PPE CASE

Personal Protective Equipment Conformity Assessment Studies and Evaluations

Evaluation of a Self-Contained Breathing Apparatus Involved in a Near Miss in the Fire Service

Birmingham Alabama Fire Department Request for a Scott® Safety Air-Pak® Model 4.5 unit

NIOSH evaluated an SCBA used by a fire fighter involved in a near miss incident. The SCBA was not found to contribute to the near miss.
A qualified service technician must inspect, repair, test, clean, and replace damaged components of any SCBA involved in an incident before it may be returned to service.

As part of the *National Institute for Occupational Safety and Health (NIOSH)* the National Personal Protective Technology Laboratory (NPPTL) agreed to examine and evaluate a Scott® Safety Air-Pak® model 4.5, 4500 psi, 30 minute, self-contained breathing apparatus.

This SCBA status investigation was assigned NIOSH Task Number 21002. The Birmingham Fire Department was advised that NIOSH NPPTL would provide a written report of the investigation and any applicable test results.

The SCBA was delivered to the NIOSH facility in Morgantown, WV on August 8, 2016 and transported to lab H1513 for secured storage. The unit was removed from secured storage for inspection on August 29, 2016 and placed back into secure storage until the performance testing was conducted on December 8, 9, 13, and 14, 2016. All movements of the SCBA unit are tracked on an entry log each time it is removed from the secured storage area for inspection and performance testing, and returned.

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.

NIOSH Task Number 21002

Investigator Information

The SCBA performance tests and inspection were conducted by Angie Andrews, Jeremy Gouzd, and Karis Kline of the Morgantown Testing Team, Evaluation and Testing Branch, National Personal Protective Technology Laboratory, National Institute for Occupational Safety and Health, Morgantown, West Virginia. The report was also written by this team.

SCBA Inspection

The unit was removed from the packaging in Lab H1513 and inspected on August 29, 2016 by Angie Andrews, Jeremy Gouzd, and Karis Kline of the Morgantown Testing Team at NPPTL. The unit was identified as a Scott® Safety Air-Pak® model 4.5, 30 minute, 4500 psi unit, with NIOSH Approval Number TC-13F-76CBRN, and as the unit submitted by the Birmingham Fire Department. The SCBA unit was visually examined, component by component, in the condition received to determine the conformance of the unit to the NIOSH-approved configuration. The visual inspection process was documented with photographs. Once the inspection was complete, the SCBA unit was repackaged and placed back in the secured storage area.

The complete SCBA inspection is summarized in **Appendix I**. Photos of the SCBA components are included in **Appendix III**.

SCBA Testing

The purpose of the testing was 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 was conducted to provide an indication of the conformance to the National Fire Protection Association (NFPA) Airflow 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. Airflow Performance Test [Chapter 5, 5.1.1]

Appendix II contains the complete NIOSH test report for the SCBA. **Tables ONE and TWO** summarize the NIOSH and NFPA test results.

Summary and Conclusions

An SCBA unit was submitted to NIOSH NPPTL by the Birmingham Fire Department for evaluation by telephoning to request the evaluation. The SCBA unit was delivered to NIOSH on August 8, 2016 and extensively inspected on August 29, 2016. The unit was identified as a Scott® Safety Air-Pak® model 4.5, 30 minute, 4500 psi unit with NIOSH Approval Number TC-13F-76CBRN. As a result of the inspection, it was determined that the unit was in good condition. An empty cylinder was delivered with the unit, with the valve in the off position. The regulator and facepiece sealing areas were relatively clean and in good condition. The facepiece had only slight scratches on the lens. Visibility through the facepiece lens was good. The facepiece head harness and the straps were in good condition and the straps moved freely, but were slightly dirty. The NFPA approval label was present and legible. The personal alert safety system (PASS) functioned.

The facepiece provided by Birmingham Fire Department broke at the lower left attachment point during donning onto the headform. It was replaced with a NIOSH-owned Scott® facepiece for the remainder of the tests.

The SCBA submitted by the Birmingham Fire Department did not meet the requirements of all six NIOSH SCBA certification tests. The unit failed the NIOSH Positive Pressure test (Standard Test Procedure Number 120, 42 CFR Part 84 Reference: Subpart H, 84.70 (a)(2)(ii)). The unit passed the NFPA “Airflow Performance” test.

