

PPE CASE



Personal Protective Equipment Conformity Assessment Studies and Evaluations

Evaluation of Two Self-Contained Breathing Apparatus Involved in a Fatality in the Fire Service

Worcester Fire Department requested the evaluation of two Scott® Safety Air-Pak® Model 75, 45 minute, 4500 psi units

The National Institute for Occupational Safety and Health (NIOSH) conducts a Fire Fighter Fatality Investigation and Prevention Program, which is executed by its Division of Safety Research. In support of this Program, NIOSH's National Personal Protective Technology Laboratory (NPPTL) inspects and evaluates the Self-Contained Breathing Apparatus (SCBA) used by the fire fighter during a fatality.

This report provides a summary of NPPTL's inspection and evaluation methods, and findings for two SCBAs that were used by the Worcester Fire Department fire fighter during a fatal event. The SCBAs were the Scott® Safety Air-Pak® Model 75 4.5, 45 minute, 4500 psi units. The NIOSH Division of Safety Research (NIOSH DSR) and the Worcester Fire Department were advised that NIOSH NPPTL would provide a written report of the investigation and any applicable test results.

What NIOSH Did to Protect the Worker

Upon receipt of the SCBAs, NPPTL staff managed the custody of evidence throughout the inspection and evaluation process at its Morgantown, West Virginia facility. NPPTL staff inspected all of the SCBA components and documented their findings with written and photographic evidence. They also tested the two SCBAs to determine conformance to the NIOSH approval requirements as outlined in Title 42, Code of Federal Regulations, Part 84 (42 CFR 84). Further testing was conducted to provide an indication of the conformance of each 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, 2013 Edition. If the inspection or evaluation data suggested that the SCBA units may have contributed to the fatality, NPPTL would have engaged in corrective action to ensure that

NIOSH received two SCBAs used by a fire fighter involved in a fatality. The SCBAs were not found to contribute to the fatality.

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.

no other users of the product would experience an incident. In this case, no such corrective action was necessary. NPPTL then managed the disposition of the SCBAs.

Chain of Custody

The SCBA units were submitted to NIOSH NPPTL by NIOSH DSR for the Worcester Fire Department for evaluation. The SCBA units were delivered via FedEx in a plastic box to Lab H1513 in the NIOSH facility in Morgantown, West Virginia on February 12, 2019.

On February 25, 2017, NPPTL employees Jay Tarley and Angie Andrews inspected the SCBA units. The SCBA units remained in Lab H1513 throughout the inspection and testing process.

The SCBAs were identified as belonging to the Worcester Fire Department and were visually examined, component by component, in the condition received to determine the conformance of the units to the NIOSH-approved configuration. The units were both identified as the Scott® Safety Air-Pak® Model 75 4.5, 45 minute, 4500 psi unit, with NIOSH Approval Number TC-13F-212CBRN.

SCBA Inspection

On February 25, 2019, NPPTL employees Angie Andrews and Jay Tarley inspected the SCBA units. The SCBAs were identified as belonging to the Worcester, MA Fire Department and were visually examined, component by component, in the condition received, to determine the conformance of the unit to the NIOSH-approved configuration. The units were identified as the Scott® Safety Air-Pak Model 75, 45 minute, 4500 psi unit, NIOSH Approval Number TC-13F-212CBRN.

As Received (pictured below) SCBA Unit L43 and L14

- SCBAs were delivered by FedEx ground in a plastic container to Lab H1513
- SCBAs were in good shape
- A cylinder was included for each unit
- A mask was included with L43
- The donning switch was on with both units, with regulator intact
- Bypass was closed on L43 and open on L14



Figure 1: SCBA Units L43 and L14 as received



Figure 2: SCBA Units L43 and L14 as received

Components and Observations for SCBA Unit L43 (Figure 1) (“right” or “left” are from the user’s perspective) (see Figures in Appendix)

Facepiece AV 3000 (Figures 3 - 5)

- Facepiece seal P/N: 31001740; Large; MFG date: 02/2017
- Nosecup P/N: 201128; Size: Large; MFG date: 3rd Q 2015
- Retaining ring top MFG date: 12/2016; P/N: 31002809; bottom MFG date 7/2076, PN 31002810
- Lens P/N: 805337-13/-33/-36/39; MFG date: 03/2017
- Overall condition good, with minimal scratches
- Lens was good, with minimal scratches
- Hairnet was good condition, but dirty
- Hairnet straps good, straps moved freely and held in place by buckle, held securely to facepiece
- Attachment points for straps were good
- The facepiece seal was in good condition
- Regulator interface area was in good condition

