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# CBRN Escape Respirator

## CBRN Self Contained Escape CWA Concept

- Sarin (GB) and Mustard (HD) challenge vapor concentrations are the same as SCBA CBRN standard

# CBRN Escape Respirator

## CBRN Self Contained Escape CWA Concept

- Sarin (GB):
  - Vapor Challenge – 2,000 mg/m<sup>3</sup>
  - Breakthrough – 0.087 mg/m<sup>3</sup> Peak
    - 2.1 mg min/m<sup>3</sup> Ct
  - Time Agent Generated = 15 minutes
  - Total Test Time = (2 X Respirator Service Time)
    - = 15 min agent generation + non-generated exposure time

# CBRN Escape Respirator

## CBRN Self Contained Escape CWA Concept

- Mustard (HD):
  - Vapor Challenge 300 mg/m<sup>3</sup>
  - Liquid Challenge 0.86 ml
  - Breakthrough – 0.60 mg/m<sup>3</sup> Peak
  - - 6.0 mg min/m<sup>3</sup> Ct
  - Time Agent Generated = 15 minutes
  - Total Test Time = (2 X Respirator Service Time)  
= 15 min agent generation + non-generated exposure time

# CBRN Escape Respirator

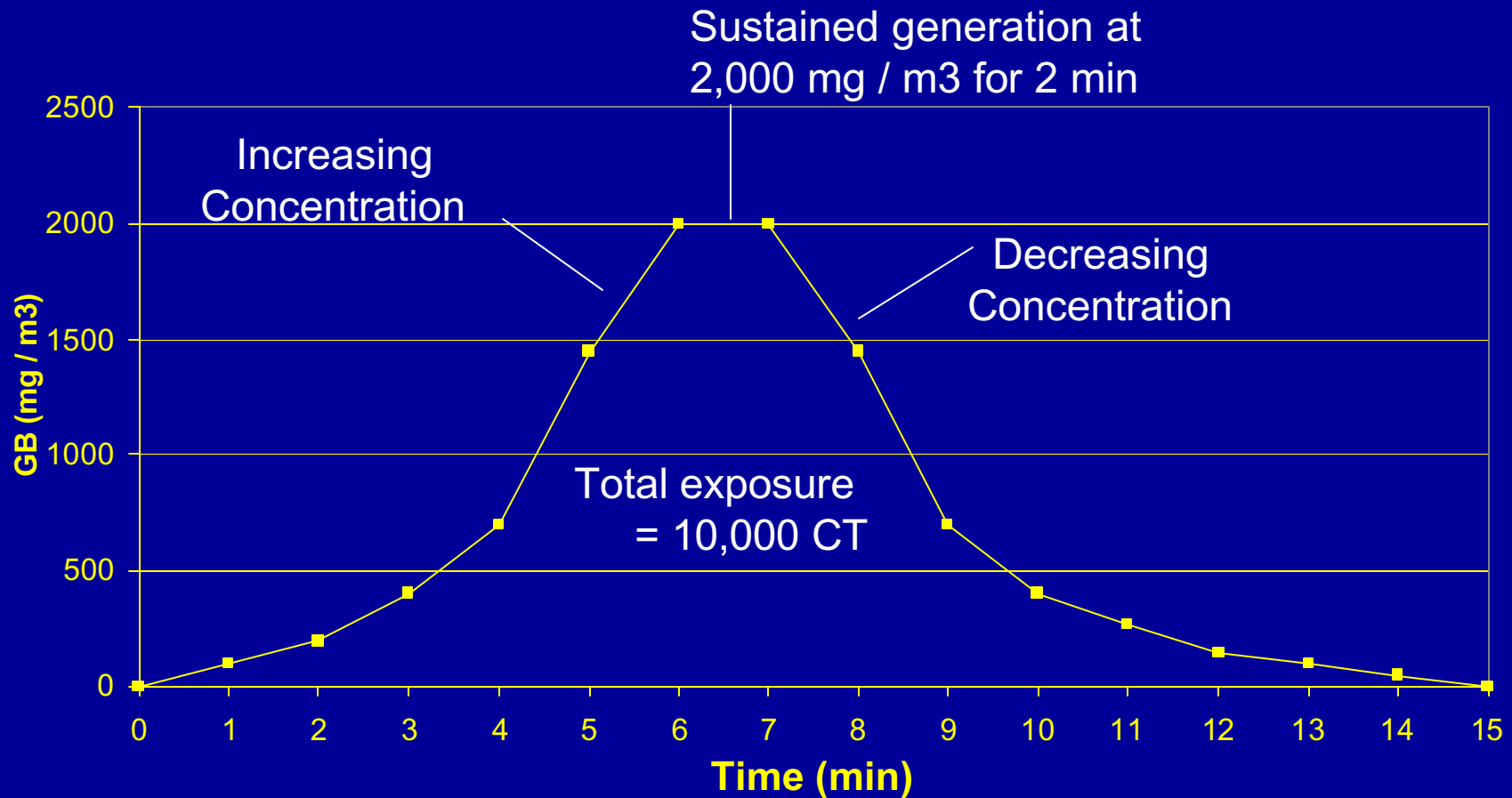
## CBRN Self Contained Escape CWA Concept

### Live Agent Exposure Profiles

- GB- 10,000 mg min/m<sup>3</sup> Ct in 15 minutes requires an exposure of varying concentration
- HD- 4,500 mg min/m<sup>3</sup> Ct in 15 minutes is achievable at a constant exposure