A Certified Product Investigation Process (CPIP) was initiated due to the unit failing the NIOSH SCBA Certification Positive Pressure Test. The purpose of the CPIP Program is to ensure that NIOSH-approved respirators continue to meet or exceed the criteria on which the approval was based. The SCBA unit was returned to secured storage pending shipment.

If the unit is to be placed back in service, the SCBA must be repaired, tested, cleaned and any damaged components replaced and inspected by a qualified service technician, including testing and other maintenance activities as prescribed by the schedule from the SCBA manufacturer. Typically a flow test is required on an annual basis, at a minimum.

Appendix I

SCBA Inspection Report

National Personal Protective Technology Laboratory, Evaluation and Testing Branch

Respirator Field Problem
Incoming Inspection Report Summary

Task Number:	TN-21002	**Requestor:**	Birmingham Fire Department
Date Received:	August 8, 2016		
Date Inspected:	August 29, 2016	**Description:**	Fire Department Requesting Technical Assistance
Manufacturer:	Scott® Safety	**Inspected by:**	Angie Andrews, Jeremy Gouzd, Karis Kline
Approval Number:	TC-13F-76CBRN	**SCBA Type:**	Open-Circuit, Pressure-Demand

The SCBA was received in a cardboard box (refer to **Figures 1 – 3** in **Appendix III**).

Contact Agency: Birmingham Fire Department

As received:

- Cardboard box was received damaged, box was split open.
- Cylinder received empty with valve open.
- Mask mounted regulator (MMR) was locked into the waist strap with donning switch on, and regulator active.

Components and Observations

NOTE: All references to "right" or "left" are from the user's perspective.

1. **Facepiece: (**refer to **Figures 4-6** in **Appendix III)**

Facepiece assembly; P/N not found Model: AV3000 Size: Medium

Facepiece Seal P/N: 10011307 Manufacture date: 11/09

Nosecup P/N: 31001044 Manufacture date: 3rd quarter 2009 Size: Medium

- Overall condition good but dirty.
- Lot number label present but illegible.
- Lens dirty, but in good condition with a few scratches.

- Hairnet straps dirty, but in fair condition; straps moved freely and held in place, held securely to facepiece.
- Strap at top left corner was frayed.
- Attachment points for straps were good.
- The facepiece seal "rubber" portion good.
- Regulator interface area good, with some debris.

2. <u>Mask Mounted Regulator (MMR):</u> (refer to **Figures 7-9** in **Appendix III)**

AirPak® Plus CBRN with Vibralert and EZ-Flo regulator

MMR assembly P/N: illegible S/N: illegible Manufacture date: illegible

- Overall condition fair, with some damage.
- Outer case good with stickers present but illegible.
- Donning switch and cover in good working condition.
- Secured to low pressure line.
- Bypass in the open position.
- Bypass knob had signs of normal wear.
- Inside flange clean and in good condition.
- Sealing area had a small rip.
- Locking assembly functioned.
- Some damage found to rubber coating inside of the HUD.
- HUD loose from casing.

3. <u>Low Pressure Regulator Hose:</u> (refer to **Figure 10** in **Appendix III)**

- Overall condition good.
- Secured at all attachments points.
- Quick Disconnect present and functioned.
- Line passed through the shoulder strap to the reducer.

4. <u>4.5 Pressure Reducer Assembly:</u> (refer to **Figures 11 and 12** in **Appendix III)**

P/N: 200438-01 S/N: 11550932001008

Manufacture date: 8-03-09

HUD connection P/N: 31001150-02

- Overall condition good with some wear.
- All air-line connections were secure.

5. <u>High Pressure Hose and Cylinder Attachment:</u> (refer to **Figures 13-15** in **Appendix III)**

Cylinder attachment P/N: 802228-15

Manufacture date: 07/09

Quick-Fill marking: Eaton FD17-1002-10-04

- Overall condition good, some scratches.
- Cylinder attachments thread clean, threads on and off, and "O" ring was in place.
- Quick-Fill appeared to have been dropped or hit causing the tip to be damaged.
- Pressure relief valve lightly damaged with a crack in covering.

6. <u>Console Assembly PASS:</u> (refer to **Figures 16 and 17** in **Appendix III)**

Scott® label: present P/N: partially illegible S/N: illegible

Manufacture date: illegible

SEI label: NFPA 1982, 2007ed.

