



National Personal Protective Technology Laboratory
Technology Evaluation Branch

Status Investigation Report of A
Self-Contained Breathing Apparatus
Submitted by the
Baltimore County Fire Department and Police Department
for the
Lutherville, MD Fire Department,
Lutherville, MD

NIOSH Task Number 17689

April 18, 2011

Disclaimer

The purpose of Respirator Status Investigations is to determine the conformance of each respirator to the NIOSH approval requirements found in Title 42, *Code of Federal Regulations*, Part 84. A number of performance tests are selected from the complete list of Part 84 requirements and each respirator is tested in its “**as received**” condition to determine its conformance to those performance requirements. Each respirator is also inspected to determine its conformance to the quality assurance documentation on file at NIOSH.

In order to gain additional information about its overall performance, each respirator may also be subjected to other recognized test parameters, such as National Fire Protection Association (NFPA) consensus standards. While the test results give an indication of the respirator’s conformance to the NFPA approval requirements, NIOSH does not actively correlate the test results from its NFPA test equipment with those of certification organizations which list NFPA-compliant products. Thus, the NFPA test results are provided for information purposes only.

Selected tests are conducted only after it has been determined that each respirator is in a condition that is safe to be pressurized, handled, and tested. Respirators whose condition has deteriorated to the point where the health and safety of NIOSH personnel and/or property is at risk will not be tested.

Investigator Information

The SCBA inspections were conducted by Thomas D. Pouchot, General Engineer. This report was written by Thomas D. Pouchot. This investigator is part of the Technology Evaluation Branch (TEB), National Personal Protective Technology Laboratory (NPPTL), National Institute for Occupational Safety and Health (NIOSH), located in Bruceton, Pennsylvania.

**Status Investigation Report of the
Self-Contained Breathing Apparatus from the Lutherville, Maryland,
Fire Department
Submitted By the
Baltimore County, MD Fire and Police Department**

NIOSH Task Number 17689

Background

As part of the *National Institute for Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program*, the Technology Evaluation Branch agreed to examine and evaluate the SCBA identified as Scott Health and Safety Air Pak 45 minute, 4500 psig, self-contained breathing apparatus (SCBA).

This SCBA status investigation was assigned NIOSH Task Number 17689. The Baltimore County, Maryland, Fire Department was advised that NIOSH would provide a written report of the inspections and any applicable test results of this SCBA from the Lutherville, Maryland, Fire Department.

The SCBA, contained within two evidence bags, was delivered to the NIOSH facility in Bruceton, Pennsylvania, on March 8, 2011. After its arrival, the packages were taken to building 20 and stored under lock until the time of the evaluation.

SCBA Inspection

The packages were opened in the General Inspection Room (building 20) and a complete visual inspection was conducted by Tom Pouchot, General Engineer, NPPTL. The SCBA examined and designated Unit #1, was opened and inspected on April 12, 2011. Unit #1 SCBA was the unit worn by the firefighter. The SCBA was examined, component by component, in the condition as received to determine conformance of the unit to the NIOSH-approved configuration. The visual inspection process was photographed. The unit #1 SCBA was identified as the Scott Health and Safety Air Pak 45 minute, 4500 psig unit, NIOSH approval number TC-13F-212.

The complete SCBA inspection is summarized in **Appendix I**. The condition of each major component was also photographed with a digital camera. Images of the SCBA are contained in **Appendix III**.

Unit #1, due to extensive damage, could not be safely pressurized and tested.

SCBA Testing

The purpose of the testing is to determine the conformance of the SCBA to the approval performance requirements of Title 42, *Code of Federal Regulations*, Part 84 (42 CFR 84). Further testing is also conducted to provide an indication of the conformance of the SCBA to the National Fire Protection Association (NFPA) Air Flow Performance requirements of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service*, 1997 Edition.

NIOSH SCBA Certification Tests (in accordance with the performance requirements of 42 CFR 84):

1. Positive Pressure Test [§ 84.70(a)(2)(ii)]
2. Rated Service Time Test (duration) [§ 84.95]
3. Static Pressure Test [§ 84.91(d)]
4. Gas Flow Test [§ 84.93]
5. Exhalation Resistance Test [§ 84.91(c)]
6. Remaining Service Life Indicator Test (low-air alarm) [§ 84.83(f)]

National Fire Protection Association (NFPA) Tests (in accordance with NFPA 1981, 1997 Edition):

7. Air Flow Performance Test [Chapter 5, 5-1.1]

No report on testing is included, as no testing was conducted.