Mask Mounted Regulator (MMR) (Figures 6, 7)

- Vibralert and with Heads-Up Display (HUD)
- Regulator assembly P/N, S/N not readable MFG date: 03/20/12
- Overall condition, fair
- Outer case good and front label fair

- Donning switch was on
- Bypass was closed
- Sealing area good with slight fraying around the edge, had minimal scratches
- Locking assembly functioned
- HUD fully intact

Low Pressure Regulator Hose (Figures 6)

- Marking: L3521
- Overall condition is good
- No quick disconnect

Pressure Reducer Assembly (Figures 8, 9)

- P/N: 200925-02
- S/N 115S121005971
- MFG date: 3/17/12
- Overall condition was good, dirty
- All airline connections were secure with no sign of heat damage

High Pressure Hose and Cylinder Attachment (Figures 10, 11)

- Overall condition was good. No signs of heat damage on inside of high-pressure line attachment rubber cover
- Markings on cylinder attachment: 802228-15; 0312

- Soot covered
- Cylinder attachment threads good and “O” ring in place
- RIC/UAC system connector markings: Parker RGX-N-05; 230V
- RIC/UAC system connector cover in good condition

PASS Console Assembly (Figures 12, 13)

- Scott label: not readable
- Overall condition good, dirty/sooty
- Lines in good shape—pressure/electrical
- Gauge lens good and readable
- Attachment present
- SEI label present, 2007 edition
- HUD US Patent#: 5,097,826
- Additional marking: FT1073

PASS Control Module with PAK-Alert (Figures 14, 15)

- Scott label Pak-Alert SE7 : PN 201110-11, SN 115S1212004433, MFG Date 3/2/12
- USTC UL913; E105-0154
- Scott P/N: 200451-01, -11; Pak-Alert SE7
- Scott P/N: 200451-02, -12 with Pak-Tracker
- MFG date: 5/3/2016
- Overall condition was good, dirty with soot and debris
- Held securely to backframe
- Wire connection connected to PASS device
- Wire held secure to backframe and connected to console assembly

Backframe Assembly (Figures 16, 17)

- SEI label present, 2007 ed
- NIOSH label TC-13F-212CBRN
- Other marking: three additional labels: L43, Industrial protection services flow tested 12/13ladder 4 SCBA 3
- Overall condition good, no bends/cracks in wire frame, or plate
- Shoulder straps were attached to the frame
- Cylinder strap latch good condition, functional

Straps and Buckles (Figures 18)

- 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; no fraying shown

Compressed Air Cylinder and Cylinder Valve Assembly (Figures 19, 20)

Minute Duration: 45 minute

DOT –Number: DOT-SP 10915-4500

TC-SU5134-310

IL 704115

REE: 99

Scott Part number: 805588-AC0841

- Scott logo visible Luxfer L5G
- Manufacture date: 2/2012
- Overall condition was fair, minimal surface scratches, but dirty
- Gauge was readable
Threads clean
 - As received, cylinder valve fully closed with no air remaining
 - Rubber bumper at base on cylinder valve was in good condition
 - Rehydro label present: 2/17
 - Info on stem: Not readable

Components and Observations for SCBA L14 (“right” or “left” are from the user’s perspective) (see Figures in Appendix)

Mask Mounted Regulator (MMR) (Figures 21, 22)

- Vibralert and with Heads-Up Display (HUD)
- Regulator assembly P/N, S/N not readable
- Other marking: A1012
- Overall condition, good
- Outer case good and front label fair
- Donning switch was on
- Bypass was open
- Sealing area good with slight fraying around the edge, had minimal scratches
- Locking assembly functioned
- HUD fully intact

Low Pressure Regulator Hose (Figures 21)

- P/N: 31001416
- Other marking: 1008
- Overall condition was good
- No quick disconnect

Pressure Reducer Assembly (Figures 23, 24)

- P/N: 200925-02
- S/N 115S1212000603
- FD Label: L14
- MFG date: 3/19/12
- Overall condition was good, dirty
- All airline connections were secure with no sign of heat damage

High Pressure Hose and Cylinder Attachment (Figures 25, 26)

- Overall condition was good. No signs of heat damage on inside of high-pressure line attachment rubber cover.
- Markings on cylinder attachment: 802228-15; 0312
- Cylinder attachment threads good and “O” ring in place
- RIC/UAC system connector markings: Parker RGX-N-05; 11NV
- High pressure hose marking: 0462P
- RIC/UAC system connector cover in good condition.

