survey and walkthroughs, boom or sorbent pad deployment, vacuum operations, tree & vegetation removal, road construction, soil excavation, and water sampling.

Figure 2.1 Work Area Map



2.2 Description of Operations

The following work activities are likely to occur during work operations and therefore will be considered in the determination of the appropriate exposure assessment strategy.

- incident command
- field supervision
- field safety inspection
- materials handling
- Emergency Support Personnel
- machine wrecking operation
- air, water, & soil environmental sampling
- vacuum ops and product removal
- transportation
- decontamination
- machine excavation operation
- Fire Suppression Operations

“Incident Command” – refers to all persons conducting full-shift work operations at the incident command post. The job tasks at incident command are not conducted in close proximity to impacted areas.

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“Field Supervision” – refers to in-field management or supervision of response and remediation workers. Field supervisors are in relative proximity, and may work directly within impacted areas for the duration of their work shift.

“Field Safety Inspection” – refers to safety supervisors, safety leads, and/or safety observers that represent in-field maintenance of the Health and Safety Plan for response and remediation efforts.

“Materials Handling” – refers to workers that work directly with or may handle materials or objects impacted by crude oil during remediation operations. This may include sorbent boom material and sorbent pads.

“Emergency Support Personnel” – refers to EMT or police workers that are located on-site to provide first aid, life support, and site security services.

“Machine Wrecking Operation” – refers to the operation of a track-hoe, back-hoe, front-end loader, or other machine-driven equipment used during the wrecking operations. This may include the removal of damaged tankcars with residual crude oil inside or on the exterior surfaces.

“Machine Remediation Operation” – refers to the operation of a track-hoe, back-hoe, front-end loader, or other machine-driven equipment used during the removal of contaminated soils or water. This job description may also include the preparation of infrastructure designed to support the remediation of impacted soil as well as general site infrastructure construction.

“Environmental Sampling-Air” – refers to air sampling technicians that frequent work areas where remediation activity takes place.

“Environmental Sampling-Soil” – refers to soil sampling technicians that frequent work areas where remediation activity takes place.

“Environmental Sampling-Water” – refers to water sampling technicians that frequent work areas where remediation activity takes place.

“Vacuum Ops & Product Removal” – refers to workers who are working to remove crude oil from impacted soil, water, or roadways.

“Transportation” – refers to workers operating commercial and non-commercial vehicles for the purpose of transporting workers and/or project supplies to work sites in the remediation area.

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“Decontamination” – refers to workers performing decontamination operations of personnel and equipment performing work in regulated areas.

2.3 Identification of Potential Occupational Exposures

The following constituents of crude oil: benzene, toluene, ethyl benzene, xylene, and n-hexane have been identified as the COPCs for the response and remediation operations. The occupational exposure limits (OELs) [i.e, Threshold Limit Values (TLVs) and Permissible Exposure Limits (PELs)] for these COPCs are stated in Table 2.1.

Table 2.1 Occupational Exposure Limits*

Chemical	ACGIH TLV (ppm)		OSHA PEL (ppm)	
	TWA ^a	STEL ^b /CEIL (C) ^c	TWA ^d	STEL ^e /CEIL (C) ^f
Benzene	0.5	2.5	1	5
Ethyl benzene	20	125†	100	-
Toluene	20	-	200	300 (C); 500**
Xylene	100	150	100	-
n-Hexane	50	-	500	-
Hydrogen Sulfide	1	5	-	20 (C); 50**

** 10 minute peak; once per 8 hour shift. †NIOSH STEL

- a. *Threshold Limit Value - Time Weighted Average (TLV-TWA) = The TWA concentration for a conventional 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. (ACGIH, 2013b)*
- b. *Threshold Limit Value - Short Term Exposure Limit (TLV-STEL) = A 15 minute TWA exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV-TWA. (ACGIH, 2013b)*
- c. *The concentration that should not be exceeded during any part of the working exposure.*
- d. *Permissible Exposure Limit - Time Weighted Average (PEL-TWA) = The permissible concentration in air of a substance to which nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, 48 weeks per year for 45 years without adverse effects. (OSHA 29 CFR: 1910.1000)*
- e. *Permissible Exposure Limit - Short Term Exposure Limit (PEL-STEL) = A 15 minute TWA exposure that should not be exceeded at any time during a workday. (ACGIH, 2013b)*
- f. *Permissible Exposure Limit – Ceiling (PEL-C). The exposure limit that shall at no time be exceeded. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15 – minute time weighted average exposure, which shall not be exceeded at any time during the working day (OSHA 29 CFR: 1910.1000).*