Summary and Conclusions

The SCBA from the Lutherville, Maryland, Fire Department was submitted to NIOSH by the Baltimore County, Maryland, Fire Department and Police Department for evaluation. The SCBA was delivered to NIOSH on March 8, 2011, and inspected on April 12, 2011. The unit was identified as Scott Health and Safety, Air Pak 4500 psig, SCBA (NIOSH approval number TC-13F-212 unit #1, a 45 minute duration unit). Unit #1 suffered extensive damage from heat and fire and was covered with dirt, grime, foreign particulate material, and soot. The cylinder valve as received was damaged, the hand wheel was operable. The gauges were all unreadable and heavily damaged. The regulator and facepiece were heavily damaged, unusable, and the regulator plastic materials had been melted and were bonded onto the facepiece. The SCBA air cylinder was heavily damaged and burned. The outside cylinder covering was black and the labeling was unreadable.

The air cylinder on unit # 1 was so heavily damaged that the manufacturer, date of manufacture, DOT number, and re-test date label were not readable and a cylinder re-test date could not be determined.

In light of the information obtained during this investigation, NIOSH has proposed no further action on its part at this time. Following the visual inspection, the SCBA was returned to storage pending return to the Baltimore County, Maryland, Fire Department

Appendix I

SCBA Inspection Report



National Personal Protective Technology Laboratory / Technology Evaluation Branch

Respirator Field Problem
Incoming Inspection Report Summary – Unit #1

Task Number: 17689	Requestor: Baltimore County MD Fire Department
Date Received: March 8, 2011	
Date Inspected: April 12, 2011	Description: Fatality
Manufacturer: Scott Health and Safety	Inspected by: Tom Pouchot
Approval Number: TC-13F-212	SCBA Type: Open Circuit, Pressure-Demand

The SCBA unit #1 was received in two evidence bags and delivered to NIOSH by NIOSH personnel (refer to Figures 1 - 6 in Appendix III).

Bag #1 contained the SCBA, without the cylinder, inside another evidence bag.
Bag #2 contained the cylinder and valve unit.

Evidence tags on Bag #1, SCBA: (refer to Figure 3 in Appendix III)

Evidence Card, Lite Orange Color
Baltimore County Police
Received 1/19/2011
CC# 11-019-1335
Precinct 06 (BC)
Hynes, Nicholas

January 26, 2011 (Hand written)

UPC Present

Evidence Tag, Yellow
CC# 11-019-1335
DI# 4865-002
UPC present

Evidence Card, White
CC# 11-019-1335
Offense: S(?) Death/
Fire
Location: 30 Dowling Cir
Officer: Long #4865
PC# FSS
Item#: 4865-002 Air Tank
harness with mask and various
items rec from Capt. Cooke
Received By: Det M. S(?)
Date: 1/31/11, Time: 10:30

Evidence tags on Bag #2, Cylinder: (refer to Figures 5 and 6 in Appendix III)

Evidence Card, Salmon Color

Baltimore County Police
Received 1/19/2011
CC# 11-019-1335
Precinct 06 (BC)
Hynes, Nicholas

January 26, 2011 (Hand written)

UPC present

Evidence Tag, Yellow

CC# 11-019-1335
DI# 4865-003
UPC present

Evidence Card, White

CC# 11-019-1335
Offense: S(?) Death/
Fire
Location: 30 Dowling Cir
Officer: Long #4865
PC# FSS
Item#: 4865-003 One Air
Tank Rec from Item #4865-
002

Received By: Det M. S(?)
Date: 1/31/11, Time: 10:30

Components and Observations – Unit #1

NOTE: All references to “right” or “left” are from the user’s perspective.

