

Incident:	105820- BNSF Crude Oil
Location:	Casselton, ND
Client:	BNSF
Version History:	1.0

CTEH Project-Specific Action Levels
Plan/Assignment: WORK AREA

Objective: Report air levels using handheld instruments before they reach those requiring respiratory protection. Stationary monitoring devices not utilized due to extreme low temperatures and battery life concerns.

Analyte	Plan	Action Level	Basis	Action to be Taken
Total VOCs	Work Area	100 ppm	Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Benzene	Work Area	0.5 ppm	OSHA PEL Action level – Reading sustained for 15 minutes	Evacuate Area or don air purifying respirator; report reading to Site Management
Toluene	Work Area	10 ppm	½ ACGIH® TLV – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Ethyl Benzene	Work Area	10 ppm	½ ACGIH® TLV – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Xylene	Work Area	50 ppm	½ ACGIH® TLV – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Hydrogen Sulfide	Work Area	1 ppm	ACGIH® TLV – Reading sustained for 15 minutes	Evacuate Area, report reading to Site Management;
Hexane	Work Area	25 ppm	½ NIOSH TWA – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Carbon Monoxide	Work Area	12.5 ppm	½ NIOSH TWA – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Particulate Matter (PM 2.5)	Work Area	1.5 mg/m3	½ ACGIH Recommendation for respirable dust	Report reading to Site Management, recommend alternate work practices
Nitric oxide	Work Area	12.5	½ ACGIH® TLV – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices
Nitrogen Dioxide	Work Area	0.1 ppm	½ ACGIH® TLV – Reading sustained for 15 minutes	Report reading to Site Management, recommend alternate work practices

Plan/Assignment: Community

Objective: Conduct real-time air monitoring prior to homeowners entering the residence. After initial assessment, continue air monitoring while homeowners remove belongings.

Analyte	Plan	Action Level	Basis	Action to be Taken
Total VOCs	Community	0.5 ppm	Reading sustained for 15 minutes	Report reading to Site Management, Further investigation; recommend engineering control if possible.

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Benzene	Community	0.05 ppm	Instrument Detection limit Reading sustained for 15 minutes	Report reading to Site Management, recommend engineering control if possible.
Toluene	Community	1.0 ppm	Acute MRL- Reading sustained for 15 minutes	Report reading to Site Management, recommend engineering control if possible.
Hexane	Community	1.2 ppm	ACGIH TLV/42 – Reading sustained for 15 minutes	Report reading to Site Management, recommend engineering control if possible.
Xylene	Community	2.0 ppm	Acute MRL – Reading sustained for 15 minutes	Report reading to Site Management, recommend engineering control if possible.
Hydrogen Sulfide	Community	1 ppm	Instrument Detection Limit ACGIH TLV®– Reading sustained for 15 minutes	Report reading to Site Management, recommend engineering control if possible.
Sulfur dioxide	Community	0.1 ppm	Instrument detection limit	Report reading to Site Management, recommend engineering control if possible.
Nitrogen dioxide	Community	0.1 ppm	Instrument detection limit	Report reading to Site Management, recommend engineering control if possible.
Nitric Oxide	Community	0.1 ppm	Instrument detection limit	Report reading to Site Management, recommend engineering control if possible.
Particulate Matter (PM2.5)	Community	0.1 mg/m3	Wildfire Smoke Guidelines	Report reading to Site Management, recommend engineering control if possible.

Plan: All – FLAMMABILITY

Objective: Report areas where flammability is most likely

Analyte	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
LEL	1 %	-	-	-	Egress and Notify Site Management, recommend alternate work practices

Methods/Resource Types

Chemical	Instrument	Detection Limit	Media/Tube#/Lamp	Notes	Correction Factor
Total VOCs	MultiRAE	0.1 ppm	PID 10.6 eV lamp		1
Benzene	UltraRAE	0.05 ppm	PID 9.8 eV lamp	Change SEP tube frequently	0.55
	MultiRAE	0.1 ppm	PID 10.6 eV lamp		0.53
	Colorimetric	0.05 ppm	Gastec tube #121L	Measuring range: 0.1 to 10 Volume: 500 ml	1
	Analytical	2ug LOQ	3M 3520 Badge	Modified NIOSH 1500/1501	
Ethyl	MultiRAE	0.1 ppm	PID 10.6 eV lamp		0.52

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Chemical	Instrument	Detection Limit	Media/Tube#/Lamp	Notes	Correction Factor
Benzene	Analytical	2ug LOQ	3M 3520 Badge	Modified NIOSH 1500/1501	
Toluene	MultiRAE	0.1 ppm	PID 10.6 eV lamp		0.5
	Colorimetric	0.5 ppm	Gastec tube #122L	Measuring range: 2 – 50 ppm Volume: 100 mL	1
	Analytical	2ug LOQ	3M 3520 Badge	Modified NIOSH 1500/1501	
Xylene	MultiRAE	0.1 ppm	PID 10.6 eV lamp		0.39
	Colorimetric	0.1 ppm	Gastec tube #123L	Measuring range: 2 – 100 ppm Volume: 200 mL	1
	Analytical	2ug LOQ	3M 3520 Badge	Modified NIOSH 1500/1501	
Hydrogen Sulfide	MultiRAE	1 ppm	Chemical Specific Sensor	Measuring range: 1.0 – 1,000 ppm	1
	Gastec	0.25 ppm	4LL		
LEL	MultiRAE	1%		Measuring range: 1 – 100%	1
Hexane	Gastec				
	Analytical		3M 3520 Badge	Modified 1500/1501	
Sulfur dioxide	MultiRAE	0.1 ppm	Electrochemical sensor		
	Gastec	0.05 ppm	Gastec tube #5Lb		
Nitrogen dioxide	Gastec	0.5	9L		
Nitric Oxide	MultiRAE	1 ppm	10.6		

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Hand-held Survey	CTEH staff members will utilize handheld instruments (e.g. MultiRAE Plus; UltraRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations outdoors around the incident location as well as inside of the affected residence. CTEH will use these hand-held instruments primarily to measure the breathing zone and locate sources. Additionally, measurements can be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions
Analytical sampling	Analytical sampling can be used to validate the hand-held data monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples will 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.

Sampling Areas

Sampling Area	Description
Work Area	The general area around the incident location where workers are actively or sporadically



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	participating in remediation activities.
Community/Residence	The immediate area in and around the mobile home where individuals not participating in remediation activities could potentially be exposed to the spilled chemicals (ie homeowners).
Other	During the course of the remediation, some additional areas may be established which require a unique set of action levels or sampling (e.g. decontamination zones, etc.)



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Quality Assurance/Quality Control Procedures

Method	Procedure
Real-time	<ul style="list-style-type: none">• Real time instruments will 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 will be conducted, if necessary, to assess accuracy and precision in the field.• Lot numbers and expiration dates will be recorded with use of Gastec colorimetric tubes.
Analytical	<ul style="list-style-type: none">• Chain of custody documents will be completed for each sample.• Level IV data validation will be performed on the first sample group analyzed.• Level II data validation will be performed on 20% of all samples.• Level IV data validation will be performed on 10% of all samples.
Other	



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Change from version 1.0 to 1.1

- *In the section titled:*

	Name/Position	Signature	Date Signed
Prepared By:			