Appendix C: Example decision guides and chemical fact sheets for staff use while monitoring in the field

Data Decision Guides

These figures (Figure C - 1, Figure C - 2, and Figure C - 3) represent decision guides to help staff determine actions to take while in the field when applying mobile monitoring comparison values (MMCVs). There are three guides, to be used based on the instrument's averaging capabilities in real-time (e.g., instantaneous, 30-min, 1-hour, etc.) and the monitoring capabilities of the instruments in the vans. These general decision guides provide a visual representation of the associated actions for MMCV exceedances. They are not meant to be a stepwise decision tree; they are meant to help guide the user to determine the most appropriate action. These decision guides are intended for use by TCEQ field personnel.

Figure C - 1. Data decision guide for mobile monitoring team (MMT) staff for use when only instantaneous data are available. This guide is for use by MMT staff who have the instrument capabilities to do remote monitoring and stationary monitoring.

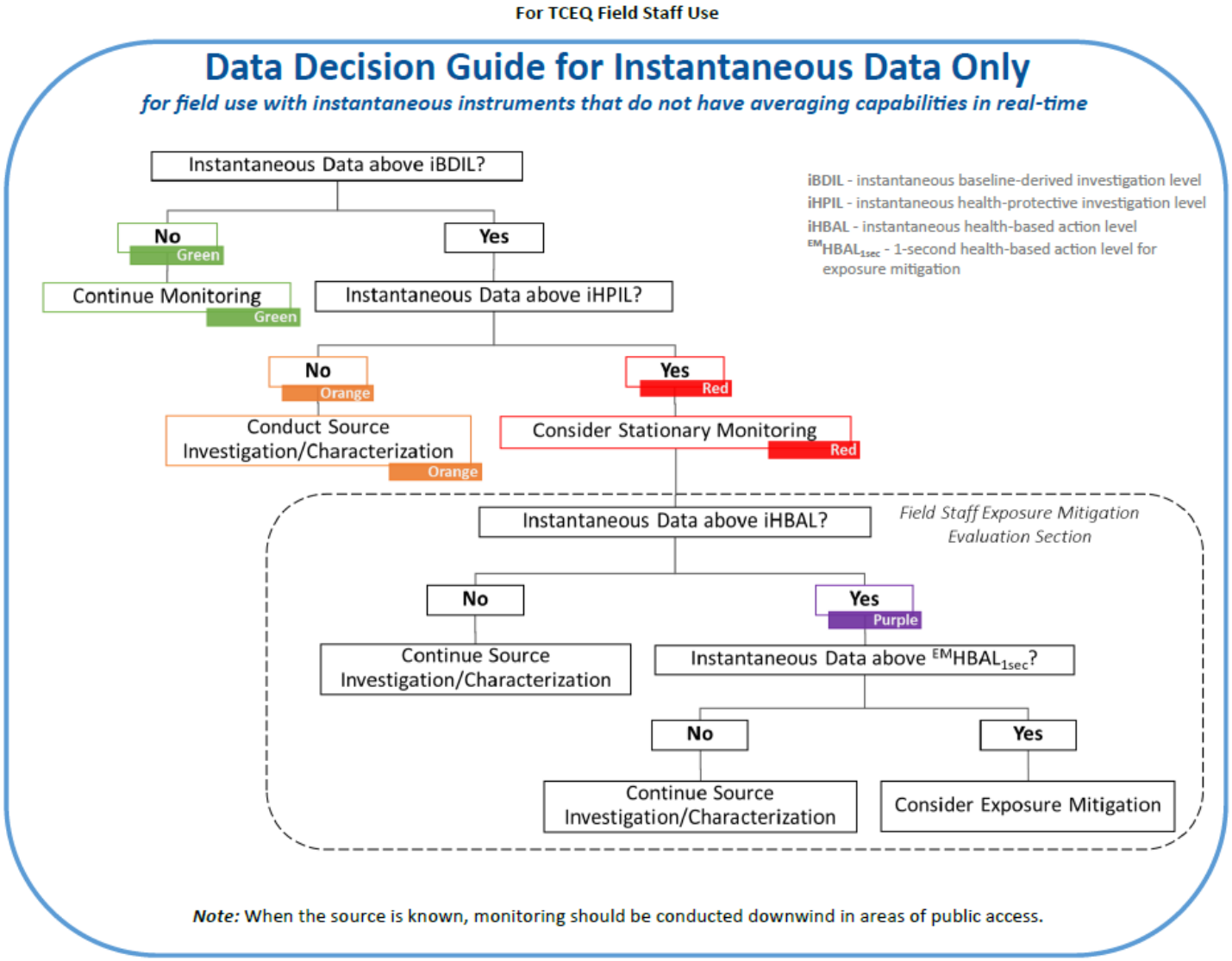


Figure C - 2. Data decision guide for mobile monitoring team (MMT) staff for use when both instantaneous and average data are available. This guide is for use by MMT staff who have the instrument capabilities to do remote monitoring and stationary monitoring.