SCBA Condition As Received

Cylinder gauge extremely damaged, 0 pressure in cylinder
By-Pass in the fully closed position
Donning Switch extremely damaged
Buddy-Breather line present
Regulator mounted to facepiece
Cylinder valve fully closed

1. Facepiece: (Refer to Figures 8 - 13 in Appendix III):

Model: AV-2000 Part number: Not visible
Face seal: Part number: 10009779 Mold date: 4th Quarter of 1998
Nosecup: Part number: not visible Mold date: 2nd Quarter of 1999
Head Harness: Hair Net style Part number: not visible

- As received, the regulator assembly was attached to the facepiece and severely damaged as the plastic materials had been melted. The mask mounted regulator was unrecognizable and was permanently attached to the facepiece due to the plastic regulator housing having melted and bonded to the facepiece plastic component housing that had also melted.
- The lens was extensively damaged, melted, bubbled and a hole, pushed outward, was present on the left side.
- No visibility was present through the lens.
- All facepiece plastic components had all been melted except the lens rings.
- The rubber face seal material was deformed.

- The left temple strap was no longer attached to the facepiece as the attachment was ripped.
- The nose cup was in fair condition with foreign matter present on the inside.
- The nose cup was dislodged from the voice/radio interface port.
- The nose cup inhalation valves were present and in fair condition.
- The voice projection unit, on the right side of the facepiece was heavily damaged and the housing was melted.
- The radio interface bracket, on the left side of the facepiece was present.

2. Pressure Demand (Second Stage) Regulator: (Refer to Figures 8, 10, 12, and 13 in Appendix III):

Air Pak with Vibralert
 Part numbers not visible
 Manufacture date not visible

- As received, the regulator assembly was heavily damaged and attached to the facepiece. The regulator could not be removed as the plastic components had been melted and were permanently bonded to the facepiece.
- Internal components of the regulator were visible.
- None of the activation buttons were functional or recognizable.
- No visible part number.
- The by-pass valve was damaged, but was operable, found in the closed position, and the plastic activation button material was melted.
- The larger internal regulator valve spring was exposed.
- A Strap and adjuster were melted onto the regulator body.
- The low pressure hose was attached to the regulator.
- Donning switch cover was not present.

3. Low Pressure Regulator Hose and Quick Disconnect: (Refer to Figures 13 - 15 in Appendix III):

- No part number was visible.
- Over-all condition of the hose was extremely damaged.
- The outside cover of the hose was burned the entire length.
- Unable to dis-engage the quick disconnect.
- Both ends of the hose were attached as assembled.

4. 4.5 Pressure Reducer Assembly: (Refer to Figures 15 - 17 in Appendix III):

- No part number or serial number markings were visible.
- Very dirty on outside of the housing.
- Regulator was attached to the backframe and the regulator was able to be adjusted with the attachment bracket.
- All the hoses were connected properly to the regulator.

5. High-Pressure Hose and Cylinder Connection: (Refer to Figures 17 and 18 in Appendix III):

Cylinder Attachment P/N: 802228-01 Other markings: A2099, 16-09

- The over-all condition of the assembly is extremely damaged.
- The high pressure hose line has been burned the entire length with some inner hose exposed.
- The cylinder attachment hand wheel can be turned.
- The attachment threads are fairly clean and threads on and off of the cylinder.
- The sealing o-ring is present and appears in good condition.

6. PASS Console Assembly with Remote Gauge: (Refer to Figures 19 – 21 in Appendix III):

Console P/N: 805191-01 Sensor P/N: 805193-01 Pressure Switch P/N: 805177-01

- S/N not visible.
- Manufacture date not visible.
- Condition of unit is extremely damaged.
- Gauge lens melted and gauge unreadable.
- Plastic housing damaged and melted at the unit top.
- Rubber attachment strap burned and in two pieces.
- PASS did not function when activated.
- PASS buttons appear to be functional.
- SEI PASS Label present; NFPA 1982: 1998 Edition.

7. PASS Control Module: (Refer to Figures 22, 24, and 25 in Appendix III):

Part number not visible.

- Manufacture date not visible.
- Over-all condition of unit is fair, with some heat damage to the left side of the assembly.
- Unit is attached to the backframe.
- Wire is attached to backframe and connected to PASS Console.

8. Backframe Assembly: (Refer to Figures 7, 23 - 27 in Appendix III):

Part number not visible

NIOSH Label present

SEI Label present: NFPA 1981: 1997 Edition.

