

## Post Fire – Potential Exposure Limits to Consider

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DOH Fact Sheet:

*“Results from environmental tests are rarely needed to inform the actions people should take to avoid being exposed to smoke because smoke is known to be toxic and people should avoid breathing it. Also, environmental testing is rarely needed to help to direct cleanup efforts or to determine whether a building may be reoccupied.*

*“When environmental testing is necessary, it is usually done for specific, fire-related chemicals and a comprehensive sampling plan is developed so that results are reliable and informative. Any environmental samples must be analyzed by a laboratory certified by the New York State Department of Health Environmental Laboratory Approval Program (ELAP). Collecting just a few environmental “grab” samples without having a sampling plan often produces uncertain results that don't help decision-making.”*

### **OSHA Permissible Exposure Limits (PELs)**

TWA concentrations for OSHA PELs must not be exceeded during any 8-hour workshift of a 40-hour workweek.

A STEL is designated by "ST" preceding the value and is measured over a 15-minute period unless noted otherwise.

OSHA ceiling concentrations (designated by "C" preceding the value) must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure.

### **NIOSH Recommended Exposure Limits (RELs)**

For NIOSH RELs, "TWA" indicates a time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek.

A short-term exposure limit (STEL) is designated by "ST" preceding the value; unless noted otherwise, the STEL is a 15-minute TWA exposure that should not be exceeded at any time during a workday.

A ceiling REL is designated by "C" preceding the value; unless noted otherwise, the ceiling value should not be exceeded at any time.

Any substance that NIOSH considers to be a potential occupational carcinogen is designated by the notation "Ca".

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The "[skin]" designation indicates the potential for dermal absorption; skin exposure should be prevented as necessary through the use of good work practices, gloves, coveralls, goggles, and other appropriate equipment.

The IDLH was considered a maximum concentration above which only a highly reliable breathing apparatus providing maximum worker protection should be permitted. In determining IDLH values, NIOSH considered the ability of a worker to escape without loss of life or irreversible health effects along with certain transient effects, such as severe eye or respiratory irritation, disorientation, and in coordination, which could prevent escape. As a safety margin, IDLH values are based on effects that might occur as a consequence of a 30-minute exposure. However, the 30-minute period was NOT meant to imply that workers should stay in the work environment any longer than necessary; in fact, EVERY EFFORT SHOULD BE MADE TO EXIT IMMEDIATELY!

### **American Industrial Hygiene Association (AIHA) Emergency Response Planning Guidelines ERPGs**

ERPG Definitions: The AIHA ERP Committee has utilized three guidance concentration levels. Each of these levels is defined and briefly discussed below:

ERPG-3: "The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects."

The ERPG-3 level is a worst-case planning level above which there is the possibility that some members of the community may develop life threatening health effects. This guidance level could be used to determine the airborne concentration of a chemical that could pose life threatening consequences should an accident occur. This concentration could be used in planning stages to project possible levels in the community. Once the distance from the release to the ERPG-3 level is known, the steps to mitigate the potential for such a release can be established.

ERPG-2: "The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action."

Above ERPG-2, there may be significant adverse health effects, signs, or symptoms for some members of the community which could impair an individual's ability to take protective action. These effects might include severe eye or respiratory irritation, muscular weakness, CNS impairments, or serious adverse health effects.

ERPG-1: "The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor."

The ERPG-1 identifies a level which does not pose a health risk to the community but which may be noticeable due to slight odor or mild irritation. In the event that a small non-threatening release has occurred, the community could be notified that they may notice an odor or slight irritation but that concentrations are below those which could cause unacceptable health effects. For some materials, because of their properties, there may not be an ERPG-1. Such cases would include substances for which sensory perception levels are higher than the ERPG-2 level. In those cases, the ERPG-1 level would be given as "Not Appropriate." It is also possible that no valid sensory perception data are available for the chemical. In these cases, the ERPG-1 level would be given as "Insufficient Data."