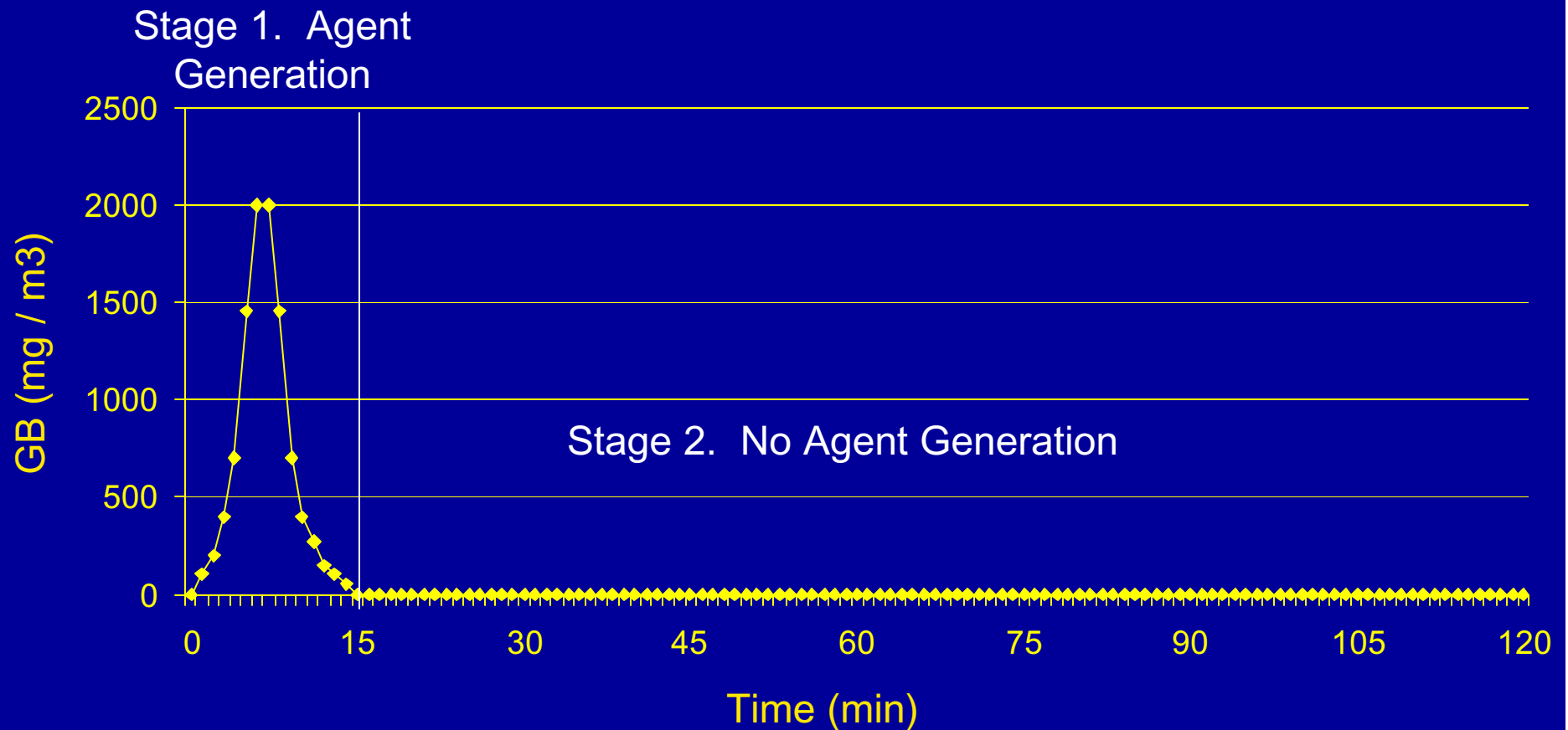
# CBRN Escape Respirator (self contained)

## GB Test : Stage 1 - Agent Generation



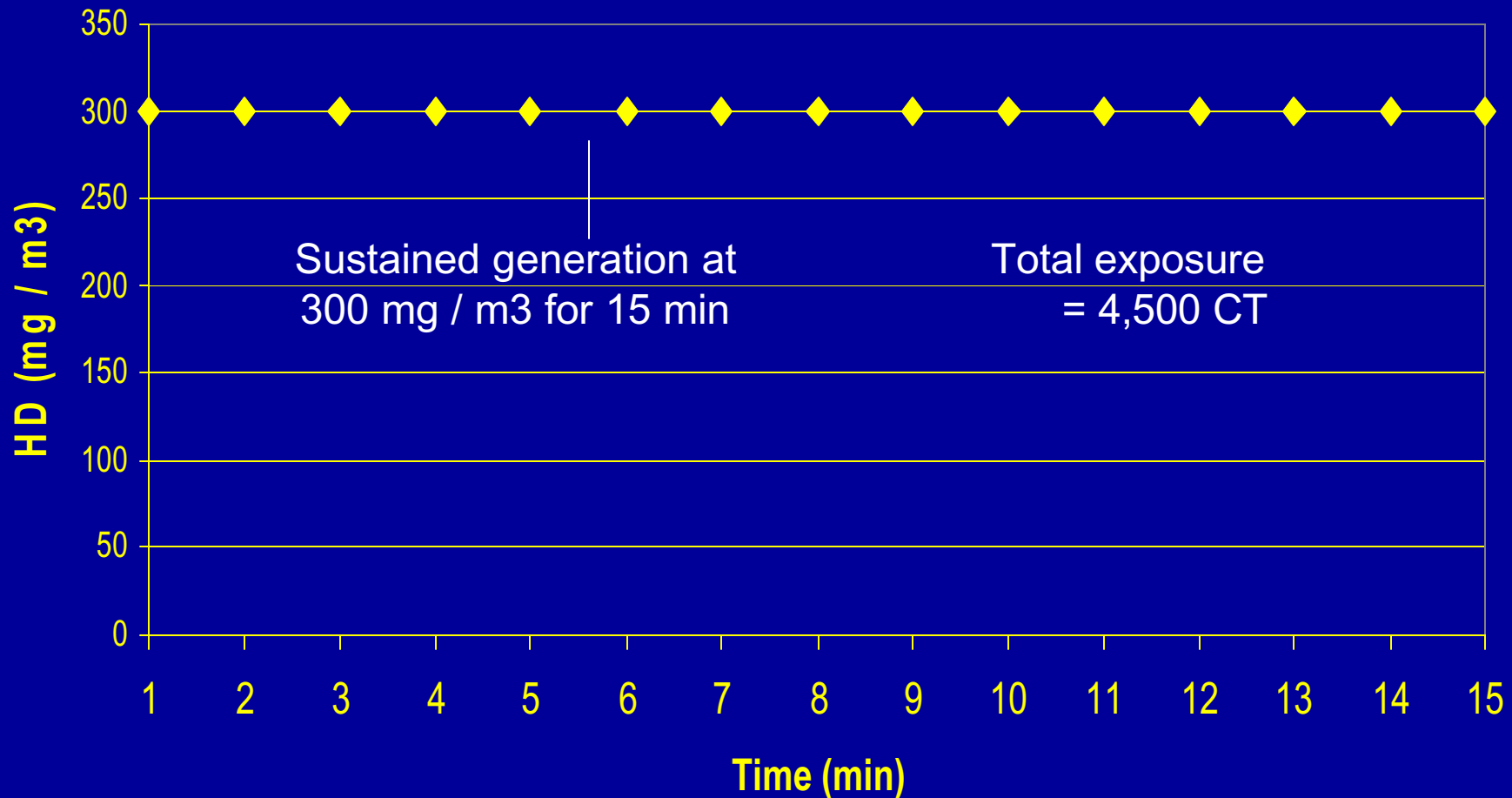
# CBRN Escape Respirator (self contained)