2.4 Similar Exposure Groups

A SEG is a group of workers having the same general exposure profile based on similarities and frequency of the tasks they perform, the materials/processes in which they work, and the similarity of the manner in which the task is performed. To establish the SEGs, a job task analysis has been conducted to determine job

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classifications, work practices, and job task frequency and duration. The work activities may be considered non-routine based on the following observed site characteristics:

- variable duration work task,
- transient work force,
- variable work sites,
- and, variable work practices.

To address the unpredictable nature of non-routine work operations, SEGs will be established using a comprehensive exposure strategy. The comprehensive strategy includes characterizing exposures to the COPCs for all workers using observational and quantitative methods. Primary SEGs have been identified by observational methods. The SEGs are described in Table 2.2 below:

Table 2.2 Similar Exposure Groups

SEG	Description
Incident Management	<i>Workers with infrequent, short-duration excursions to the work area(s).</i>
	Tasks: <ul style="list-style-type: none"> • Incident Command
Field Supervision	<i>Field Supervisors for remediation operations. Continuous presence at work areas, with limited close proximity work to potentially contaminated materials.</i>
	Tasks: <ul style="list-style-type: none"> • Field Supervision • Field Safety Inspection Supervisors • Emergency Support Personnel
Environmental Field Specialists	<i>Workers collecting environmental and occupational air, soil, and/or water samples at remediation sites. Continuous presence at work sites, with infrequent short-duration handling of potentially contaminated material.</i>
	Tasks: <ul style="list-style-type: none"> • Environmental Sampling-Air • Environmental Sampling-Water • Environmental Sampling-Soil

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Railway Cleanup Technicians	<i>Workers with continuous presence at remediation sites with frequent, moderate-to-long duration work among or near potentially contaminated material.</i>
	Tasks: <ul style="list-style-type: none"> • Materials Handling • Vacuum Operations & Product Removal • Machine Wrecking Operation • Machine Excavation Operation • Decontamination of Workers, PPE, and Equipment

The “Field Supervision”, “Environmental Field Specialists”, and “Railway Cleanup Technicians” SEGs have been identified as the “Maximum Risk” worker SEGs based on the presence of potential airborne constituents of crude oil and additional factors such as: type of work practice, job task frequency and duration, and proximity to the crude oil or impacted areas. Therefore, worker exposure samples will be collected on a representative population of the these SEGs.

The Incident Management SEG requires no personal exposure samples to be collected. However, real-time monitoring will be used where applicable to supply workers from these SEGs exposure information during their presence in the field.

2.5 Method for Determining Sample Deployment and Sample Numbers

Prior to each workday, CTEH field staff will observe the work areas and identify new operations and work tasks as well as estimate the worker population per SEG for the following day. CTEH will then deploy samples on a small representative population of each SEG. CTEH will determine the number of samples to be collected based on multiple factors. Ideally, CTEH will attempt to deploy 1 sample for every 10 workers in the SEG; however, CTEH will deploy a number of samples that is reasonable and achievable.

3 Sampling Methods

CTEH has implemented two methods used to evaluate worker exposure, real-time air monitoring and worker exposure sampling. These methods are described in sections 3.1 and 3.2 below.

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3.1 Worker Exposure Sampling

Worker exposure to benzene, toluene, ethyl benzene and xylene (BTEX compounds) and hexane will be evaluated using an organic vapor monitor (OVM) badge placed in the worker's breathing zone. These analytical samples will be collected on the 3M 3500/3520 organic vapor monitor (OVM) badge and analyzed for BTEX and hexane using gas chromatography flame ionization detector (GC/FID) in accordance with the National Institute for Occupational Safety and Health (NIOSH) air sampling method 1500/1501 (available upon request). The OVM badge is a passive dosimeter, composed of a permeation membrane and activated charcoal sorbent media, which collects air samples at a flow rate controlled by the physical process of diffusion. Collected samples were logged and shipped to Galson Laboratories, AIHA accredited, for subsequent analysis. Table 3.3 displays the OVM badge limits of detection (LODs) for BTEX and hexane.