HUD U.S. Patent Number: 5097826

- Overall condition good, with light wear.
- Pressure and electrical lines in good condition.
- Gauge lens legible.
- Protective casing in good condition.
- Rubber attachment strap was present; attached to the PASS console and shoulder strap.

7. <u>PASS Control Module:</u> (refer to **Figures 18** in **Appendix III)**

P/N: 200451-01,-11 P/N: 200451-02, -12 with Pak-Tracker

Scott P/N: 200451-01 S/N: 115S0932003830

FCC ID: T5E200461 IC #: 6453A-200451

Manufacture date: 08-06-09

Other marking: NIOSH CBRN agent approved sticker

- Overall condition good.
- Held securely to backframe.
- Wire connection was connected to PASS.
- Wire held securely to backframe and ran to console assembly.

8. <u>Backframe Assembly:</u> (refer to **Figures 19 and 20** in **Appendix III)**

Markings: A3Q0

SEI label attached, NFPA 1981, 2007 Edition

CBRN label present; NIOSH label present

TC number covered by tape (1906 written in tape)

- Overall condition good.
- Shoulder straps attached to the frame.
- Cylinder strap and latch in good condition.
- Cylinder strap adjuster functioned.
- Damage to backframe at bottle connection point.

9. <u>Straps and Buckles:</u> (refer to **Figure 21** in **Appendix III)**

- Overall strap condition good.
- Both shoulder straps attached at the top of the backframe.
- Hose lines and wires passed through shoulder straps.
- All adjustable buckles moved and held in place.
- Waist area buckle latched and released.
- Lumbar strap in good condition.

10. <u>Auxiliary Hose:</u> (refer to **Figure 22 and 23** in **Appendix III)**

Stamps: A3Q09, FT with 816 below it, 200015-05 with 08/2009 below

Manufacture date: 3rd quarter 2009, 5 stamped on it

- Overall clean and in good condition.
- Rubber covering clean and functioned.

11. <u>Cylinder and Cylinder Valve Assembly:</u> (refer to **Figures 24-27** in **Appendix III)**

DOT SP 10915-4500	Scott® P/N: 805532-BA0593
TC-SU-5134-310	Scott® logo: visible
OK 410305	REE: 78
Luxfer P/N: L45M-346	Manufacture date: 09/09
Cylinder valve S/N: illegible	
Hydrostatic date: 10/2015	30 Minute, 4500 psi

Other markings: partial eagle sticker, Birmingham Fire Rescue Service sticker

- Overall condition fair but scratched.
- Gauge was legible.
- Threads in good condition.
- As received, cylinder was empty with valve fully closed.
- Rubber bumper at base of cylinder valve was in good condition.

Appendix II

SCBA Test Results

National Personal Protective Technology Laboratory, Evaluation and Testing Branch

SCBA Test Report

Task Number:	TN-21002
Manufacturer:	Scott® Safety
NIOSH Approval Number:	TC-13F-76CBRN
Tests Performed by:	Angie Andrews, Jeremy Gouzd, Karis Kline
Report written by:	Karis Kline
Date of Report:	December 29, 2016

I. Background

On August 8, 2016, an SCBA unit from the Birmingham Fire Department was delivered to the NIOSH facility in Morgantown, West Virginia. The unit was removed from the packaging in Lab H1513 and inspected on August 29, 2016 by Angie Andrews, Jeremy Gouzd, and Karis Kline of the NPPTL Morgantown Testing Team (MTT). The SCBA was visually examined, component by component, in the condition received to determine the conformance of the unit to the NIOSH-approved configuration. The unit was identified as the Scott® Safety Air-Pak® model 4.5, 30 minute, 4500 psi unit, with NIOSH Approval Number TC-13F-76CBRN, and as the unit submitted by the Birmingham Fire Department. The visual inspection process was documented photographically. The unit was tested December 8, 9, 13, and 14, 2016.

II. Test Outlines

1. POSITIVE PRESSURE TEST – NIOSH Standard Test Procedure Number 120, 42 CFR Part 84

Reference: Subpart H, § 84.70 (a)(2)(ii)

Requirement:
The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.