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### **AEGLs Acute Exposure Guidelines Levels**

(United States Environmental Protection Agency, downloaded from website 4/15/14, <http://www.epa.gov/oppt/aegl/index.htm>)

AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. AEGL-2 and AEGL-3, and AEGL-1 values as appropriate, will be developed for each of five exposure periods (10 and 30 minutes, 1 hour, 4 hours, and 8 hours) and will be distinguished by varying degrees of severity of toxic effects. It is believed that the recommended exposure levels are applicable to the general population including infants and children, and other individuals who may be susceptible. The three AEGLs have been defined as follows:

AEGL-1 is the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL-2 is the airborne concentration (expressed as ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3 is the airborne concentration (expressed as ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Airborne concentrations below the AEGL-1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor, taste, and sensory irritation or certain asymptomatic, nonsensory effects. With increasing airborne concentrations above each AEGL, there is a progressive increase in the likelihood of occurrence and the severity of effects described for each corresponding AEGL. Although the AEGL values represent threshold levels for the general public, including susceptible subpopulations, such as infants, children, the elderly, persons with asthma, and those with other illnesses, it is recognized that individuals, subject to unique or idiosyncratic responses, could experience the effects described at concentrations below the corresponding AEGL.

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### Hydrochloric Acid - Exposure Limits

*from OSHA Occupational Chemical Database website 3/12/14*

OSHA		NIOSH		Related Information
PEL-TWA ppm:	NA	REL-TWA ppm:	NA	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b>
PEL-TWA mg/m3:	NA	REL-TWA mg/m3:	NA	
PEL-STEL ppm:	NA	REL-STEL ppm:	NA	
PEL-STEL mg/m3:	NA	REL-STEL mg/m3:	NA	
PEL-C ppm:	5	REL-C ppm:	5	
PEL-C mg/m3:	7	REL-C mg/m3:	7	<b>Carcinogen Classifications:</b>
Skin Notation:	N	Skin Notation:	N	IARC-3, TLV-A4
Notes: NA		Notes: NA		
		IDLH ppm:	50	
		IDLH mg/m3:	NA	
		IDLH Notes:	NA	

### Hydrocyanic Acid - Exposure Limits

*from OSHA Occupational Chemical Database website 3/12/14*

OSHA		NIOSH		Related Information
PEL-TWA ppm:	10	REL-TWA ppm:	NA	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b>
PEL-TWA mg/m3:	11	REL-TWA mg/m3:	NA	
PEL-STEL ppm:	NA	REL-STEL ppm:	4.7	
PEL-STEL mg/m3:	NA	REL-STEL mg/m3:	5	
PEL-C ppm:	NA	REL-C ppm:	NA	
PEL-C mg/m3:	NA	REL-C mg/m3:	NA	<b>Carcinogen Classifications:</b>
Skin Notation:	Y	Skin Notation:	Y	EPA-II
Notes: NA		Notes: NA		
		IDLH ppm:	50	
		IDLH mg/m3:	NA	

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		<b>IDLH Notes:</b>	NA
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### Carbon Monoxide - Exposure Limits

*from OSHA Occupational Chemical Database website 3/12/14*

OSHA	NIOSH		Related Information	
PEL-TWA ppm:	50	REL-TWA ppm:	35	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b>
PEL-TWA mg/m3:	55	REL-TWA mg/m3:	40	
PEL-STEEL ppm:	NA	REL-STEEL ppm:	NA	
PEL-STEEL mg/m3:	NA	REL-STEEL mg/m3:	NA	
PEL-C ppm:	NA	REL-C ppm:	200	
PEL-C mg/m3:	NA	REL-C mg/m3:	229	<b>Carcinogen Classifications:</b>
Skin Notation:	N	Skin Notation:	N	
Notes: NA		Notes: NA		
		IDLH ppm:	1200	
		IDLH mg/m3:	NA	
		IDLH Notes:	NA	