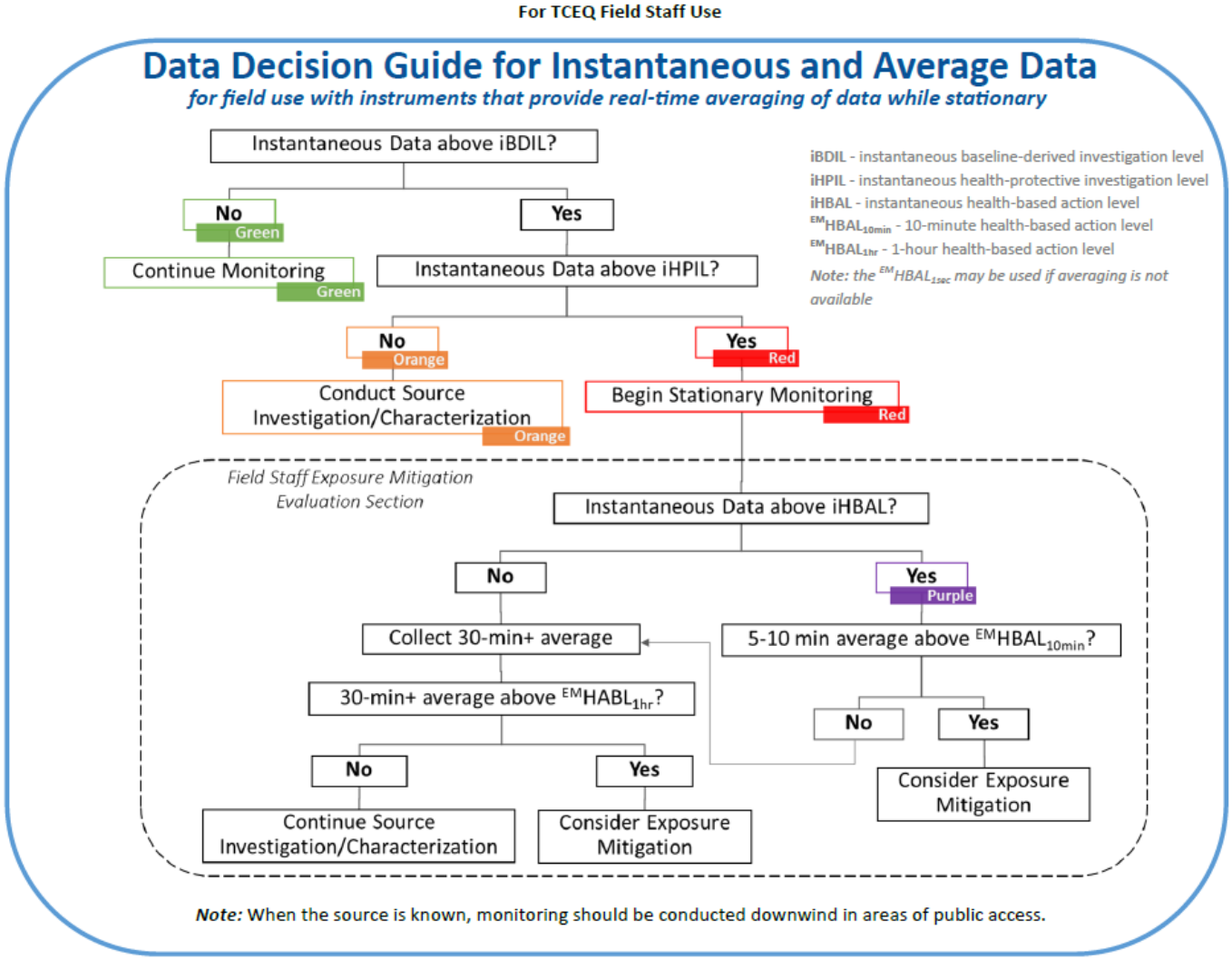
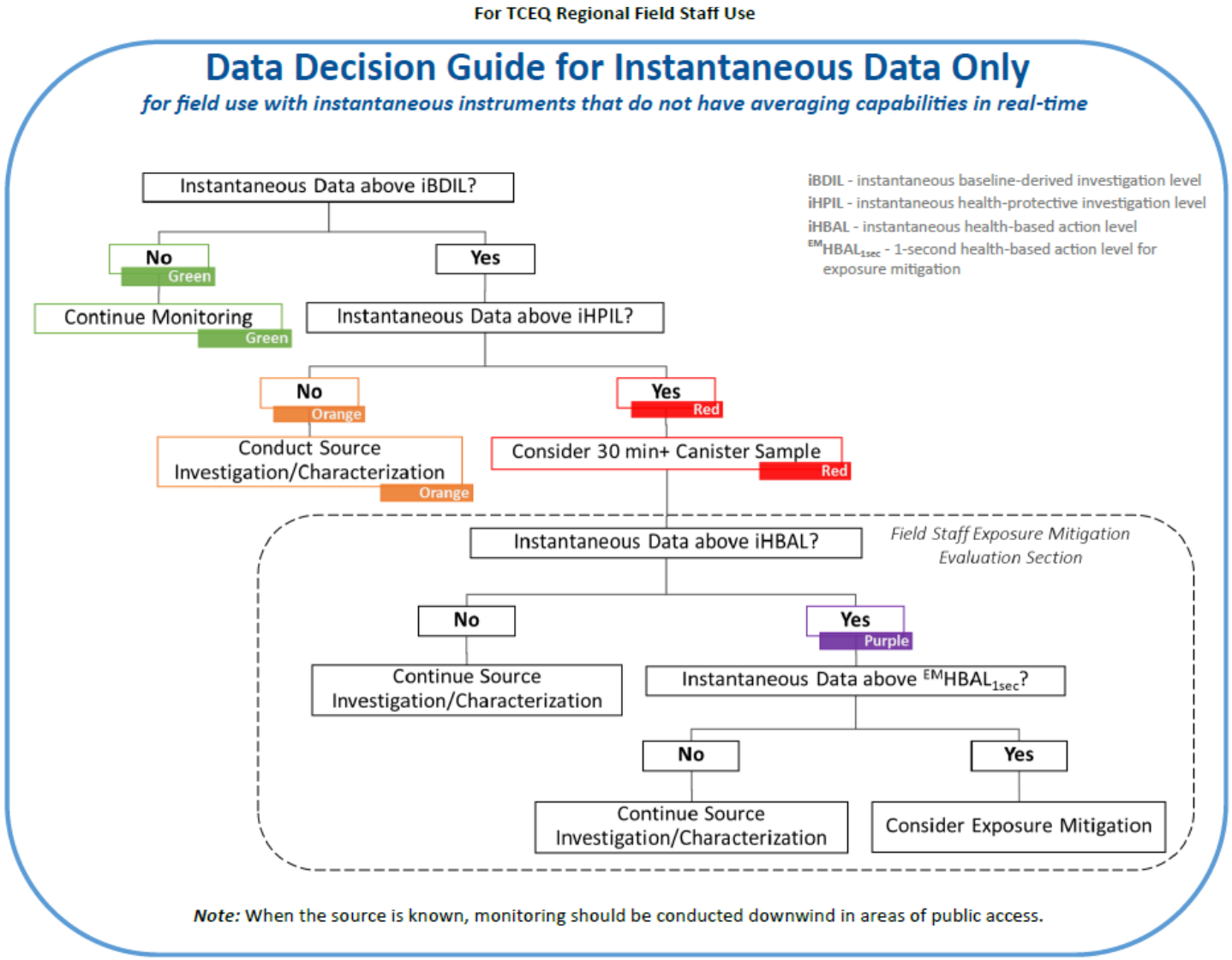


Figure C - 3. Data decision guide for TCEQ regional staff for use when only instantaneous data are available. This guide is for use by TCEQ regional staff who do not have the instrument capabilities to do remote monitoring or stationary monitoring.