GB Test : Stages 1. + 2. For a 60 min Unit



# CBRN Escape Respirator (self contained)

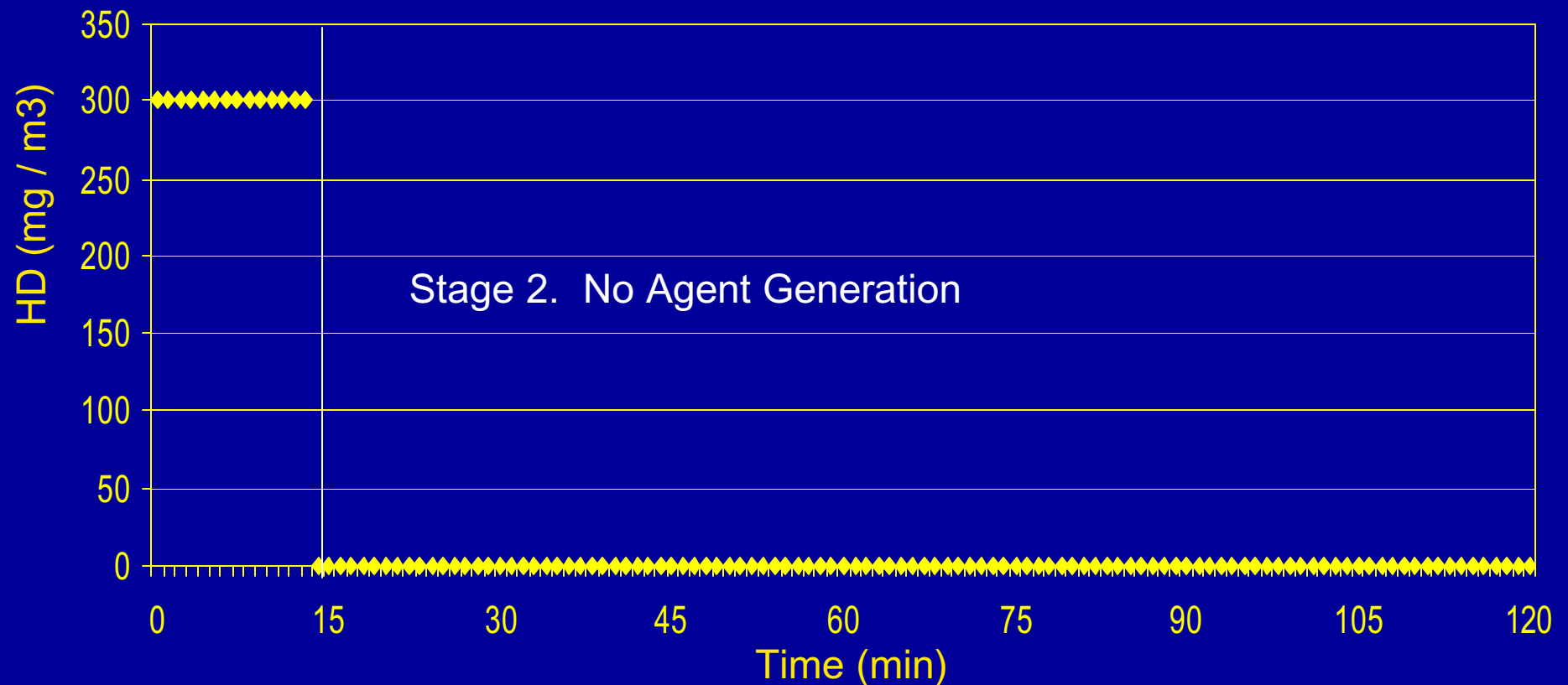
## HD Test : Stage 1 - Agent Generation



# CBRN Escape Respirator (self contained)

HD Test : Stages 1. + 2. For a 60 min Unit

Stage 1. Agent  
Generation





# The Protective Equipment Team

Aberdeen Proving Ground  
Edgewood Area  
Edgewood, Maryland

Raymond R. Lins  
25 June 2003



# Protective Equipment Team Accreditations

- Accredited for International Standard ISO/IEC 17025 certified by American Association for Laboratory Accreditation (A2LA)
- Certified Testing Laboratory for National Institute for Occupational Safety and Health (NIOSH)



# NIOSH Escape Respirator Testing

- May 2003: Air Purifying Escape Respirator (Escape) R&D Testing
- Development of Standard Testing Procedure (STP)
- October 2003: Escape Respirator Certification Testing

# Protective Equipment Team

## Swatch Testing

- 3 sets of 6 Swatch Test Systems using MINICAMS for Agent Detection
- 1 set of 6 Swatch Cups for Vapor or Liquid Challenge Using a MINICAM for Agent Detection
- 1 set of Six Dawson Cups with a MINICAM for Agent Detection
- 2 Hoods with Holders for 100 Fly Cups
- 1 Q170 Tester
- ASTM 739 Certified by A2LA for NFPA Swatch Testing