- Over-all condition of the backframe is fair.
- No bends or cracks present in the metal frame base.
- Shoulder straps are attached to the frame.
- Cylinder strap and latching handle are both extremely damaged.
- Cylinder strap adjuster is damaged but functional.
- Cylinder latching handle is damaged but can be moved.

- “30-10” etched into metal portion of frame.
- “Lutherville Fire Rescue Squad 303” label present and placed over top of a “Baltimore County Fire Department” label.

9. Straps and Buckles: (Refer to Figures 7, 28 - 32 in Appendix III):

- The condition of the straps is extremely damaged.
- Shoulder straps are damaged and some of the inner material is exposed.
- Some of the outer shoulder strap material is missing.
- End of service life Bell Alarm is attached to the left shoulder strap.
- Alarm Hose attached at both ends.
- The waist strap has been cut in two.
- Waist buckle latches and releases.
- All adjustable buckles move and hold the straps in place.
- Mask mounted regular docking bracket loose and not assembled to waist belt.
- Docking bracket damaged.

10. Cylinder and Valve Assembly: (Refer to Figures 33 – 38 in Appendix III):

DOT and other information not readable on cylinder

Only Scott Logo visible

Additional Labels present but not readable

Hydo test label present but not readable

Valve assembly label present but not readable

- The over-all condition of the assembly is heavily damaged.
- The outer covering of the cylinder is burned and black in color.
- No labels readable except Scott Logo.
- Cylinder gauge unreadable.
- Valve assembly threads clean and undamaged.
- Cylinder valve hand wheel can be turned and valve can be opened and closed.
- Cylinder valve in the closed position when received.
- Rubber bumper on cylinder valve is extensively damaged.

11. Buddy Breather: (Refer to Figures 39 – 41 in Appendix III):

No part number visible

- Condition of Buddy Breather Assembly is extensively damaged.
- As received hose was hanging loose on SCBA.
- No rubber boots were present on the end fittings.
- Male fitting appears relatively clean.
- Female fitting more damaged.
- Hose line in poor condition as the line was burned the entire length.
- Hose line had several holes present.
- The two fittings appeared to function with some effort.

12. RIC Fitting and Hose: (Refer to Figures 25 and 42 in Appendix III):

No part number visible

- The over-all condition of the assembly is extremely damaged.
- Outer covering of the hose is missing for most of the length, exposing the inner hose.
- Rubber boot present on fitting but extremely damaged and tightly attached.

13. Additional Parts: (Refer to Figure 43 in Appendix III):

- Flash light lens and collector assembly showing damage.
- Loose Snap.

Appendix II

SCBA Background Report



National Personal Protective Technology Laboratory / Technology Evaluation Branch

SCBA Background Report

Task Number: 17689
Manufacturer: Scott Health and Safety
NIOSH Approval Number: TC-13F-212
Evaluation Performed by: Tom Pouchot
Date of Report: April 18, 2011

I. Background

On April 12, 2011, two packages containing the SCBA from the Lutherville, Maryland, Fire Department were opened in the General Inspection Room (building 20) and a complete visual inspection was conducted by Tom Pouchot, General Engineer, NPPTL. The SCBA was examined and designated Unit #1. The Unit #1 SCBA was the unit worn by the deceased firefighter. The SCBA was examined, component by component, in the condition as received to determine conformance of the unit to the NIOSH-approved configuration. The visual inspection process was photographed. Unit #1 SCBA was identified as the Scott Health and Safety, Air Pak 45 minute, 4500 psig unit, NIOSH approval number TC-13F-212. Unit #1 was too heavily damaged to be tested.

II. Test Outlines

Results – The SCBA unit was not tested, therefore, no results were reported.

III. Disposition

Following the examination, the SCBA was returned to the packages in which it was shipped to NIOSH and placed in storage pending return to the Baltimore County Fire Department.