PASS Console Assembly (Figures 27, 28)

- Scott label: not readable
- Overall condition good, dirty/sooty
- Lines in good shape—pressure/electrical
- Gauge lens good and readable

- Attachment present
- SEI label present, 2007 edition
- HUD US Patent#: 5,097,826

PASS Control Module with PAK-Alert (Figures 29, 30)

- Scott label Pak-Alert SE7 : PN 200451-02, SN 115S1201002309, MFG Date 1/4/12
- Scott P/N: 200451-01, -11; Pak-Alert SE7
- Scott P/N: 200451-02, -12 with Pak-Tracker
- Pak-Tracker ID#: 00144226
- Overall condition was good, dirty with soot and debris
- Held securely to backframe
- Wire connection connected to PASS device
- Wire held secure to backframe and connected to console assembly

Backframe Assembly (Figures 31, 32)

- SEI label present, 2007 ed
- NIOSH label TC-13F-212CBRN
- Backframe assembly P/N: 200275-01
- Other marking: three additional labels: L14, Industrial protection services flow tested 12/13,
- Overall condition good, no bends/cracks in wire frame, or plate
- Shoulder straps were attached to the frame
- Cylinder strap latch good condition, functional

Straps and Buckles (Figures 33)

- 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; no fraying shown

Compressed Air Cylinder and Cylinder Valve Assembly (Figures 34, 35)

Minute Duration: 45 minute

DOT –Number: DOT-SP 10915-4500

TC-SU5134-310

IL 704039

REE: 99

Scott Part number: 805588-AC0841

- Scott logo visible Luxfer L5G-501?
- Manufacture date: 2/2012

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- Overall condition was fair, minimal surface scratches, but dirty
 - Gauge was readable
 - Threads clean
 - As received, cylinder valve fully closed with 2000 psi air remaining
 - Rubber bumper at base on cylinder valve was in good condition
 - Rehydro label present: 2/17
 - Info on stem: Not readable
 - Other marking L1, L14

SCBA Testing

The SCBA unit was tested using the six NIOSH standard test methods and one NFPA test method as described in **Table 1**.

Table 1. Summary of results from testing SCBA Unit L43.

NIOSH Tests	Description of Results	PASS/ FAIL
<p>Positive Pressure Test - NIOSH Standard Test Procedure No. 120 42 CFR Part 84 Reference: Subpart H, § 84.70 (a)(2)(ii) Requirement: <i>The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.</i> 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) is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece.</p>	<p>The unit did not meet the test requirement. The inhalation breathing resistance became negative approximately 10 minutes into the testing and remained negative throughout the remainder of the test. *The PASS unit functioned and there was a HUD *The corresponding cylinder was used Inhalation Breathing Resistance: (inches of water column) = -0.2</p>	<p>FAIL</p>
<p>Rated Service Time Test - NIOSH Standard Test Procedure No. 121 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b) Requirement: <i>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.</i> Procedure: A breathing machine with a 622 kg.-m./min. cam operating at 24 RPM with a 40 liters per minute flow rate is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece. The breathing machine is run until the inhalation portion of the breathing curve falls below the minimum requirement.</p>	<p>The SCBA did not meet the test requirement due to the pressure in the facepiece becoming negative. The test was stopped after the unit reached the rated service time of 45 minutes. The PASS unit functioned during the test. The SCBA went negative on inhalation; therefore, it did not maintain positive pressure in the facepiece. Measured Service Time: 45 min Test stopped after the unit reached 45 minutes due to the pressure in the facepiece becoming negative.</p>	<p>FAIL</p>