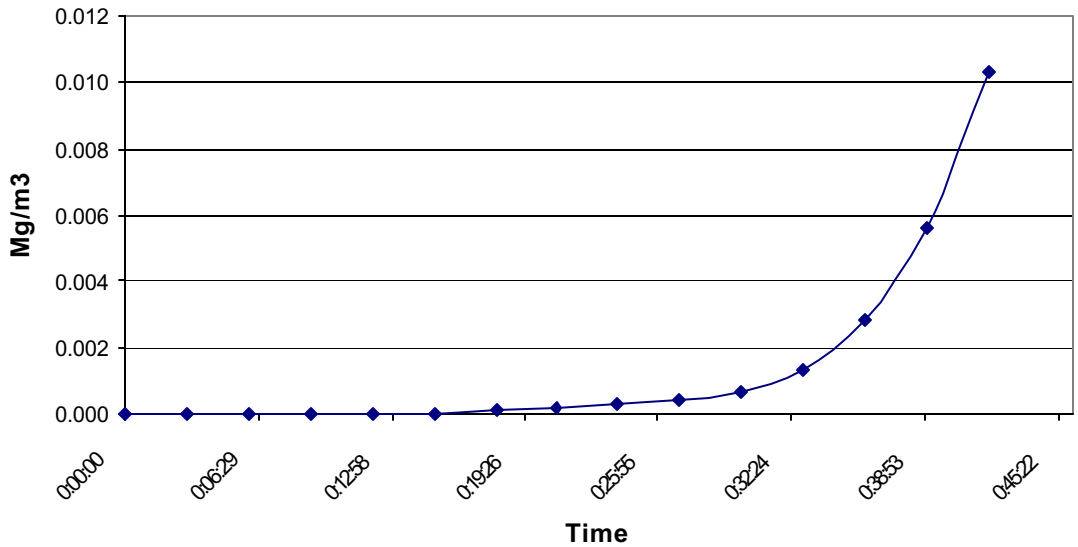


# June 2003 Development of Standard Testing Procedure (STP)

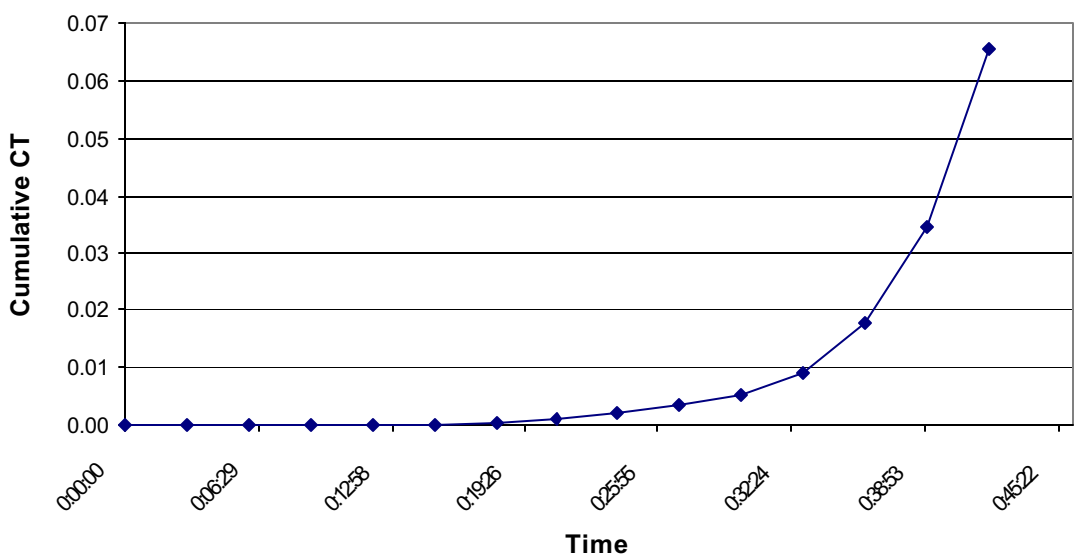
Closed Circuit Rebreather System Which Uses  
Lithium Hydroxide as a Passive Scrubber