Appendix III

Images



National Personal Protective Technology Laboratory / Technology Evaluation Branch

IMAGES

One Self-Contained Breathing Apparatus from the Lutherville MD Fire Department
Lutherville, Maryland
Submitted by the Baltimore County Fire Safety Office

NIOSH Task No. 17689

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Figure 1 - Unit #1 Packaged SCBA in Evidence Bag as received from the Baltimore County Fire and Police Departments

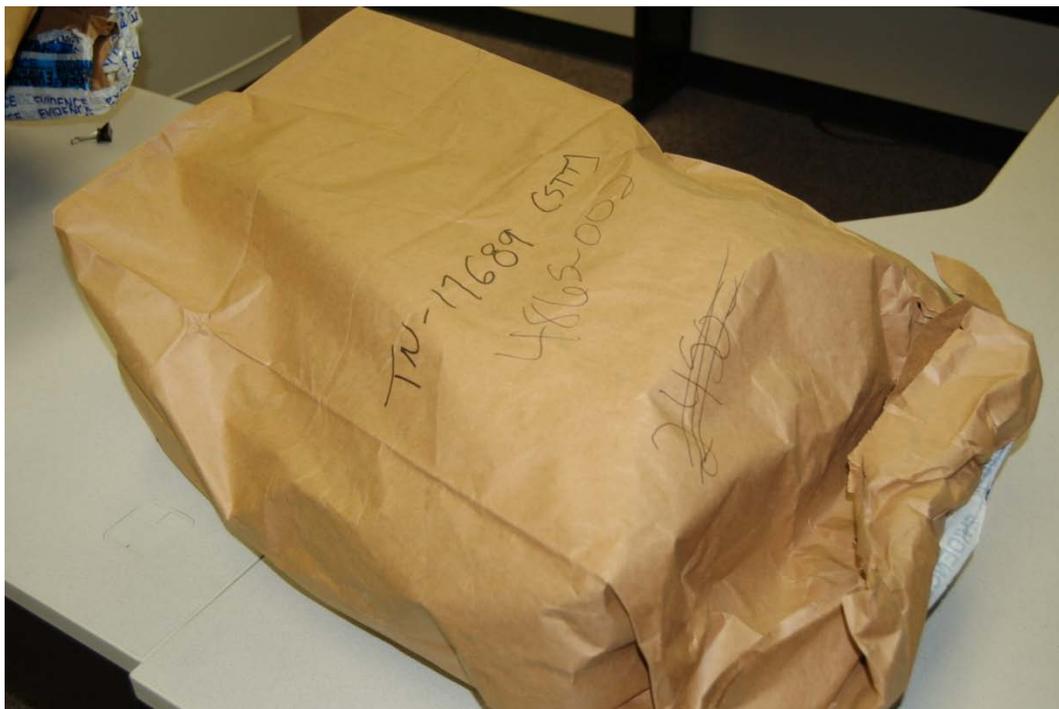


Figure 2 – Unit #1 SCBA Inner Packaging



Figure 3 – Unit #1 SCBA Package Evidence Tags



Figure 4 - Unit #1 Cylinder Packaging as received from the Baltimore County Fire and Police Departments



Figure 5 – Unit #1 Cylinder Packaging Evidence Tags

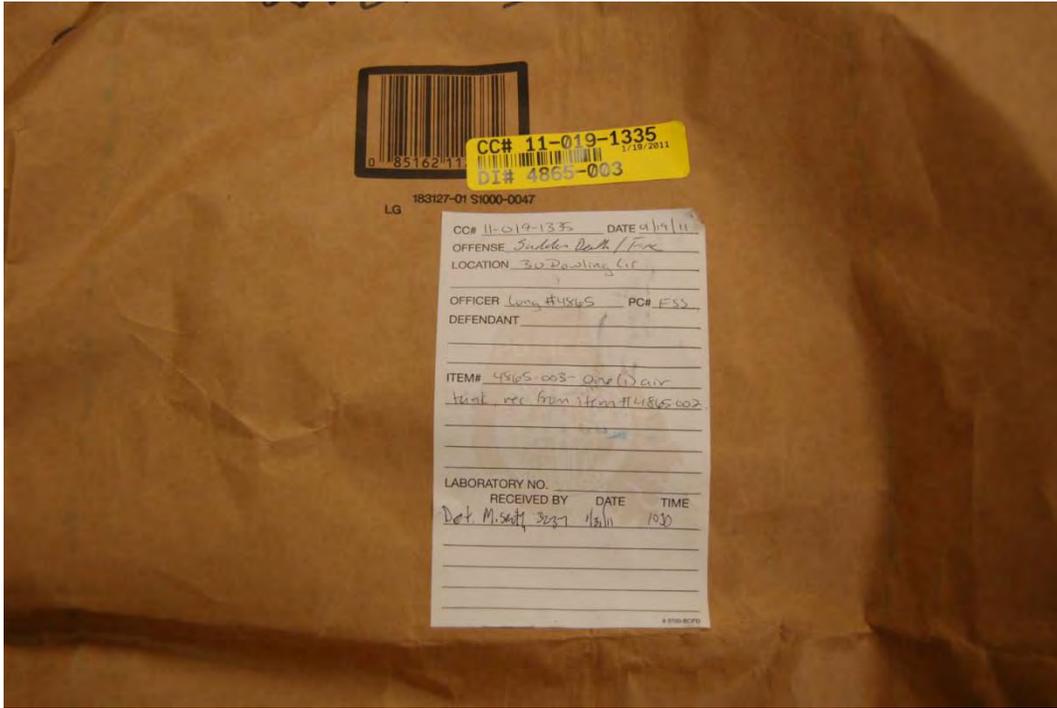


Figure 6 – Unit #1 Cylinder Packaging Evidence Tag

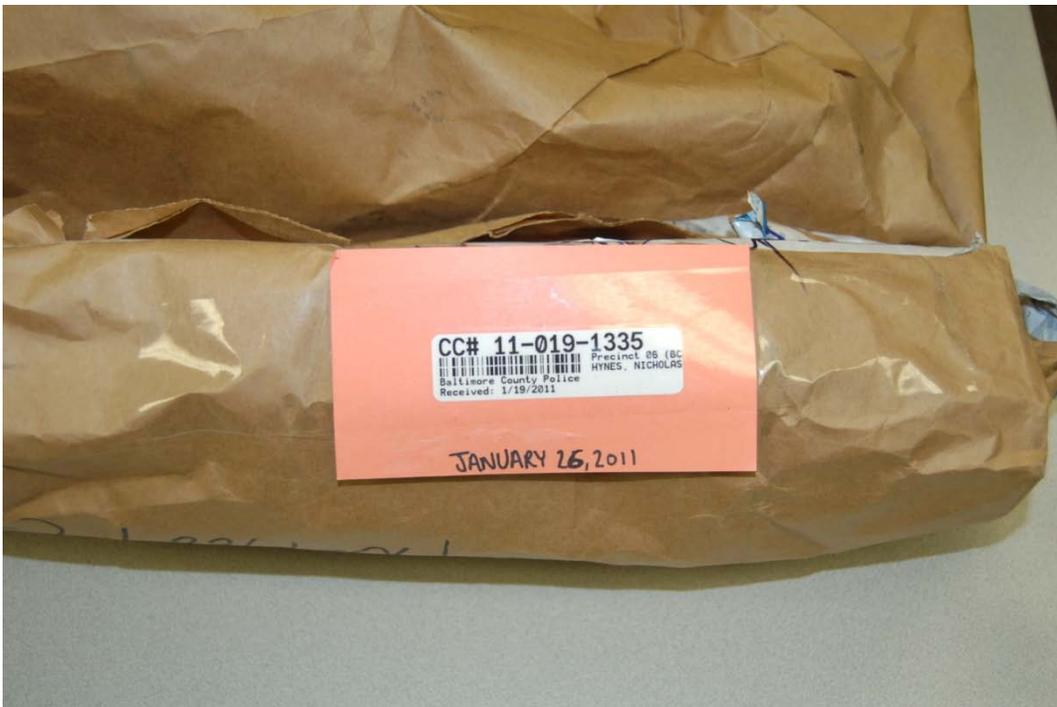


Figure 7 – Unit #1 Without Cylinder



Figure 8 - Unit #1 Facepiece with Regulator



Figure 9 – Unit #1 Facepiece with Lens Damage



Figure 10 – Unit #1 Facepiece with Voice Projecting Unit



Figure 11 – Unit #1 Inside View of Facepiece



Figure 12 – Unit #1 Second Stage Regulator Assembly



Figure 13 – Unit #1 Regulator By-Pass Knob



Figure 14 – Unit #1 Low Pressure Hose and Quick Disconnect



Figure 15 – Unit #1 Hose Connections to Pressure Reducer



Figure 16 – Unit #1 Pressure Reducer Assembly



Figure 17 – Unit #1 Pressure Reducer Assembly Mounted to Backframe



Figure 18 – Unit #1 High Pressure Hose and Cylinder Attachment Assembly



Figure 19 – Unit #1 PASS Console with Remote Gauge



Figure 20 – Unit #1 PASS Console



Figure 23 – Unit #1 Backframe and Cylinder Strap Assembly