<p>Static Pressure Test NIOSH Standard Test Procedure No. 122 42 CFR Part 84 Reference: Subpart H, § 84.91 (d) Requirement: <i>The static pressure (at zero flow) in the facepiece shall not exceed 38 mm. (1.5 inches) water column height.</i> Procedure: The facepiece is fitted to an anthropometric head for testing. A pressure tap in the head is connected to a calibrated manometer. Full cylinder pressure is applied to the unit at zero flow and a reading from the manometer is recorded.</p>	<p>The SCBA met the test requirement. Facepiece Static Pressure: (inches of water column) = 0.80</p>	<p>PASS</p>						
<p>Gas Flow Test - NIOSH Standard Test Procedure No. 123 42 CFR Part 84 Reference: Subpart H, § 84.93 (b) and (c) Requirement: <i>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 gauge pressure in the facepiece.</i> Procedure: A pressure tap in the anthropometric head is connected to a manometer for determining when the pressure inside the facepiece is at zero. A mass flow meter is connected in line between the anthropometric head and an adjustable vacuum source to measure flow. The SCBA cylinder is replaced by a test stand which is adjusted initially to full cylinder pressure. The vacuum source is adjusted during the test to maintain the desired pressure inside the facepiece. Once the proper facepiece pressure has stabilized, a flow reading is recorded. The procedure is then repeated with the test stand adjusted to 500 psig.</p>	<p>The SCBA met the test requirement.</p> <table border="0"> <tr> <td>Applied Pressure</td> <td>Air Flow (liters per min.)</td> </tr> <tr> <td>4500 psig</td> <td>362.5</td> </tr> <tr> <td>500 psig</td> <td>376.6</td> </tr> </table>	Applied Pressure	Air Flow (liters per min.)	4500 psig	362.5	500 psig	376.6	<p>PASS PASS</p>
Applied Pressure	Air Flow (liters per min.)							
4500 psig	362.5							
500 psig	376.6							
<p>Exhalation Resistance Test - NIOSH Standard Test Procedure No. 122 42 CFR Part 84 Reference: Subpart H, § 84.91 (c) Requirement: <i>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.</i> Procedure: The facepiece is mounted on an anthropometric head form. A probe in the head form is connected to a slant manometer for measuring exhalation breathing resistance. The air flow through the apparatus is adjusted to a rate of 85 liters per minute and the exhalation resistance is recorded.</p>	<p>The SCBA met the test requirement.</p> <p>Exhalation Breathing Resistance: (inches of water column) = 1.95 Static Pressure: (inches of water column) = 0.80 Difference: (inches of water column) = 1.15</p>	<p>PASS</p>						

<p>Remaining Service Life Indicator Test - NIOSH Standard Test Procedure No. 124 42 CFR Part 84 Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c)</p> <p>Requirement: <i>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.</i></p> <p><i>This requirement is 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.</i></p> <p>Procedure: A calibrated gauge is connected in line between the air supply and the first-stage regulator. The unit is then allowed to gradually bleed down. When the low-air alarm is activated, the pressure on the gauge is recorded. This procedure is repeated six times. The average of the six readings is calculated and recorded.</p>	<p>As these SCBA models do not have a remote gauge shutoff, the test requirement is 25% +2, -2, which is between 1215 psi and 1035 psi.</p> <table border="1" data-bbox="1312 289 1871 609"> <thead> <tr> <th></th> <th>Electric</th> <th>Vibralert</th> </tr> <tr> <th>Run #</th> <th>Alarm Point (psi)</th> <th>Alarm Point (psi)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1140</td> <td>1140</td> </tr> <tr> <td>2</td> <td>1110</td> <td>1110</td> </tr> <tr> <td>3</td> <td>1120</td> <td>1110</td> </tr> <tr> <td>4</td> <td>1110</td> <td>1110</td> </tr> <tr> <td>5</td> <td>1110</td> <td>1110</td> </tr> <tr> <td>6</td> <td>1110</td> <td>1110</td> </tr> <tr> <td>Avg:</td> <td>1116</td> <td>1115</td> </tr> </tbody> </table> <p>The electronics did not work = PASS Vibralert = PASS</p>		Electric	Vibralert	Run #	Alarm Point (psi)	Alarm Point (psi)	1	1140	1140	2	1110	1110	3	1120	1110	4	1110	1110	5	1110	1110	6	1110	1110	Avg:	1116	1115	<p>PASS</p> <p>PASS</p>
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Avg:	1116	1115																											