Chemical-Specific Fact Sheet – Benzene as an Example

This figure (Figure C - 4) represents the chemical-specific fact sheet, using benzene as an example chemical. The document is intended as a quick reference guide on the chemical by providing information on what the chemical is, the known health effects levels, the MMCV safe levels, and other agency safe levels for reference. This fact sheet is for use by TCEQ field personnel.

Figure C - 4. Benzene fact sheet.

For TCEQ Field Staff Use

Benzene Fact Sheet

for field use with mobile monitoring instruments

This Field Guide provides a summary of the different mobile monitoring comparison values developed by the Toxicology, Risk Assessment, and Research Division for use in evaluating real-time mobile monitoring data in the field.

***All derived mobile monitoring comparison values are intended to be used as guidance.** Field investigators and mobile monitoring staff should use their own discretion when deciding to mitigate exposure, such as when experiencing health effects or intense odors, regardless of measured concentrations.*

What is Benzene?

- Benzene can be found everywhere in the environment
- Benzene rapidly degrades in the atmosphere
- Benzene has an aromatic, paint-thinner-like, sweet odor

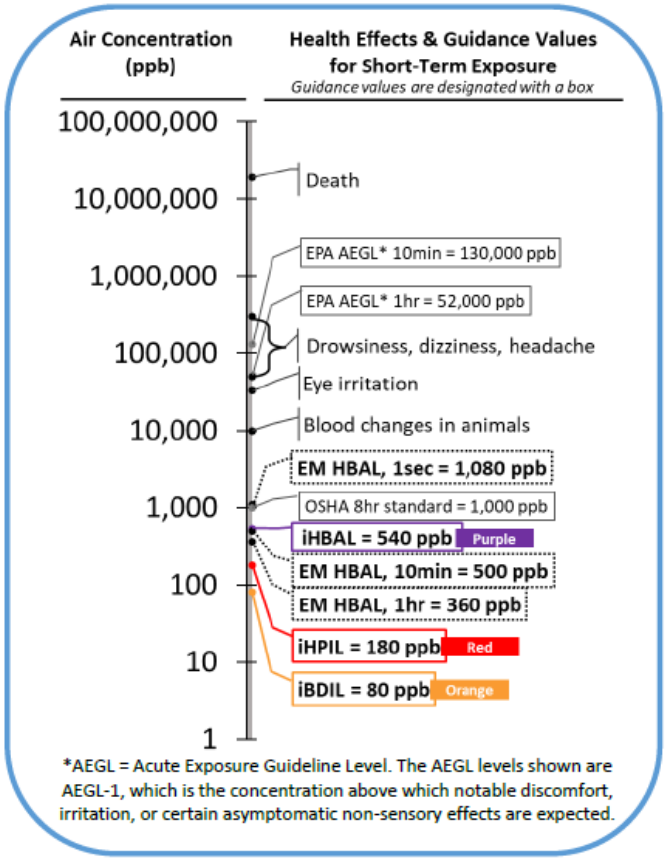
At What Levels Can Benzene Cause Harm?

Breathing high levels of benzene for a short period of time can affect the central nervous system. Repeated exposure to high levels over several days or longer can cause damage to blood cells. Long-term exposure (e.g., many years) is associated with an increased risk for cancer (i.e., acute myelogenous and monocytic leukemia).

Mobile Monitoring Comparison Values

	Benzene
iBDIL (ppb) Orange	80
iHPIL (ppb) Red	180
iHBAL (ppb) Purple	540
$^{EM}HBAL_{10min}$ (ppb)	500
$^{EM}HBAL_{1hr}$ (ppb)	360
$^{EM}HBAL_{1sec}$ (ppb)	1,080

iBDIL - instantaneous baseline-derived investigation level
iHPIL - instantaneous health-protective investigation level
iHBAL - instantaneous health-based action level
$^{EM}HBAL_{10min}$ - 10-minute health-based action level for exposure mitigation
$^{EM}HBAL_{1hr}$ - 1-hour health-based action level for exposure mitigation
$^{EM}HBAL_{1sec}$ - 1-second health-based action level for exposure mitigation



*AEGL = Acute Exposure Guideline Level. The AEGL levels shown are AEGL-1, which is the concentration above which notable discomfort, irritation, or certain asymptomatic non-sensory effects are expected.

For more information on EPA's AEGL values, please see EPA's website.

