3.2.1.4 Air Monitoring

	YOUR ORGANIZATION STANDARD OPERATING PROCEDURES/GUIDELINES

TITLE: Air Monitoring	**SECTION/TOPIC:** Fire Suppression Risk Management
NUMBER: 3.2.1.4	**ISSUE DATE:**
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PREPARED BY: X _____ Preparer	**APPROVED BY:** X _____ Approver
These SOPs/SOGs are based on FEMA guidelines FA-197	

1.0 POLICY REFERENCE

CFR	
NFPA	
NIMS	

2.0 PURPOSE

This standard operating procedure/guideline addresses monitoring carbon monoxide (CO) levels during overhaul, equipment and uses, removal of SCBA.

The purpose of the air management policy is to improve firefighter safety by describing how we will manage the air in our SCBA cylinders while operating in the hazard zone at an incident.

3.0 SCOPE

This SOP/SOG pertains to all personnel in this organization.

4.0 DEFINITIONS

These definitions are pertinent to this SOP/SOG.

5.0 PROCEDURES/GUIDELINES & INFORMATION

5.1 <u>Monitoring Carbon Monoxide (CO) Levels during Overhaul</u>:

<u>History</u>

The vast majority of the structure fires we respond to are single or multi-family residential occupancies. Our typical strategy is an aggressive offensive fire fight to achieve the tactical priorities. Generally, we are able to search these structures quickly, put out the fire, and exit the hazard zone without having to give much thought to air management. There are usually multiple points of egress close by should a rapid retreat to the exterior become necessary.

A serious safety issue evolves when we apply these same residential air management tactics to larger, more complex structures such as commercial buildings. Air management becomes critically important in incidents involving commercial buildings because firefighting forces usually have greater travel distances and have to navigate obstacles to reach the fire. Additionally, there are limited points of egress available for rapid retreat to the exterior if conditions change. The increased fire load inside the structure and complex interior building arrangements challenge us as we attempt to exit the building as the line you enter on is also the exit path. Locating the fire, extinguishment, and exiting the hazard zone requires more time and air consumption. The danger of getting lost or entangled on the way out increases as well so it's critical to insure firefighters exit the hazard zone with an emergency reserve of air.

After City a Firefighter's death, numerous training exercises were conducted to determine the causes and possible solutions for firefighter emergencies encountered during commercial and/or "big box" fires. It was discovered that once the low air alarm of an SCBA is activated, a firefighter can crawl approximately 150 feet until their air supply is exhausted. For this reason the maximum distance a crew will enter any building is 150 feet. If the fire is located further than 150 feet, command will assign additional companies to attack from a closer access point. When operating from a horizontal standpipe, gated "Y" devices are not to be taken inside a structure.

<u>#1 Rule of Air Management</u>

<u>All members utilizing an SCBA in the hazard zone of an incident shall monitor the amount of air in their SCBA cylinder as well as their rate of air consumption in order to exit the hazard zone prior to the low air alarm activation of the SCBA.</u>

Just as ocean divers are trained to surface with an emergency reserve of air, firefighters shall exit the hazard zone of an incident with an emergency reserve of air. It is critical that firefighters understand that the initial 75% of the air supply is the "working and exiting air". This includes air utilized for gaining access, working toward the tactical objectives, and exiting the hazard zone.

The remaining 25% of the air supply is the emergency reserve to be used only in the event an

emergency occurs while exiting such as becoming lost, trapped, or entangled upon exiting the hazard zone.

Company officers shall frequently assess their crew's air consumption rates and decide the crew's exit time based on the individual with the greatest assumed air consumption rate. It is the individual firefighter's responsibility to continually assess and report his/her air consumption to his/her company officer.

Strategic Level Air Management

The incident commander shall consider air management a critical fireground factor when evaluating the risk management profile of a building, performing size-up, and determining the strategy. Command will assist companies in air management by:

- Controlling position and function of crews in the hazard zone (accountability)
- Maintaining an awareness of how long crews have been working (elapsed time notifications)
- Insuring adequate resources are on-scene to maintain a tactical reserve (layered resources)
- Assigning companies to multiple points of egress (150' rule)
- Relieving and rotating operating crews as needed (recycle / rehab / on-deck).

Command should seek "air status" of companies in the hazard zone through regular position, air status, conditions, actions, and needs reports (PACAN reports). Benchmarks for PACAN reports are 10 minute elapsed time on air, all clear, fire control, and lost stopped.