National Fire Protection Association (NFPA) Test (in accordance with NFPA 1981, 2013 Edition):

NFPA Test	Description of Results	PASS/FAIL
<p>NFPA Air Flow Performance Test—NFPA 1981 (2013 Edition) Reference: Chapter 8, Performance Requirements, Section 8-1.1</p> <p>Requirement: SCBA shall be tested for air flow performance as specified in Section 8.1, Air flow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in. (0.0 mm) water column and not greater than 3½ in. (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.</p> <p>Procedure: The required equipment specified in the NFPA standards were used to conduct the tests on this unit. A pressure tap in the head is connected to a transducer which in turn is connected to a flatbed chart recorder for determining the pressure in the facepiece.</p>	<p>The SCBA passed this test. PASS, HUD, and alarm systems were functional.</p> <p>Maximum Facepiece Pressure: (inches of water column) = 2.7 Minimum Facepiece Pressure: (inches of water column) = 0.40</p>	<p>PASS</p>

SCBA Testing

The SCBA unit was tested using the six NIOSH test methods and one NFPA test method as described in **Table 2**.

Table 2. Summary of results from testing SCBA Unit L14.

NIOSH Tests	Description of Results	PASS/ FAIL
<p>Positive Pressure Test - NIOSH Standard Test Procedure No. 120 42 CFR Part 84 Reference: Subpart H, § 84.70 (a)(2)(ii) Requirement: <i>The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.</i> 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) is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece.</p>	<p>The unit did not meet the test requirement. The inhalation breathing resistance became negative approximately 11 minutes into the testing and remained negative throughout the remainder of the test. *The PASS unit functioned and there was a HUD *The corresponding cylinder was used</p> <p>Inhalation Breathing Resistance: (inches of water column) = -0.1</p>	<p>FAIL</p>
<p>Rated Service Time Test - NIOSH Standard Test Procedure No. 121 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b) Requirement: <i>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.</i> Procedure: A breathing machine with a 622 kg.-m./min. cam operating at 24 RPM with a 40 liters per minute flow rate is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece. The breathing machine is run until the inhalation portion of the breathing curve falls below the minimum requirement.</p>	<p>The SCBA did not meet the test requirement due to the pressure in the facepiece becoming negative. The test was stopped after the unit reached the rated service time of 45 minutes. The PASS unit functioned during the test. The SCBA went negative on inhalation; therefore, it did not maintain positive pressure in the facepiece.</p> <p>Measured Service Time: 45 min Test stopped after the unit reached 45 minutes due to the pressure in the facepiece becoming negative.</p>	<p>FAIL</p>

<p>Static Pressure Test - NIOSH Standard Test Procedure No. 122 42 CFR Part 84 Reference: Subpart H, § 84.91 (d) Requirement: <i>The static pressure (at zero flow) in the facepiece shall not exceed 38 mm. (1.5 inches) water column height.</i> Procedure: The facepiece is fitted to an anthropometric head for testing. A pressure tap in the head is connected to a calibrated manometer. Full cylinder pressure is applied to the unit at zero flow and a reading from the manometer is recorded.</p>	<p>The SCBA met the test requirement. Facepiece Static Pressure: (inches of water column) = 0.80</p>	<p>PASS</p>						
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<p>Procedure: The facepiece is mounted on an anthropometric head form. A probe in the head form is connected to a slant manometer for measuring exhalation breathing resistance. The air flow through the apparatus is adjusted to a rate of 85 liters per minute and the exhalation resistance is recorded.</p>	<p>Static Pressure: (inches of water column) = 0.80 Difference: (inches of water column) = 1.15</p>																												
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National Fire Protection Association (NFPA) Test (in accordance with NFPA 1981, 2013 Edition):

<p>NFPA Test</p>	<p>Description of Results</p>	<p>PASS/ FAIL</p>
<p>NFPA Air Flow Performance Test—NFPA 1981 (2013 Edition) Reference: Chapter 8, Performance Requirements, Section 8-1.1 Requirement: <i>SCBA shall be tested for air flow performance as specified in Section 8.1, Air flow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in. (0.0 mm) water column and not greater than 3½ in. (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.</i></p>	<p>The SCBA passed this test. PASS, HUD, and alarm systems were functional.</p> <p>Maximum Facepiece Pressure: (inches of water column) = 2.7 Minimum Facepiece Pressure: (inches of water column) = 0.44</p>	<p>PASS</p>

Procedure:

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

Disposition of SCBA

Following testing on March 6, 2019, the SCBAs were returned to secure storage in Lab H1513 at the NIOSH facility in Morgantown, West Virginia.