Mobile Monitoring Comparison Value Table Field Guide

These figures represent the MMCV table field guide. The main table (Table C - 1) includes a listing of MMCVs and their associated actions, for use with instantaneous data. The next table (Table C - 2) includes a listing of the exposure mitigation health-based action levels and their associated actions, for use with real-time averaged data. The last two tables (Table C - 3) are universal to all MMCVs and can be used for instruments that provide instantaneous and averaging data outputs in real time. These tables provide a quick reference to the user on the basis for the MMCVs. These tables are for use by TCEQ field personnel.

Final: June 2024
Updated: January 2026

Table C - 1. Table of the mobile monitoring comparison values for instantaneous data.

For TCEQ Field Staff Use

Mobile Monitoring Comparison Values for Instantaneous Data

for field use with instruments that cannot average data in real-time or for in-motion measurements

Chemical(s) DUVAS COLOR	UNITS	iBDIL ORANGE	iHPIL RED	iHBAL PURPLE	$^{EM}HBAL_{1sec}$ N/A
Acetylene	ppb	80	25,000	75,000	150,000
Ammonia	ppb	--	850	2,550	5,100
Benzene	ppb	80	180	540	1,080
1,3-Butadiene	ppb	40	1,700	5,100	10,200
Butane	ppb	--	92,000	276,000	552,000
1-Butene	ppb	110	27,000	81,000	162,000
C3-C4 Saturated	ppb	960	--	--	--
Chlorine	ppb	--	70	210	420
Cyclohexane	ppb	120	1,000	3,000	6,000
Ethylbenzene	ppb	350	20,000	60,000	120,000
Ethylene Dichloride	ppb	--	540	1,620	3,240
Ethylene Glycol	ppb	--	1,900	5,700	11,400
Ethylene Oxide	ppb	--	910	2,730	5,460
Formaldehyde	ppb	--	44	132	264
n-Hexane	ppb	340	5,400	16,200	32,400
Hydrochloric Acid	ppb	--	440	1,320	2,640
Hydrogen Sulfide	ppb	--	70	210	420
Isobutane	ppb	280	33,000	99,000	198,000
n-Octane	ppb	160	4,100	12,300	24,600

Chemical(s) DUVAS COLOR	UNITS	iBDIL ORANGE	iHPIL RED	iHBAL PURPLE	^{EM}HBAL$_{1sec}$ N/A
Propane [a]	ppb	540	--	--	--
Propylene [a]	ppb	--	--	--	--
Sodium Hydroxide	ppb	--	5	15	30
Styrene	ppb	60	5,100	15,300	30,600
Sulfur Dioxide	ppb	70	125	375	750
Sulfuric Acid	ppb	--	30	90	180
Toluene	ppb	70	4,000	12,000	24,000
Vinyl Chloride	ppb	--	72,000	216,000	432,000
Xylenes + Ethylbenzene	ppb	60	5,000 [b]	15,000 [b]	30,000 [b]
Xylenes	ppb	350	5,000	15,000	30,000
$PM_{2.5}$	µg/m^3	--	105	--	--
PM_{10}	µg/m^3	--	450	--	--
Associated Actions		Conduct source investigation/ characterization	Consider stationary monitoring	Consider stationary monitoring & evaluation for ^{EM}HBAL levels	Consider exposure mitigation if 1 sec value > level

[a] Simple asphyxiant, non-toxic in ambient air; [b] Values are based on xylenes; "--"no value available; ppb – parts per billion; N/A – not applicable
***iBDIL** – instantaneous baseline-derived investigation level;*
***iHPIL** – instantaneous health-protective investigation level;*
***iHBAL** – instantaneous health-based action level;*
***^{EM}HBAL$_{1sec}$** – 1-second exposure mitigation health-based action level*

***Special Note for Nephelometer:** The nephelometers may be used to provide $PM_{2.5}$ and PM_{10} estimates during fires, smoke events, and/or emissions events resulting from incidents where PM-related air quality impacts are expected. The nephelometers are not intended for use to assess nuisance complaints. $PM_{2.5}$ and PM_{10} are NAAQS compounds; instantaneous and exposure mitigation HBAL levels could not be derived for these compounds.*

Note: If a value does not exist and one is needed for screening, please contact the Toxicology Division for a trip-specific value at TOX@tceq.texas.gov or 512-239-1795.