To enhance firefighter safety, command shall maintain a tactical reserve of companies on-scene. An extra company should be assigned to a forward "on-deck" position within each sector to facilitate rapid relief and replacement of companies that are exiting the hazard zone. The forward or "on-deck" company will also be ready and available to rapidly deploy for firefighter rescue in the event the need arises (RIC).

Tactical Level Air Management

A Battalion Chief along with his FIT should be placed in each sector to insure the actions of crews working within the sector accomplish the tactical objectives. The FIT assumes the role of assistant safety officer while the BC focuses on tactics in the sector. The responsibilities of the BC / FIT team in the sector include:

- Performing size-up and determining tactics for the sector
- Accountability of members operating in the sector (passports, tagging hose lines)
- Requesting resources and maintaining a reserve of "on-deck" companies
- Tracking operating crews time on air
- Managing rotation of crews and providing relief either through recycle or rehab
- Providing command with frequent PACAN reports.

Task Level Air Management

Every member shall check their SCBA at the beginning of the shift to insure that they have a full air cylinder and the pass device works. On the fireground every firefighter is responsible for managing their own air supply and frequently communicating the status of their air supply to the company officer. In turn, the company officer will give frequent progress reports including air status to command or the sector officer.

Prior to entry into the hazard zone, the company officer will brief his/her crew on the plan for achieving the tactical objectives including exiting the hazard zone together. This insures the crew has a "round trip ticket" into and out of the hazard zone safely. All members shall maintain constant contact with the hose line and manage the line so that excessive hose is not brought into the structure. This will assist in reducing travel time while following the hose line out of the building when air management is the most critical.

All members of the crew will exit prior to the low air alarm sounding on the SCBA.

Air Emergencies

An air emergency is defined as: "*anytime the breathing apparatus being used cannot deliver air to the user as designed; whether by mechanical failure or if the individual has consumed the air supply beyond the designed work cycle, or an individual becomes lost or trapped within an IDHL environment regardless of air supply".*

Activation of the low-air warning (vibe alert/whistle) is an ***immediate action*** item for the individual and the crew involved. Immediate action is described as notifying command of low-air alarm activation and immediately exiting the IDLH atmosphere intact as a crew and notifying command that you are out with a PAR after exiting. If a crew member is unable to exit due to being lost, trapped, or injured an immediate May-Day shall be called. Furthermore, when remaining air supply in the SCBA cylinder reaches the 18% to 15% range a May-Day should be called if personnel are still inside an IDLH atmosphere and will be unable to exit within 5 minutes.

In a situation that is not an urgent May-Day situation such as a low air activation while still inside an IDLH atmosphere but near an exit and able to reach the exterior safely, the notification from the crew to command will trigger a set of questions from the IC to the crew. The IC should determine:

- Where are you in the building?
- Are you able to exit safely?
- Notify me with a PAR when you are clear of the building

The IC will then notify the sector officer and/or on-deck crew stating, “I have a crew/individual that has a low air activation going off and exiting the - - - - side of the building. This will give personnel that could affect a rescue a heads up that there could be a possible emergency and rescue personnel can position themselves accordingly.

The IC will also follow up with the alarm room to insure that the Alarm Room copied the low air notification. This serves only as a heads up and requires no action by the Alarm Room.

After notification of a low-air alert, the IC will begin monitoring time elapsed since receiving notification of the low air alarm. If the individual and crew involved have not exited the building within a five or ten minute time frame, then command would react accordingly to the circumstances of the event. This may include emergency traffic, or a May-Day declaration and deployment of a RIC crew, based upon experience or circumstances that the IC is presented with.

Summary of Key Points

- Always start with a full SCBA cylinder
- Have a Round trip ticket plan (entry and exit plan)
- Maximum interior distance is 150 feet
- No gated Y's inside building
- Everyone is responsible for their own air management
- Captain's monitor crews air supply
- Crew reports air supply to Captain
- Sector officers monitor companies in their sector

- Command communicates with sectors and crews and insures adequate resources are on-scene
- Everyone exits and is out of the hazard zone prior to low air alarm activation 75% -25% rule.
- Low-air warning (vibe alert/whistle) while operating in an IDLH is considered an air emergency and requires immediate action. (Notification to Command and exiting the IDLH atmosphere intact as a crew).
- May-Day should be called if unable to leave IDLH atmosphere before exhausting emergency reserve of air supply.

5.2 <u>Air Monitoring Equipment</u>:

5.3 <u>Uses and Removal of SCBA</u>: