

# **STANFORD TOXIC GAS ALARM SYSTEMS**

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Stanford University has standardized the design and programming of campus Fire/Toxic Gas Alarm Systems. For toxic gases, there are two types of alarms that affect the occupants of buildings: (1) local alarms (usually a laboratory alarm) that do not call out the Fire Department, and (2) building alarms that automatically call out the Fire Department. In both cases for toxic gas alarms, a toxic gas sensor detected a toxic gas or a manual fire/toxic gas alarm has been activated. When a local alarm sounds (includes horn and strobe), only that laboratory with the alarm has to be evacuated. The building emergency evacuation plan will prescribe the procedures for re-entering the affected laboratory. When the building alarm sounds (includes horns and strobes), the whole building must be evacuated, and the occupants cannot return until the On-Scene Commander for responding Fire Department announces the building is safe for re-entry.

The above paragraph describes what a building occupant must do when a particular alarm sounds. However, it is important also to know what occurs within the Toxic Gas Alarm System when a sensor detects a gas or a manual fire/toxic gas alarm is activated. In both cases, the flow of gas from the gas cylinder is shut off at the cylinder valve. For the gas detected, there will be no flow from the gas cylinder to any areas in the building. In addition, even though an audible alarm is not sounded, the gas flow is shut off if a seismic switch, emergency power-off, failure of emergency power, or excess flow sensor is actuated.

The table below shows in tabular form what is described above. A red Input always sets off the building evacuation alarm and calls out the Fire Department even though a local toxic gas alarm may also be sounding. A yellow Input only sounds local alarms requiring evacuation of the affected room, but does not call out the Fire Department.

If you have questions regarding Stanford Toxic Gas Alarm Systems, please contact the University Chemical Hygiene Officer at EH&S (725-0448). For more information about the use, handling, and storage of toxic gas, consult the EH&S Lab Web page at <http://www.stanford.edu/dept/EHS/prod/researchlab/lab/index.html>.

# Guidelines: Fire and Gas Emergency Monitoring System Operational Matrix

	OUTPUT															
	Gas Shutdown Lab	Gas Shutdown Lab	Gas Shutdown Flammable Lab	Gas Shutdown Toxic Bunker	TGO Building	TGO Lab	TGO Bunker	TGO Bunker	Fire Department Level 2	Emergency Ctr 24hr	Emergency Ctr 24hr	Emergency Ctr 24hr	Emergency Ctr 24hr	Emergency Ctr 24hr	Fire Alarm	Fire Department Notification
<b>NOTES:</b>	<p>1. Gas shutdown is for area affected only. For example, if treatment failure is for a gas cabinet, then only shutdown gas flow to that cabinet.</p> <p>2. EMCS (Emergency Management Control System) Level 1 is for same or next workday response.</p> <p>3. EMCS Level 2 is for immediate response; however, local responders may adjust their response time depending on the type of alarm and known information.</p> <p>4. Control systems shall use GE, Allen Bradley, or Seimens type PLC.</p> <p>5. TGO strobes shall be "blue" in color.</p> <p>6. Time Delay for Excess Flow is 10 sec for 0-100ft, 20 sec for 101-200ft, 30 sec for 201-300ft, and 40 sec for 301ft or greater length of piping.</p> <p>7. Gas detection alarm may be delayed up to 45 sec for PELs, but must be instantaneous for IDLHs.</p> <p>8. Emergency Power Off [EPO] switches must have green-off and red-on light indicators.</p> <p>9. Local users are designated by lower case "x" and upper case "X" with lower case being the research user and upper case being the user's unit safety contact.</p> <p>10. "y" designation indicates additional outputs to the Fire Alarm outputs if the TGO Alarm is activated.</p> <p>11. If a bunker is separate from a building, during a bunker evacuation, only the bunker will be evacuated.</p>															
Seismic switch	x	x	x	x					x			x				
Gas detection (Lab room air)	x	x			x	x		x			x		x	x	x	x
Gas detection (Lab exhausted area)	x	x				x					x	x				
Gas detection (Inside storage, room air)							x	x			x		x	x	x	x
Gas detection (Bunker flammable, room air)			x			x		x			x	x			x	x
Gas detection (Bunker flammable, exhausted air)			x			x					x	x				
Gas detection (Bunker toxic, room air)				x			x	x			x	x			x	x
Gas detection (Bunker toxic, exhausted area)				x			x				x	x				
Gas detection, low level									x							
Gas detection fault									x			x				
Emergency power off [EPO] (Remote, if used)	x	x	x	x							x	x				
Emergency power off [EPO] (Lab)	x	x									x	x				
Emergency power off [EPO] (Bunker)			x	x							x	x				
Failure of emergency power [Time delay = 5 sec]	x	x	x	x						x			x			
Failure of treatment system	x	x	x	x						x		x				
Excess flow [Time delay]	x								x			x				
Excess flow [Time delay] (Bunker, flammable)			x						x			x				
Excess flow [Time delay] (Bunker, toxic)				x					x			x				
Fire/TGO alarm activation building (smoke, pull, water flow)	x	x	x	x	y					x			x	x	x	x
Fire/TGO alarm activation bunker (smoke, pull, water flow)			x	x			y			x			x	x	x	x