Procedure:
A breathing machine with a 622 kg-m/min cam operating at 24 RPM with a 40 liter per minute flow rate (115 liters per minute peak flow) was connected to an anthropometric head for cycling. A pressure tap in the head was connected to a transducer which in turn connects to a strip chart recorder for determining the pressure in the facepiece.

Results: The unit was tested on December 8, 2016 and did not meet the test requirement. The inhalation breathing resistance did become negative during the test. The HUD, remote gauge, and donning switch functioned normally.

Inhalation Breathing Resistance: (inches of water column)	**-0.25**
Pass/Fail:	**Fail**

2. RATED SERVICE TIME TEST – NIOSH Standard Test Procedure Number 121, 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b)

Requirement:
Service time will be measured while the apparatus is operated by a breathing machine as described in § 84.88. The open-circuit apparatus will be classified according to the length of time it supplies air or oxygen to the breathing machine. Classifications are listed in § 84.53.

Procedure:
A breathing machine with a 622 kg-m/min cam operating at 24 RPM with a 40 liter per minute flow rate was connected to an anthropometric head for cycling. A pressure tap in the head was connected to a transducer which in turn connects to a strip chart recorder for determining the pressure in the facepiece. The breathing machine runs until the inhalation portion of the breathing curve falls below the minimum requirement.

Results: Tested on December 8, 2016. The SCBA met the test requirement.

Test Notes:
The measured service time (adjusted to correspond with the recorded breathing cycles) was more than the rated service time of 30 minutes. The PASS unit functioned during the test. The SCBA did go negative on inhalation, and it did not maintain positive pressure in the facepiece throughout the test.

	Minutes	**Seconds**
Measured Service Time:	**35**	**12**
Pass/Fail:	**Pass**	

3. STATIC PRESSURE TEST – NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference: Subpart H, § 84.91 (d)

Requirement:
The static pressure (at zero flow) in the facepiece shall not exceed 38 mm (1.5 inches) water column height.

Procedure:
The facepiece was fitted to an anthropometric head for testing. A pressure tap in the head was connected to a calibrated manometer. Full cylinder pressure was applied to the unit at zero flow and a reading from the manometer was recorded.

Results: Tested on December 13, 2016. The SCBA met the test requirement.

Facepiece Static Pressure: (inches of water column)	**0.91**
Pass/Fail:	**Pass**

4. GAS FLOW TEST – NIOSH Standard Test Procedure Number 123, 42 CFR Part 84 Reference: Subpart H, § 84.93 (b) and (c)

Requirement:
The flow from the apparatus shall be greater than 200 liters per minute when the pressure in the facepiece of demand apparatus is lowered by 51 mm (2 inches) water column height when full container pressure is applied. Where pressure demand apparatus are tested, the flow will be measured at zero gage pressure in the facepiece.

Procedure:
A pressure tap in the anthropometric head was connected to a manometer for determining when the pressure inside the facepiece is at zero. A mass flow meter was connected in line between the anthropometric head and an adjustable vacuum source to measure flow. The SCBA cylinder was replaced by a test stand which was adjusted initially to full cylinder pressure. The vacuum source was adjusted during the test to maintain the desired pressure inside the facepiece. Once the proper facepiece pressure stabilized, a flow reading was recorded. The procedure was then repeated with the test stand adjusted to 500 psi.

Results: Tested on December 13, 2016 The SCBA met the test requirement. The bypass appeared to function normally.

Applied pressure	Airflow (liters per minute)	Pass/Fail
4500 psi	413.43	Pass
500 psi	427.59	Pass

5. **EXHALATION RESISTANCE TEST – NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference:** Subpart H, § 84.91 (c)

Requirement:
The exhalation resistance of pressure-demand apparatus shall not exceed the static pressure in the facepiece by more than 51 mm (2 inches) water column height.

Procedure:
The facepiece was mounted on an anthropometric head form. A probe in the head form was connected to a slant manometer for measuring exhalation breathing resistance. The airflow through the apparatus was adjusted to a rate of 85 liters per minute and the exhalation resistance recorded.

Results: Tested on December 13, 2016. The SCBA met the test requirement.