Tested Using SMARTMAN Test Systems

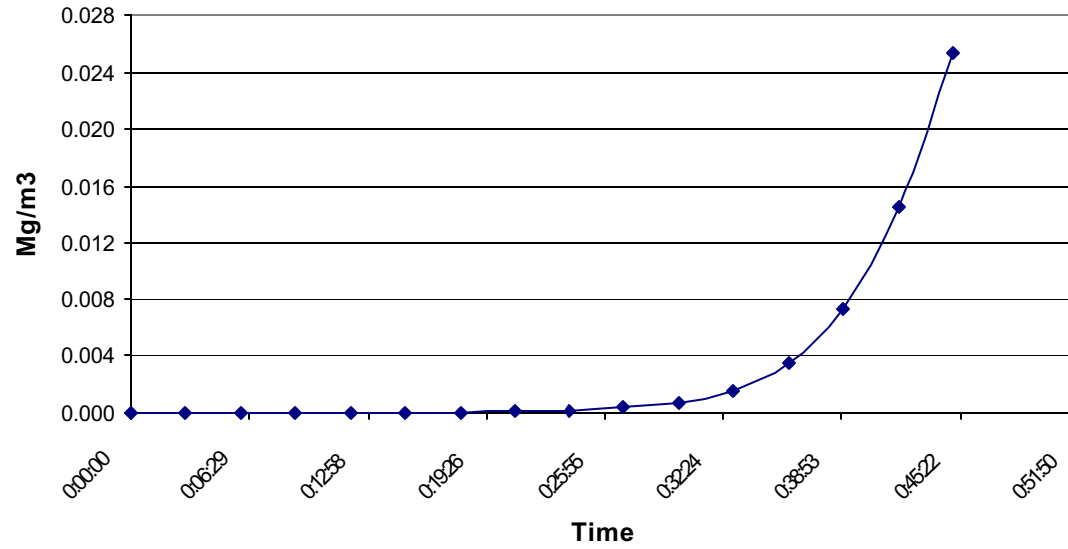
GB Test # 1



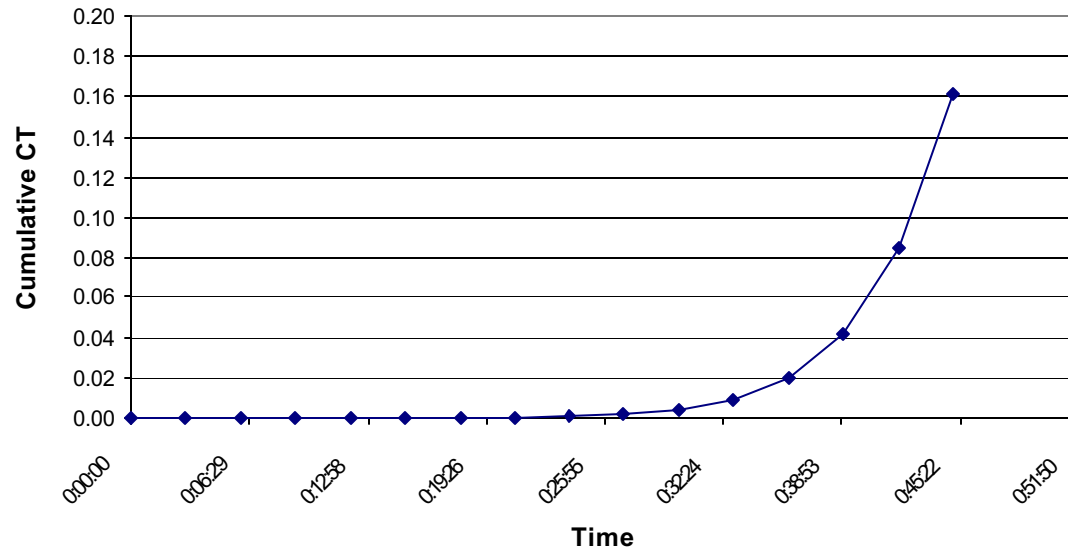
GB Test # 1



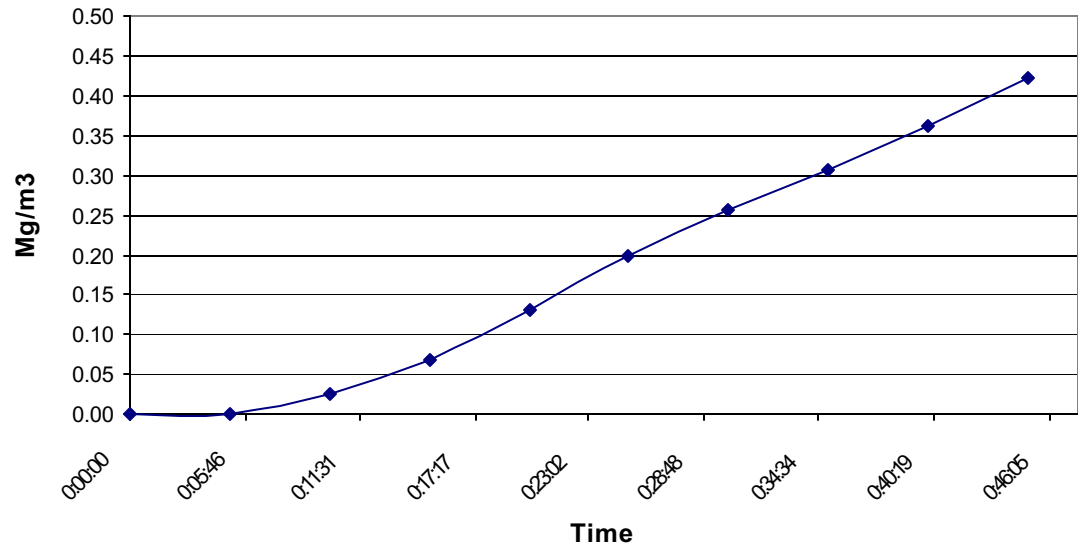
GB Test # 3



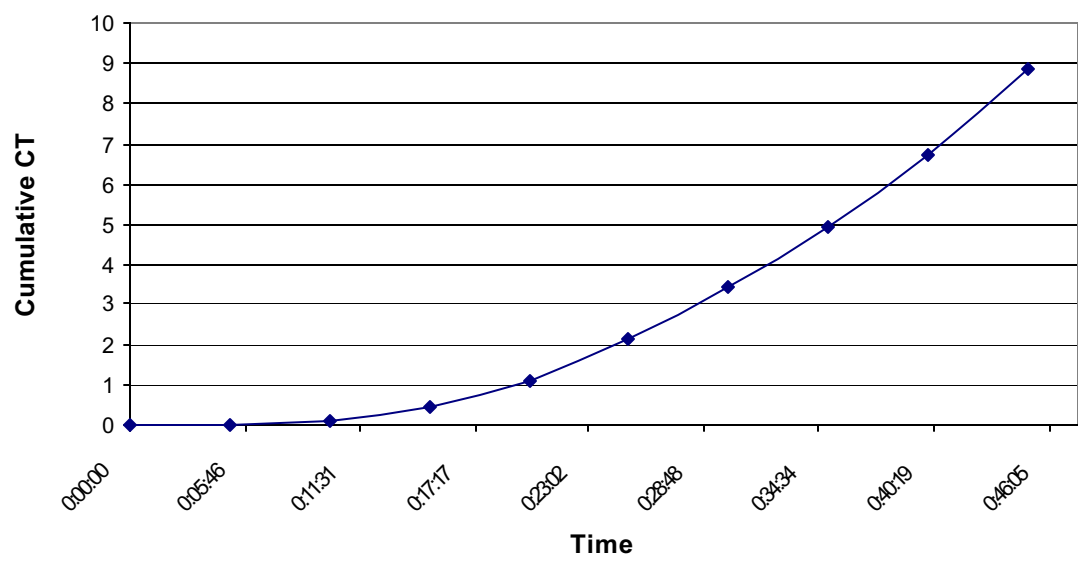