Table C - 2. Table of the mobile monitoring comparison values for averaged data.

For TCEQ Field Staff Use

Exposure Mitigation Health-Based Action Levels for Averaged Data

for field use with instruments that provide real-time averaging of data while stationary

These values should not be directly compared to instantaneous data

Chemical(s)	$^{EM}HBAL_{10min}$ (ppb)	$^{EM}HBAL_{1hr}$ (ppb)
Acetylene	75,000	50,000
Ammonia	2,550	1,700
Benzene	500 [b]	360
1,3-Butadiene	2,500 [b]	3,400
Butane	276,000	184,000
1-Butene	81,000	54,000
C3-C4 Saturated	--	--
Chlorine	200 [b]	140
Cyclohexane	3,000	2,000
Ethylbenzene	60,000	40,000
Ethylene Dichloride	1,000 [b]	1,080
Ethylene Glycol	5,700	3,800
Ethylene Oxide	2,500 [b]	1,820
Formaldehyde	132	88
n-Hexane	16,200	10,800
Hydrochloric Acid	1,000 [c]	880

Chemical(s)	$^{EM}HBAL_{10min}$ (ppb)	$^{EM}HBAL_{1hr}$ (ppb)
Hydrogen Sulfide	210	140
Isobutane	99,000	66,000
n-Octane	12,300	8,200
Propane [a]	--	--
Propylene [a]	--	--
Sodium Hydroxide	15	10
Styrene	10,000 [b]	10,200
Sulfur Dioxide	375	250
Sulfuric Acid	90	60
Toluene	12,000	8,000
Vinyl Chloride	216,000	144,000
Xylenes + Ethylbenzene	15,000 [d]	10,000 [d]
Xylenes	15,000	10,000
Associated Actions	Consider exposure mitigation if 5-10 min avg > level	Consider exposure mitigation if 30+ min avg > level

[a] Simple asphyxiant, non-toxic in ambient air; [b] Based on ½ occupational short-term exposure level (STEL); [c] Based on ½ occupational ceiling value;
[d] Values are based on acute health-based comparison values (AHBCV) for xylenes; "--"no value available; ppb – parts per billion;
$^{EM}HBAL_{10min}$ – 10-minute exposure mitigation health-based action level;
$^{EM}HBAL_{1hr}$ – 1-hour exposure mitigation health-based action level

Table C - 3. Tables showing the basis of the instantaneous and exposure mitigation mobile monitoring comparison values and recommended actions if they are exceeded.

Basis of instantaneous mobile monitoring comparison values and recommended actions if exceeded:

Comparison Value (Acronym)	DUVAS Caterpillar Color [a]	Basis	Recommended Actions with Exceedance
Concentrations below instantaneous comparison values	GREEN	N/A	No associated action
Instantaneous baseline-derived investigation level (iBDIL)	ORANGE	10× baseline level	Source investigation/characterization
Instantaneous health-protective investigation level (iHPIL)	RED	1× selected AHBCV	• Stationary monitoring or canister sample (30-min to 1-hour) • Source investigation/characterization
Instantaneous health-based action level (iHBAL)	PURPLE	3× selected AHBCV	• Increased vigilance for exceedance of an exposure mitigation value • Stationary monitoring (5-10 min) • Stationary monitoring or canister sample (30-min to 1-hour) • Source investigation/characterization

[a] Colors represent values that are ≥ the appropriate comparison value; AHBCV – acute health-based comparison value; DUVAS – Differential Ultra-Violet Absorption Spectrometer; N/A – not applicable

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Basis of exposure mitigation values and recommended actions if exceeded:

Comparison Value (Acronym)	Basis	Recommended Actions
10-min health-based action level for exposure mitigation ($^{EM}HBAL_{10min}$)	Lower of 3×AHBCV [a], ½ STEL [b], or ½ C [c]	Consider exposure mitigation for staff
1-hour health-based action level for exposure mitigation ($^{EM}HBAL_{1hr}$)	2×AHBCV	Consider exposure mitigation for staff
1-sec health-based action level for exposure mitigation ($^{EM}HBAL_{1sec}$)	3×$^{EM}HBAL_{1hr}$	Consider exposure mitigation for staff

AHBCV – acute health-based comparison value; C – occupational ceiling value; STEL – 15-minute short-term occupational exposure limit