Exhalation Breathing Resistance: (inches of water column)	**2.05**
Static Pressure: (inches of water column)	**0.91**
Difference: (inches of water column)	**1.14**
Pass/Fail:	**Pass**

6. **REMAINING SERVICE LIFE INDICATOR TEST – NIOSH Standard Test Procedure Number 124, 42 CFR Part 84 Reference:** Subpart H, § 84.83 (f) and Subpart G, §84.63(c)

Requirement:
Each remaining service life indicator or warning device shall give an alarm when the remaining service life of the apparatus is reduced within a range of 20 to 25 percent of its rated service time or pressure.

This requirement was modified under § 84.63(c) as follows: *For apparatus which do not have a method of manually turning off remote gage in the event of a gage or gage line*

failure the remaining service life indicator is required to be set at 25% ± 2% of the rated service time or pressure.

Procedure:
A calibrated gauge was connected in line between the air supply and the first stage regulator. The unit was allowed to gradually bleed down. The pressure on the gauge was recorded when the low air alarm sounded. This procedure was repeated six times. The average of the six readings was calculated and recorded.

Results: Tested on December 9, 2016. The test requirement is between 1035 and 1215 psi (25% ± 2%).

Run #	Mechanical Alarm Point (psi)	Electronic Alarm Point (psi)
1	1040	1120
2	1040	1120
3	1040	1120
4	1040	1110
5	1040	1110
6	1040	1120
Average	1040	1116.67
Pass/Fail	Pass	Pass

7. NFPA AIRFLOW PERFORMANCE TEST NFPA 1981 (1997 Edition) Reference:

Chapter 5, Performance Requirements, Section 5.1.1, Airflow Performance.

Requirement:
SCBA shall be tested for airflow performance as specified in Section 6.1, Airflow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in (0.0 mm) water column nor greater than 3½ in (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.

Procedure:
The required equipment specified in the NFPA standards were used to conduct the tests on this unit. A pressure tap in the head was connected to a transducer which in turn is connected to a flatbed chart recorder for determining the pressure in the facepiece.

Results: Tested on December 14, 2016. The SCBA passed this test.

Test Notes: PASS unit was functional. HUD was functional. Alarm systems were functional.

Maximum Facepiece Pressure: (inches of water column)	**2.71**
Minimum Facepiece Pressure: (inches of water column)	**0.42**
Pass/Fail:	**Pass**

III. Disposition:

Following testing, the SCBA unit was returned to the package in which the unit was shipped to NIOSH and placed in secured storage. The unit was then removed from secured storage on December 29, 2016 and a download of the data logger was conducted by the MTT in Lab H1513. The unit was placed back into secured storage awaiting shipment back to the fire department.

The results of all tests are summarized in Tables One and Two.

TABLE ONE – Summary of NIOSH Test Results

Task Number: 21002

Manufacturer: Scott® Safety

NIOSH Approval Number: TC-13F-76CBRN

Tests Performed By: Angie Andrews, Jeremy Gouzd, Karis Kline

Dates of Tests: December 8, 9, 13, and 14, 2016

TEST/42 CFR PART 84 REFERENCE	STANDARD	RESULT	PASS	FAIL
1. POSITIVE PRESSURE TEST Reference: Subpart H, § 84.70 (a)(2)(ii)	≥ 0.00 INWC	-0.25 INWC		**X**
2. RATED SERVICE TIME TEST Reference: Subpart F, § 84.53 (a), Subpart H, § 84.95 (a) and (b)	≥ 30 min.	35 min 12 s	**X**	
3. STATIC PRESSURE TEST Reference: Subpart H, § 84.91 (d)	≤ 1.50 INWC	0.91 INWC	**X**	
4a. GAS FLOW TEST (at Full Cylinder Pressure) Reference: Subpart H, § 84.93 (b) and (c)	≥ 200 LPM	413.43 LPM	**X**	
4b. GAS FLOW TEST (at 500 psig) Reference: Subpart H, § 84.93 (b) and (c)	≥ 200 LPM	427.59 LPM	**X**	
5. EXHALATION RESISTANCE TEST Reference: Subpart H, § 84.91 (c)	Difference ≤ 2.00 INWC	1.14 INWC	**X**	
6a. REMAINING SERVICE LIFE INDICATOR TEST (vibrating alarm) Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c)	Between 1035 and 1215 psi	1040 psi	**X**	
6b. REMAINING SERVICE LIFE INDICATOR TEST (light alarm HUD) Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c)	Between 1035 and 1215 psi	1116.67 psi	**X**	

NOTE: The Positive Pressure Test and Rated Service Life Test are run simultaneously.