Full-shift exposure will be measured by deploying 8-hr personal samples during the portion of the workday when the likelihood of exposure is considered highest. For 12-hour shifts, personal samples will be deployed two hours into each shift and collected two hours prior to the close of that shift.

If the nature of work processes or real-time monitoring data suggest the potential for exceedance of the 15-minute short term exposure limit (STEL), active sampling pumps equipped with charcoal sorbent tubes will be used to assess the worker's short term exposure.

Table 3.3 Organic Vapor Monitor Badge Description

COPCs	Collection Media	Flow Rate (cc/min)	Sample Duration* (min)	Laboratory LOQ (ug)	Limit of Detection (ppm)
Benzene	3M 3520	35.5	480	2.0	0.036
Ethyl benzene	3M 3520	27.3	480	5.0	0.087
n-Hexane	3M 3520	32.0	480	5.0	0.092
Toluene	3M 3520	31.4	480	5.0	0.088
Xylene	3M 3520	27.3	480	15.0	0.48
Benzene	226-01 charcoal tube	500	15	2.0	0.08

* Based on 8-hour shifts

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Once analyzed, the time-weighted average (TWA) concentration will be calculated for samples with positive detections of BTEX to determine if the worker's exposure meets or exceeds the site action level (TLV-TWA) of 0.5 ppm or 2.5 ppm as 15-minute STEL.

3.2 Real-time Monitoring

Real-time air monitoring will be used in the work area to identify areas or work tasks that may lead to undesired exposures to the COPCs. Real-time air monitoring data will be reviewed throughout each day to determine if additional worker exposure sampling will be required. CTEH personnel will be equipped with hand-held instruments that provide instantaneous measurement of COPCs so that controls may be implemented in rapid fashion to limit unnecessary exposure.

Real-time air monitoring will be performed during the CTEH[®] air monitoring activities. The term "real-time" refers to direct reading instruments that allow nearly instantaneous determinations of a chemical concentration in air. Real-time measurements provide immediate information for worker scenarios and, with the use of appropriate site safety measures, help prevent exposures.

Real-time monitoring shall be conducted using the Rae Systems UltraRAE and MultiRAE Plus PID, and the Gastec GV-1000 piston pump with colorimetric tubes; AreaRAEs may be available for deployment if needed.

The MultiRAE plus PID will be equipped with oxygen and LEL sensors. MultiRAEs deployed in the work area may also be equipped with Hydrogen Sulfide (H₂S) chemical specific sensors.

4 Action Level Exceedences

In the event that concentrations of the COPCs exceed site action levels, appropriate action will be taken to reduce or eliminate worker exposures. Methods of controlling exposure include administration controls as well as respiratory protection. Administrative controls used include: site-wide communication of action levels, area barricades, and worker egress. Site control may be established to prevent un-protected workers from entering the designated areas without the appropriate level of personal protective equipment. Access to any affected area will be limited to workers with appropriate respiratory protection. Workers with respiratory protection must meet the criteria documented in 29 CFR 1910.134, and discussed herein:

- Must have medical clearance to don the designated respiratory protection for the affected area,

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- Must have been trained on proper use of the selected respiratory protection,
- Must have been fit-tested resulting in a satisfactory fit for the respirator being used within 1 year, and
- Must be trained on the maintenance and storage of the respiratory being used.

If benzene levels are consistently present at concentrations above 0.5 ppm, a regulated area will be established. The regulated area will be barricaded off with benzene warning signs applied at the points of interest. Entrance into the regulated area should include the use of an approved APR and only used if the worker meets the respiratory protection requirements discussed above and detailed in 1910.134 of the OSHA standard.

5 Quality Control

Each sample date represents one sample delivery group (SDG). With each of the SDGs, field blanks will be submitted for quality control purposes.

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