Synopsis of Findings

The SCBA units inspected and evaluated by NPPTL were Scott® Safety Air-Pak® Model 75, 45-minute, 4500 psi units with NIOSH Approval Number TC-13F-212CBRN. The fire fighter was wearing one unit when the event occurred (L43). A second unit was provided for the victim during the rescue attempt (L14). One facepiece was used during the event, which was assigned to L43. The fire department provided a cylinder for testing with both SCBAs. Overall, the SCBAs were in good condition. The NFPA approval label was present and readable. The PASS, HUD, and alarm systems functioned.

The SCBAs did not meet the requirements of the NIOSH Positive Pressure Test (NIOSH Standard Test Procedure 120, 42 CFR Part 84 Reference: Subpart H, 84.70 (a)(2)(ii)), which made them fail the Rated Service Time Test (NIOSH Standard Test Procedure No. 121 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b)). The units passed the NFPA “Airflow Performance” test and all the other NIOSH tests.

The information obtained during this investigation does not suggest that the units contributed to the fatality. The SCBAs were returned to the shipping container to be shipped back to the Worcester Fire Department.

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

CASE Conclusion

No evidence was identified to suggest that the SCBA units inspected and evaluated contributed to the fatality. NIOSH determined that there was no need for corrective action with regards to the approval holder or users of SCBAs manufactured under the approval number granted to this product.

Actions to be Taken by the Fire Departments With SCBAs Involved in an Incident

- Any SCBA unit involved in an incident may not be placed back in service until the SCBA has been repaired, tested, cleaned, and any damaged components replaced and inspected by a qualified service technician, including such testing and other maintenance activities as prescribed by the schedule from the SCBA manufacturer.
- All SCBA units, even those not involved in an incident, must undergo a flow test on at least an annual basis.

Actions PPE Users, Selectors, and Purchasers May Take to Further Protect Themselves and Others from Hazards

- Sign up for [NPPTL's Listserv](#) to receive email notifications relevant to PPE.

To request additional information about this report, contact NPPTL at ppeconcerns@cdc.gov, and reference NIOSH Task Number 22942 in your request.

For more information related to personal protective equipment, visit the NIOSH NPPTL website <https://www.cdc.gov/niosh/npptl/>

To receive documents or other information about occupational safety and health topics, contact NIOSH:

Telephone: 1-800-CDC-INFO (1-800-232-4636)

TTY: 1-888-232-6348

CDC INFO: www.cdc.gov/info

Or visit the NIOSH website at <https://www.cdc.gov/niosh/>

For a monthly update on news at NIOSH, subscribe to *NIOSH eNews* by visiting <https://www.cdc.gov/niosh/eNews/>

Appendix: Photographs to Support Inspection Findings for SCBA

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L43

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Figure 3: Front of facepiece