TABLE TWO – Summary of NFPA Test Results

TEST/REFERENCE	STANDARD	RESULT	PASS	FAIL
7a. NFPA AIRFLOW PERFORMANCE **Reference:** NFPA 1981 (1997 Edition), Chapter 5.1.1	≤ 3.50 INWC Exhalation Resistance	2.71 INWC	**X**	
7b. NFPA AIRFLOW PERFORMANCE **Reference:** NFPA 1981 (1997 Edition), Chapter 5.1.1	≥ 0.00 INWC Inhalation Resistance	0.42 INWC	**X**	

The Data Logger Information

Time	Date	Off To Sensing	Sensing To Off	Pre-Alarm To Alarm	Manual Alarm	Alarm Reset	Low Battery	Sensing To Pre-Alarm	Clock Reset Pending	Clock Reset	Power On Reset	SEMS Link Down	SEMS Link UP	EVAC	EVAC ACK	Bluetooth Connect	Bluetooth Disconnect
10:03:36	9/14/2016	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
7:56:18	9/14/2016	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
1:10:34	7/29/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1:10:32	7/29/2016	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
1:08:34	7/29/2016	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
1:08:22	7/29/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
1:04:16	7/29/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:02:32	7/28/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:02:10	7/28/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18:35:14	7/25/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18:35:06	7/25/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
18:21:24	7/25/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:12:26	7/24/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:12:06	7/24/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8:15:54	7/23/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8:06:28	7/23/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:01:34	7/20/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:01:26	7/20/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
7:01:06	7/20/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:07:50	7/19/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:07:30	7/19/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:58:34	7/18/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:58:14	7/18/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16:42:22	7/15/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16:42:16	7/15/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
16:40:00	7/15/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
16:39:28	7/15/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
16:35:20	7/15/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
16:33:04	7/15/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:58:50	7/15/2016	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:58:44	7/15/2016	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
6:58:24	7/15/2016	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix III

SCBA Inspection Report

Figure 1: Cardboard box containing SCBA.

Figure 2: Inside of cardboard box.

Figure 3: SCBA unit, facepiece, and cylinder out of bag.

Figure 4: Side view of facepiece.

Figure 5: Inside view of facepiece.

Figure 6: Outside identifying markings on facepiece.

Figure 7: Mask mounted regulator connected to waist belt.

Figure 8: Inside flange, mask mounted regulator.

Figure 9: MMR, low pressure with Quick Disconnect.

Figure 10: Low pressure regulator hose and HUD connection.

Figure 11: Interior view of pressure reducer assembly.

Figure 12: Bottom view of pressure reducer assembly.

Figure 13: High pressure hose and cylinder attachment.

Figure 14: Cylinder attachment threads.