### Ammonia - Exposure Limits

*from OSHA Occupational Chemical Database website 3/12/14*

OSHA	NIOSH		Related Information	
PEL-TWA ppm:	50	REL-TWA ppm:	25	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b>
PEL-TWA mg/m3:	35	REL-TWA mg/m3:	18	
PEL-STEEL ppm:	NA	REL-STEEL ppm:	35	
PEL-STEEL mg/m3:	NA	REL-STEEL mg/m3:	27	
PEL-C ppm:	NA	REL-C ppm:	NA	
PEL-C mg/m3:	NA	REL-C mg/m3:	NA	<b>Carcinogen Classifications:</b>
Skin Notation:	N	Skin Notation:	N	
Notes: NA		Notes: NA		

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	<b>IDLH ppm:</b>	300	
	<b>IDLH mg/m3:</b>	NA	
	<b>IDLH Notes:</b>	NA	

### Nitrogen Dioxide - Exposure Limits

*from OSHA Occupational Chemical Database website 3/12/14*

OSHA		NIOSH		Related Information
<b>PEL-TWA ppm:</b>	NA	<b>REL-TWA ppm:</b>	NA	<b>AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:</b>
<b>PEL-TWA mg/m3:</b>	NA	<b>REL-TWA mg/m3:</b>	NA	1 ppm/15 ppm/30 ppm
<b>PEL-STEL ppm:</b>	NA	<b>REL-STEL ppm:</b>	1	
<b>PEL-STEL mg/m3:</b>	NA	<b>REL-STEL mg/m3:</b>	1.8	
<b>PEL-C ppm:</b>	5	<b>REL-C ppm:</b>	NA	
<b>PEL-C mg/m3:</b>	9	<b>REL-C mg/m3:</b>	NA	<b>Carcinogen Classifications:</b>
<b>Skin Notation:</b>	N	<b>Skin Notation:</b>	N	TLV-A4
<b>Notes: NA</b>		<b>Notes: NA</b>		
		<b>IDLH ppm:</b>	20	
		<b>IDLH mg/m3:</b>	NA	
		<b>IDLH Notes:</b>	NA	

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<b>Hydrogen chloride 7647-01-0 (Final)</b>					
<b>ppm</b>					
	10 min	30 min	60 min	4 hr	8 hr
<b>AEGL 1</b>	1.8	1.8	1.8	1.8	1.8
<b>AEGL 2</b>	100	43	22	11	11
<b>AEGL 3</b>	620	210	100	26	26

<b>Hydrogen cyanide 74-90-8 (Final)</b>					
<b>Ppm</b>					
	10 min	30 min	60 min	4 hr	8 hr
<b>AEGL 1</b>	2.5	2.5	2.0	1.3	1.0
<b>AEGL 2</b>	17	10	7.1	3.5	2.5
<b>AEGL 3</b>	27	21	15	8.6	6.6

<b>Nitrogen dioxide 10102-44-0 (Final)</b>					
<b>ppm</b>					
	10 min	30 min	60 min	4 hr	8 hr
<b>AEGL 1</b>	0.50	0.50	0.50	0.50	0.50
<b>AEGL 2</b>	20	15	12	8.2	6.7
<b>AEGL 3</b>	34	25	20	14	11

<b>Carbon monoxide 630-08-0 (Final)</b>					
<b>ppm</b>					
	10 min	30 min	60 min	4 hr	8 hr
<b>AEGL 1</b>	NR	NR	NR	NR	NR
<b>AEGL 2</b>	420	150	83	33	27
<b>AEGL 3</b>	1,700	600	330	150	130

NR = Not recommended due to insufficient data

<b>Ammonia 7664-41-7 (Final)</b>					
<b>ppm</b>					
	10 min	30 min	60 min	4 hr	8 hr
<b>AEGL 1</b>	30	30	30	30	30
<b>AEGL 2</b>	220	220	160	110	110
<b>AEGL 3</b>	2,700	1,600	1,100	550	390