Figure 24 – Unit #1 Backframe and Lumbar Pad



Figure 25 – Unit #1 Backframe and Lumbar Pad with RIC Fitting



Figure 26 – Unit #1 NIOSH Label on Backframe



Figure 27 – Unit #1 SEI/NFPA Label on Backframe



Figure 28 – Unit #1 Waist Strap and Buckle



Figure 29 – Unit #1 Left Shoulder Strap with Bell Alarm Attached



Figure 30 – Unit #1 Right Shoulder Strap



Figure 31 – Unit #1 Lumbar Pad Inside



Figure 32 – Unit #1 Regulator Docking Bracket and Waist Strap



Figure 33 – Unit #1 Cylinder Assembly



Figure 34 – Unit #1 Cylinder Assembly



Figure 35 – Unit #1 Cylinder Valve and Gauge Assembly



Figure 36 – Unit #1 Cylinder Valve Assembly



Figure 37 – Unit #1 Cylinder Markings



Figure 38 – Unit #1 Cylinder Marking

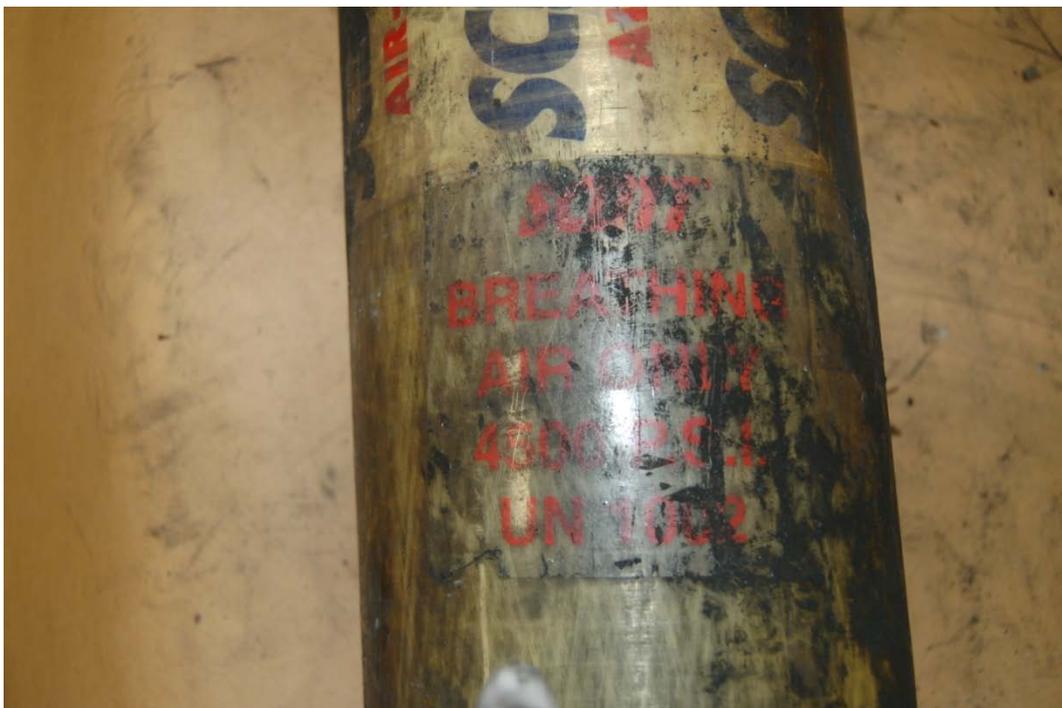


Figure 38 – Unit #1 Buddy Breather Unit



Figure 40 Unit #1 Buddy Breather Hose Damage



Figure 41 – Unit #1 Buddy Breather Hose Damage



Figure 42 – Unit #1 RIC Fitting, Hose with Boot



Figure 43 – Unit #1 Flashlight and Snap Components