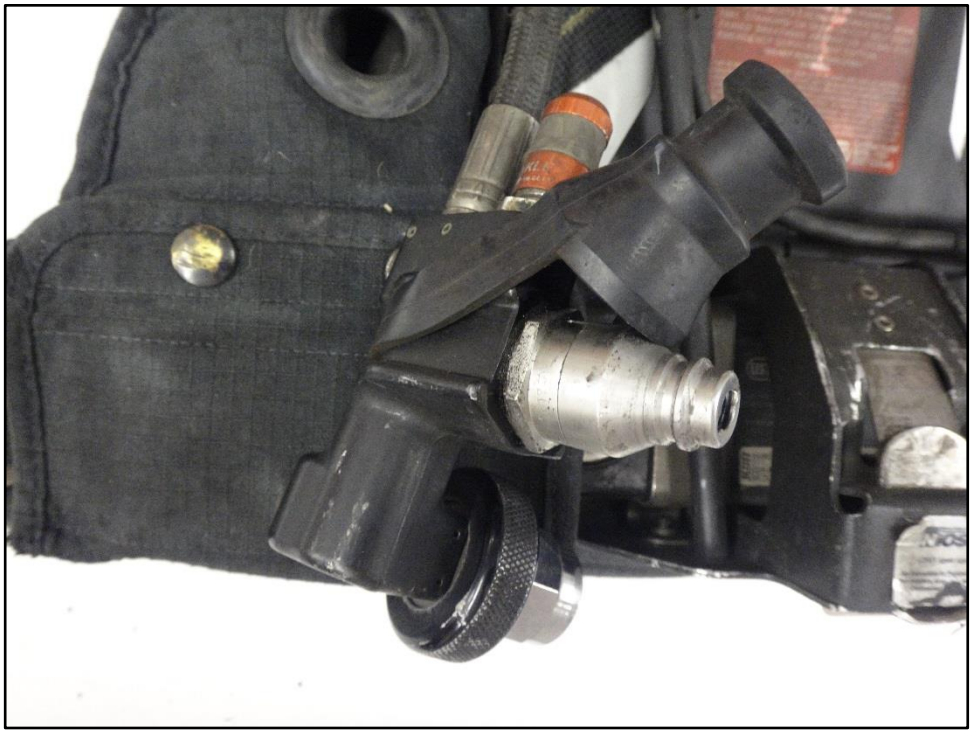


Figure 15: Quick-Fill port on cylinder attachment.

Figure 16: High pressure line to PASS console

Figure 17: Back of PASS console, SEI label.

Figure 18: Control module.

Figure 19: Inside of backframe.

Figure 20: Back view of backframe and labels.

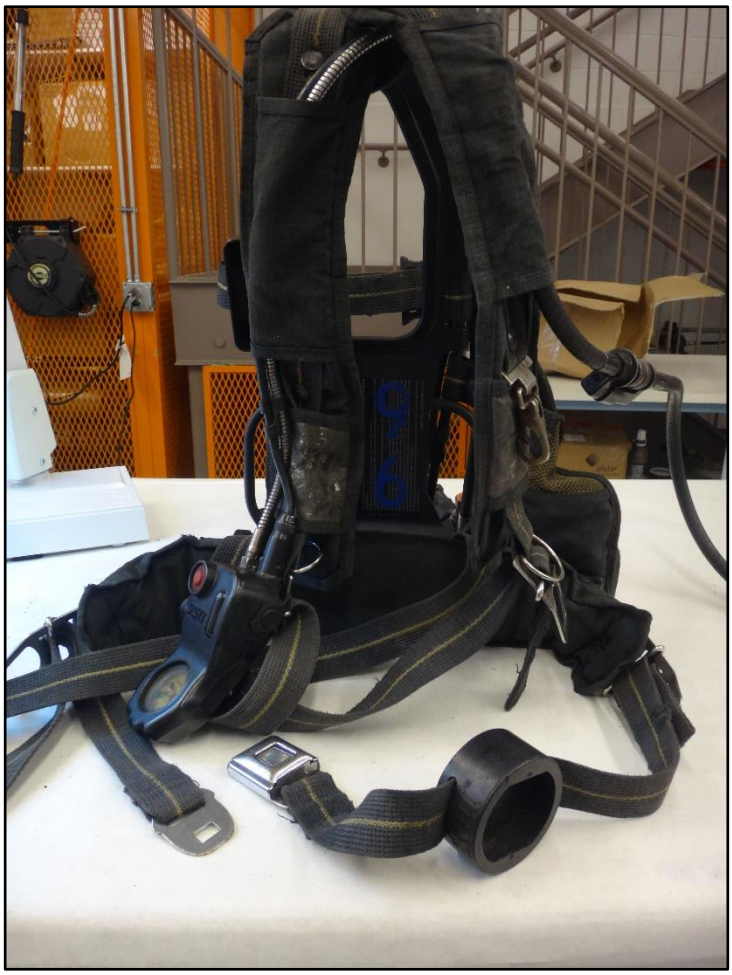
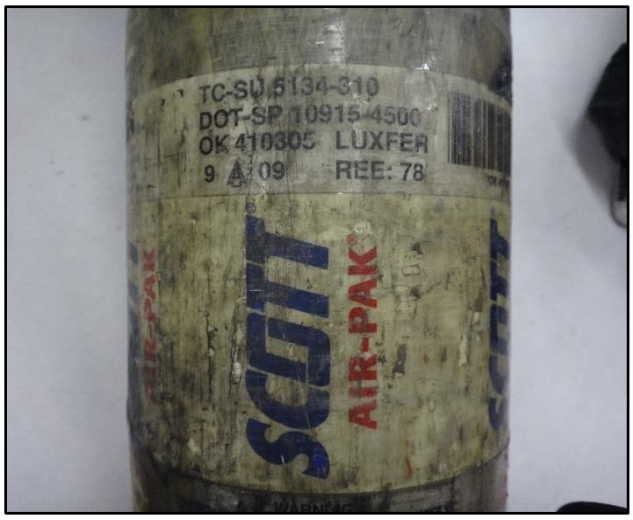


Figure 21: Straps and buckles.