GB Test # 3



HD Vapor Test # 1

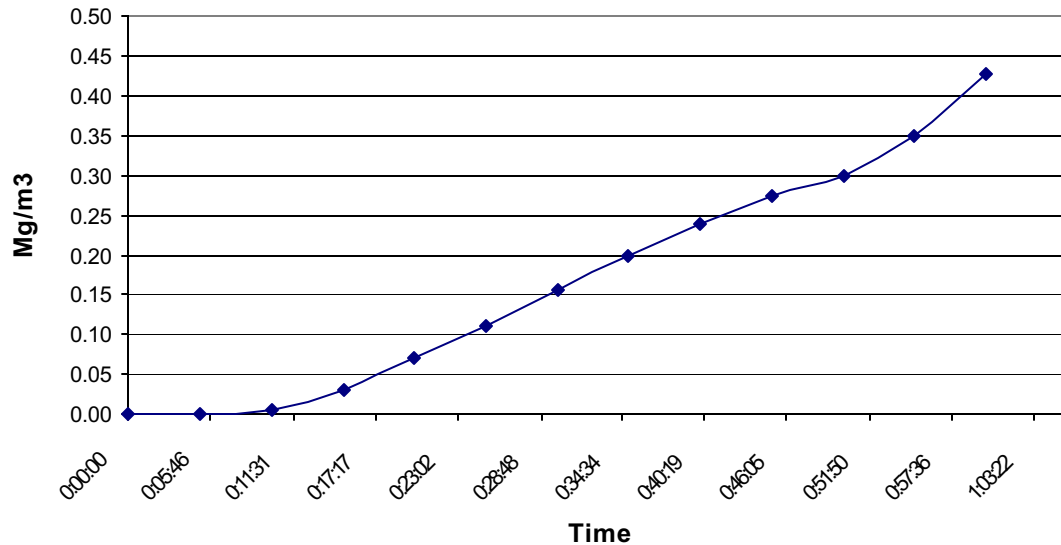


HD Vapor Test # 1

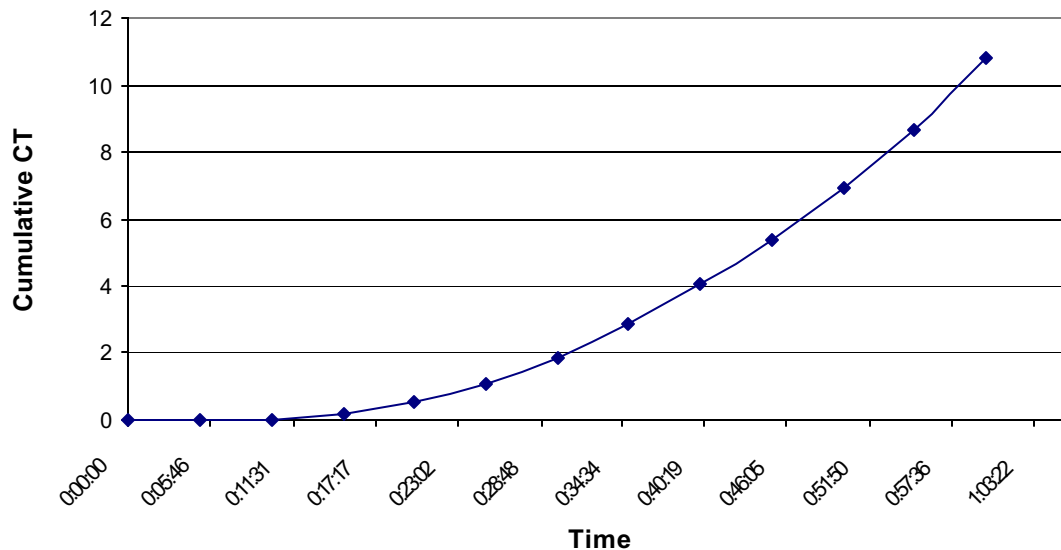




HD Vapor Test # 2



HD Vapor Test # 2



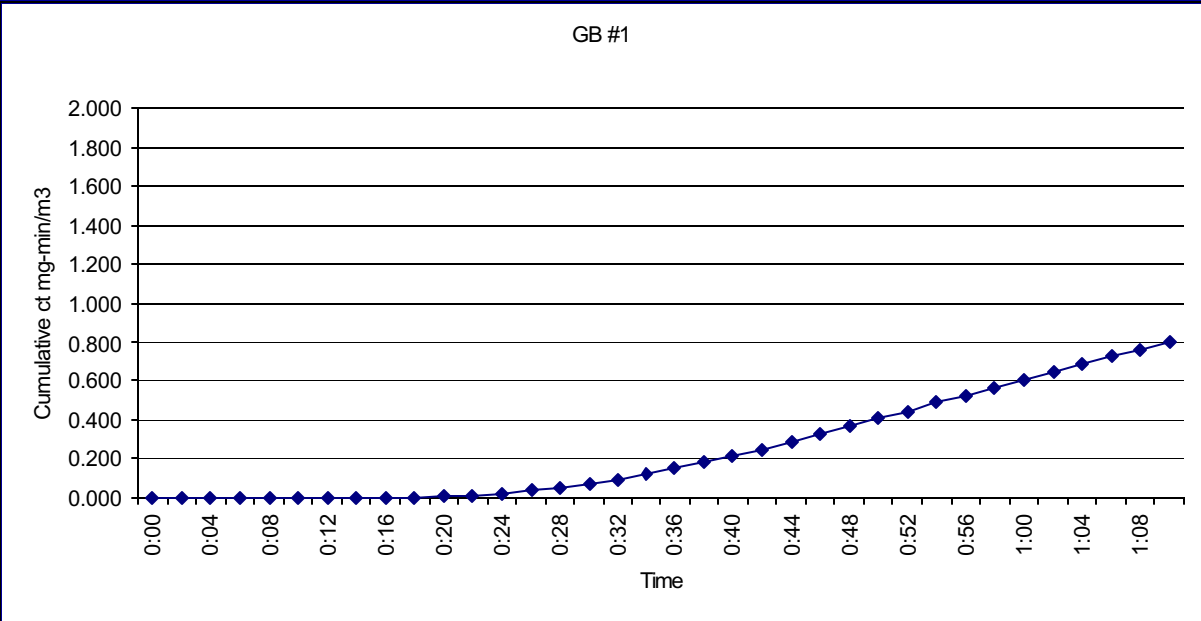