Figure 4: Inside of facepiece



Figure 5: Facepiece hairnet



Figure 6: Mask mounted regulator



Figure 7: Inside seal of mask mounted regulator and HUD



Figure 8: Pressure reducer, top view

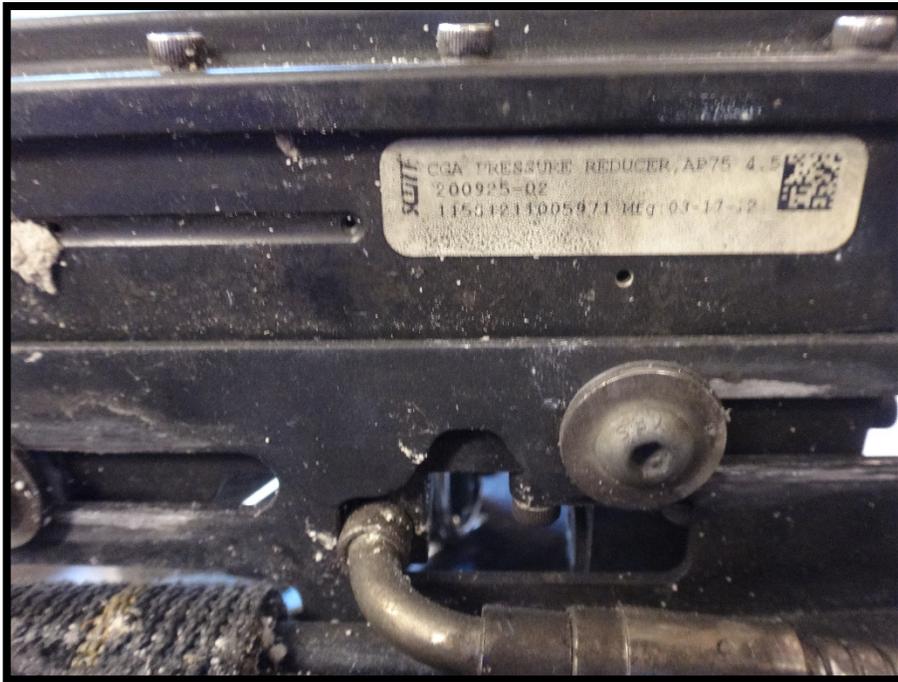


Figure 9: Pressure reducer, label



Figure 10: Cylinder attachment and RIC UAC connector



Figure 11: Cylinder attachment threads and O-ring and RIC UAC dust cover removed



Figure 12: PASS control console



Figure 13: SEI label on back of PASS control console.