Figure 22: Auxiliary hose pouch.

Figure 23: Auxiliary hose outside of pouch.

Figure 24: Overall condition of cylinder.



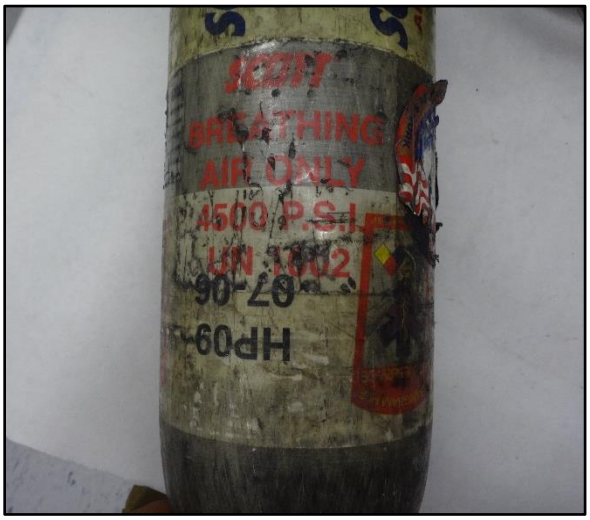


Figure 25: Identifying information on cylinder.

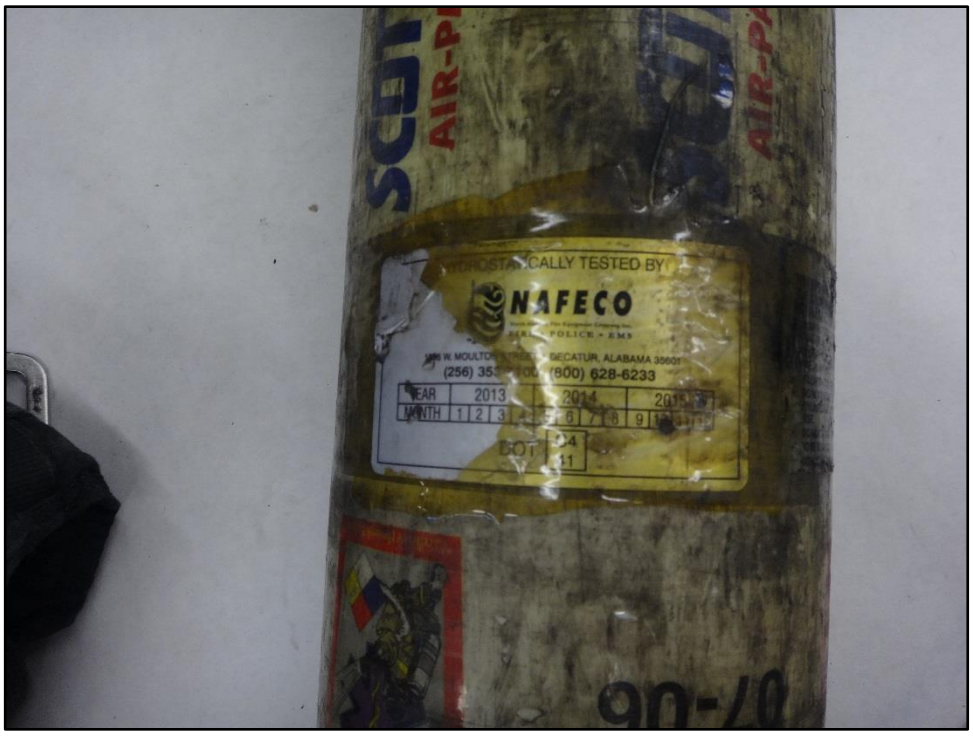


Figure 26: Hydrostatic test date.

Figure 27: Cylinder gauge is legible, view of threads.