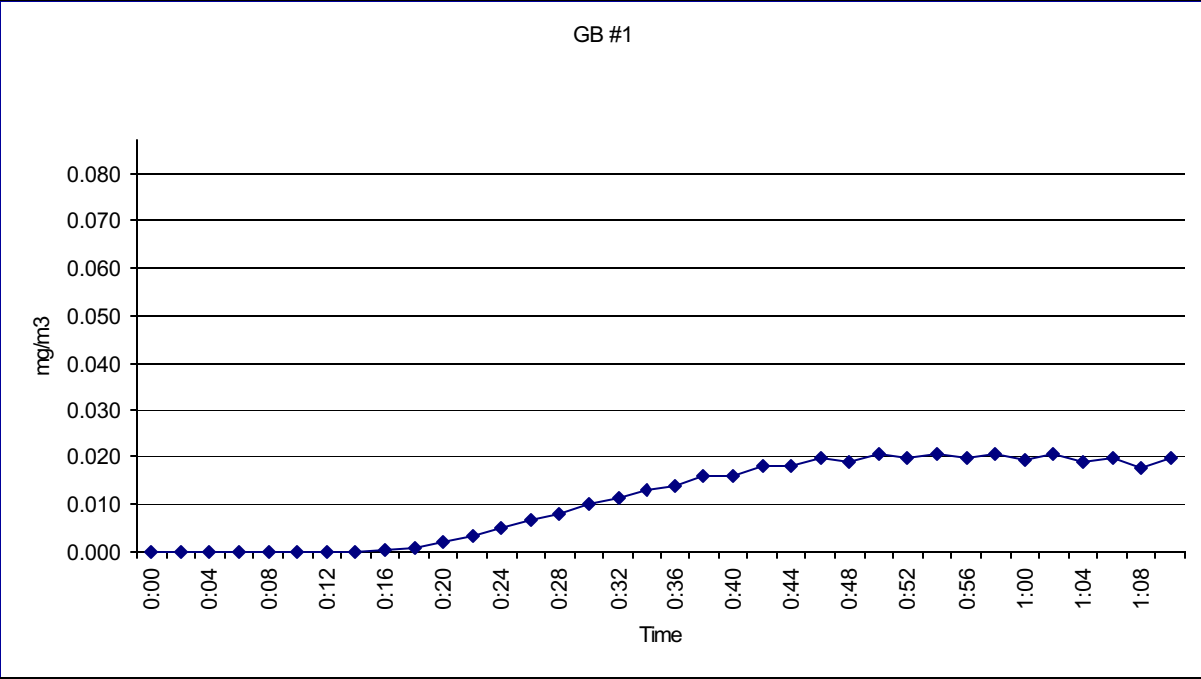
# NIOSH Approved

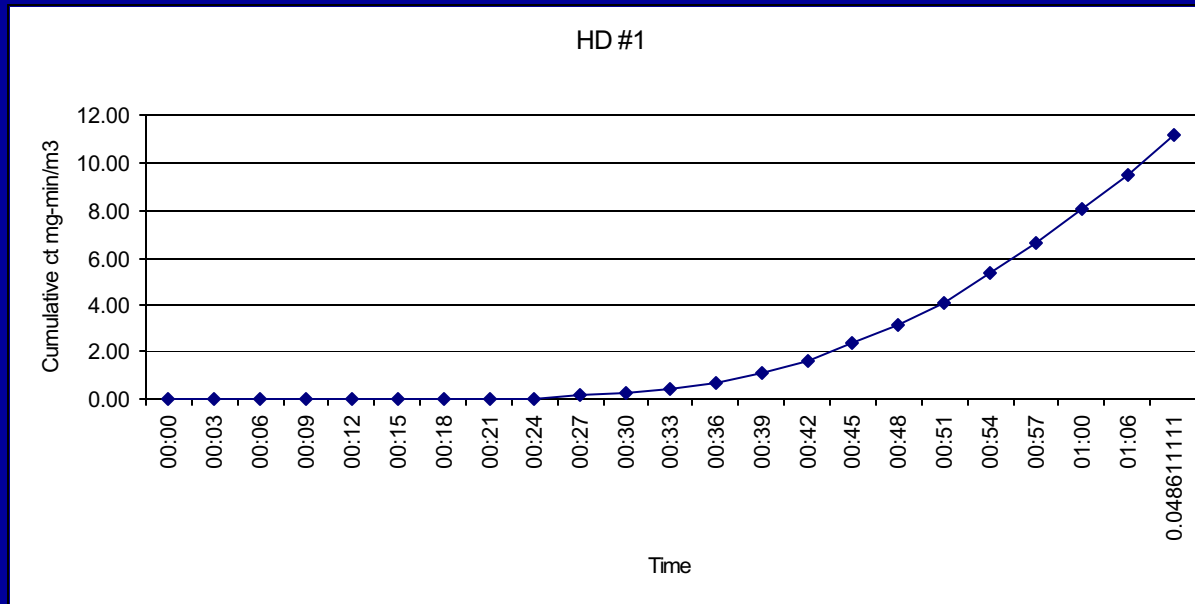
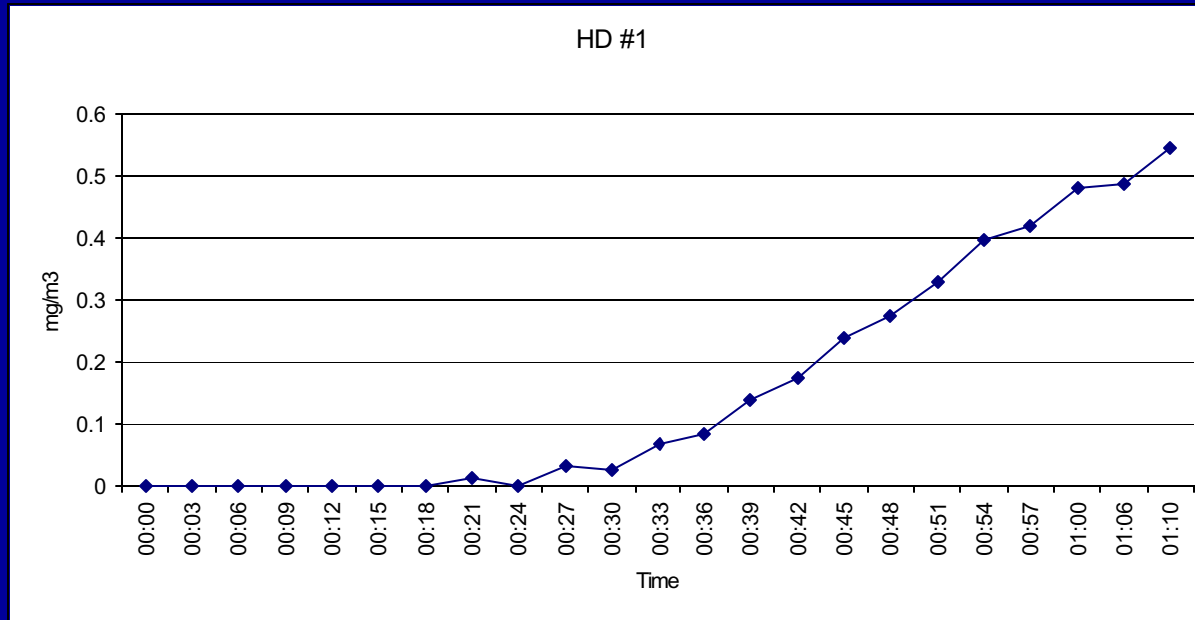
Self-Contained Compressed Oxygen  
Breathing Apparatus for Escape Only

Contains Lithium Hydroxide

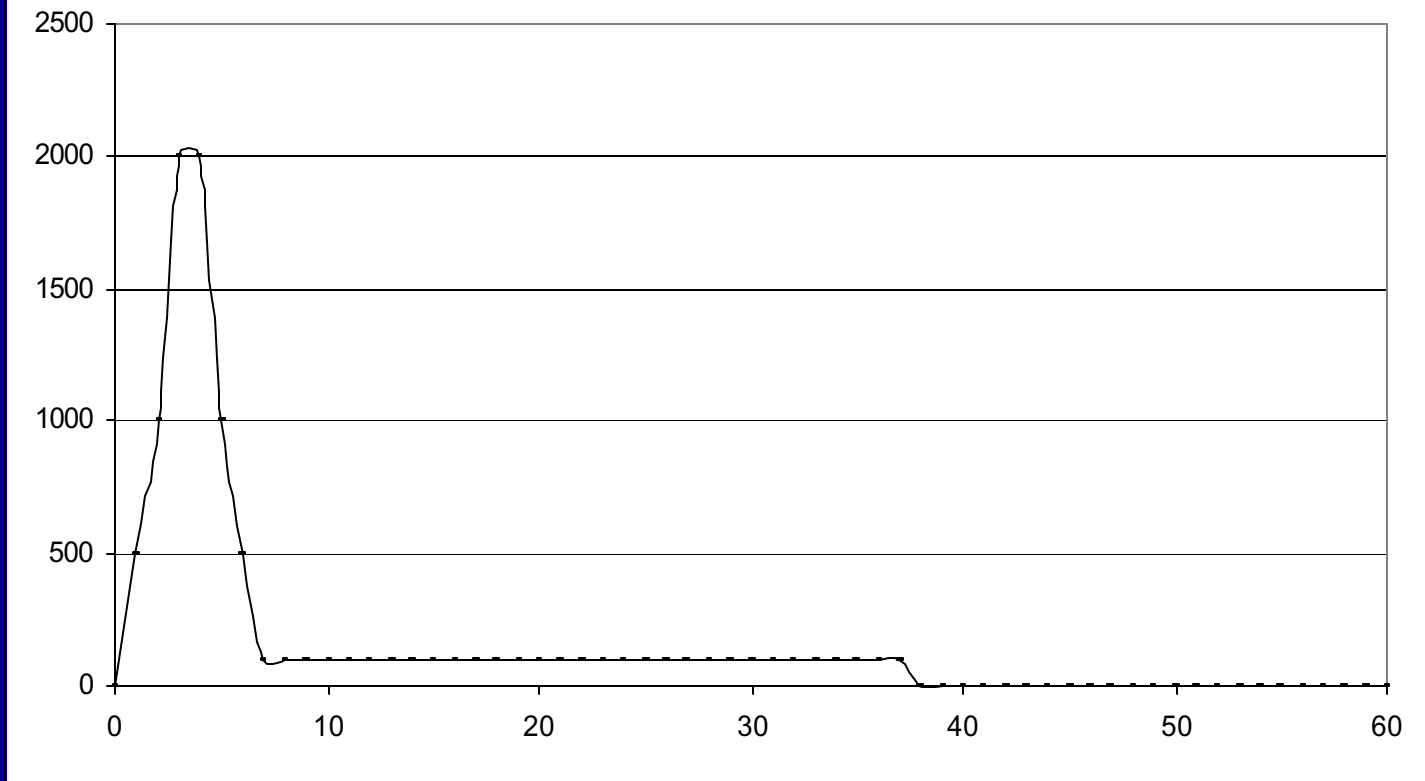
Tested Using Modified SMARTMAN Agent  
Generation System







### GB Concentration mg/m3



# Protective Equipment Team

## SMARTMAN Test Systems

- 5 Medium SMARTMAN Agent Test Systems
- 1 Medium SMARTMAN CK Test System
- 1 Medium SMARTMAN Leak Test System
- 2 Small SMARTMAN Leak Test Systems
- July 2003 1 Small SMARTMAN Agent Test System
- September 2003 2 Medium SMARTMAN Test Systems
- September 2003 2 Additional Medium SMARTMAN Test Systems with Automated Breathing Simulators