Figure 14: PASS control module overview



Figure 15: PASS control module sticker



Figure 16: Backframe



Figure 17: Backframe showing cylinder attachment



Figure 18: Straps and buckles on pack frame

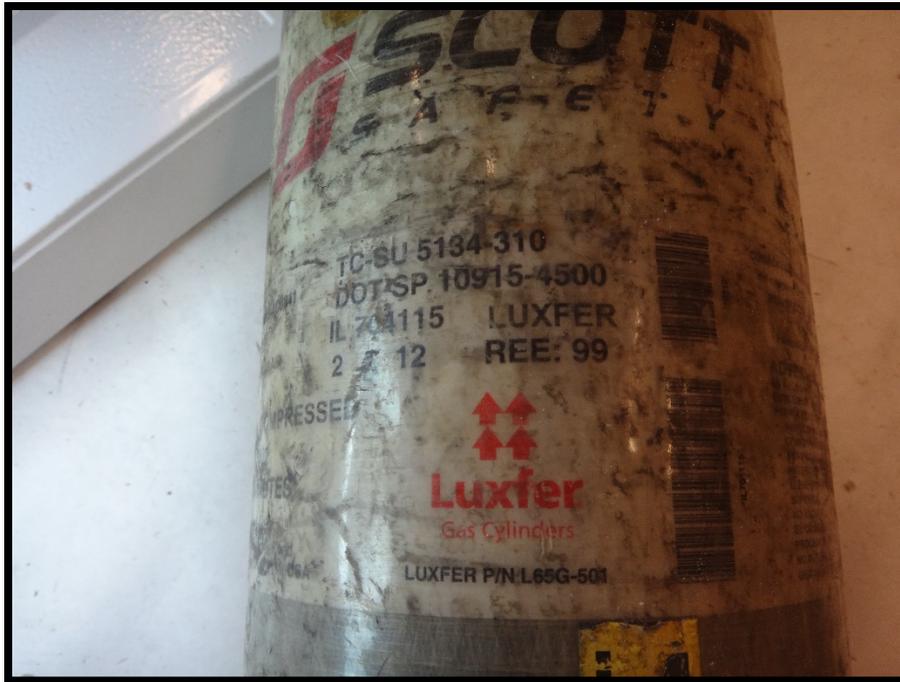


Figure 19: Compressed air cylinder



Figure 20: Gauge, threads, cylinder valve, and rubber bumper



Figure 21: Mask mounted regulator



Figure 22: Inside seal of mask mounted regulator and HUD



Figure 23: Pressure reducer, top view

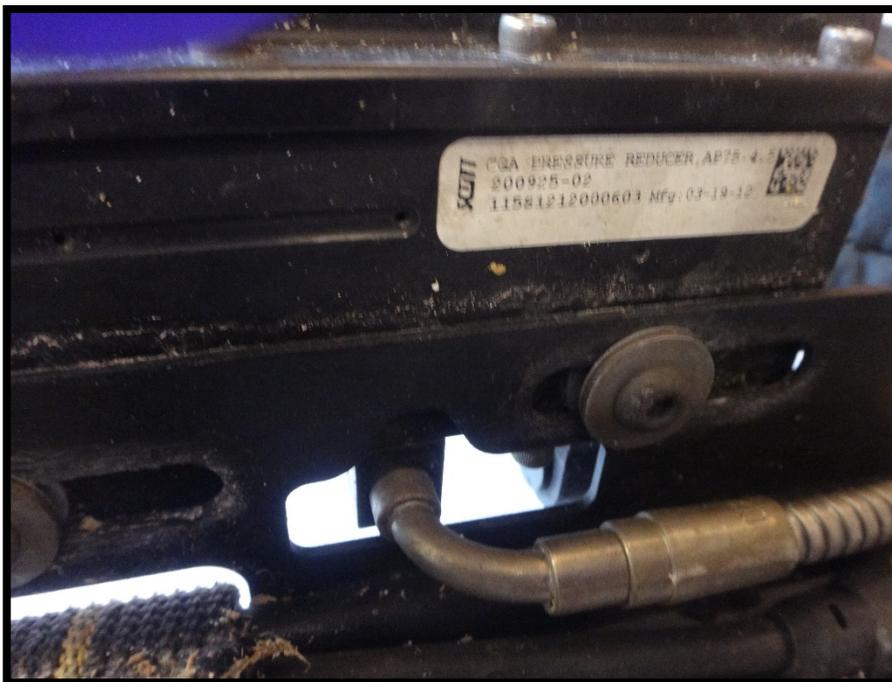


Figure 24: Pressure reducer, label



Figure 25: Cylinder attachment and RIC UAC connector



Figure 26: Cylinder attachment threads and O-ring and RIC UAC dust cover removed



Figure 27: PASS control console



Figure 28: SEI label on back of PASS control console.



Figure 29: PASS control module overview



Figure 30: PASS control module sticker



Figure 31: Backframe



Figure 32: Backframe showing cylinder attachment

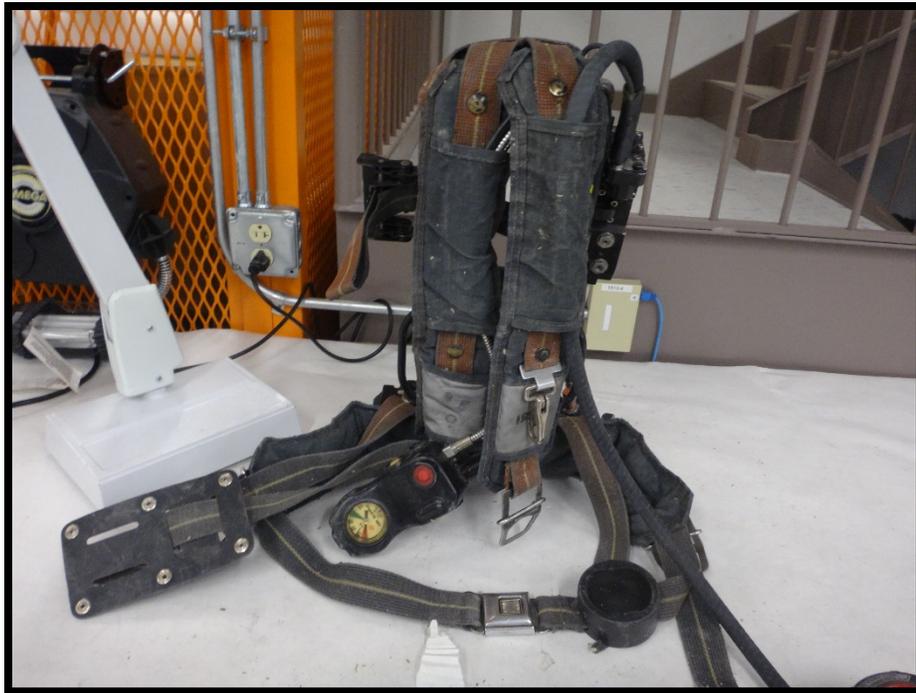


Figure 33: Straps and buckles on pack frame

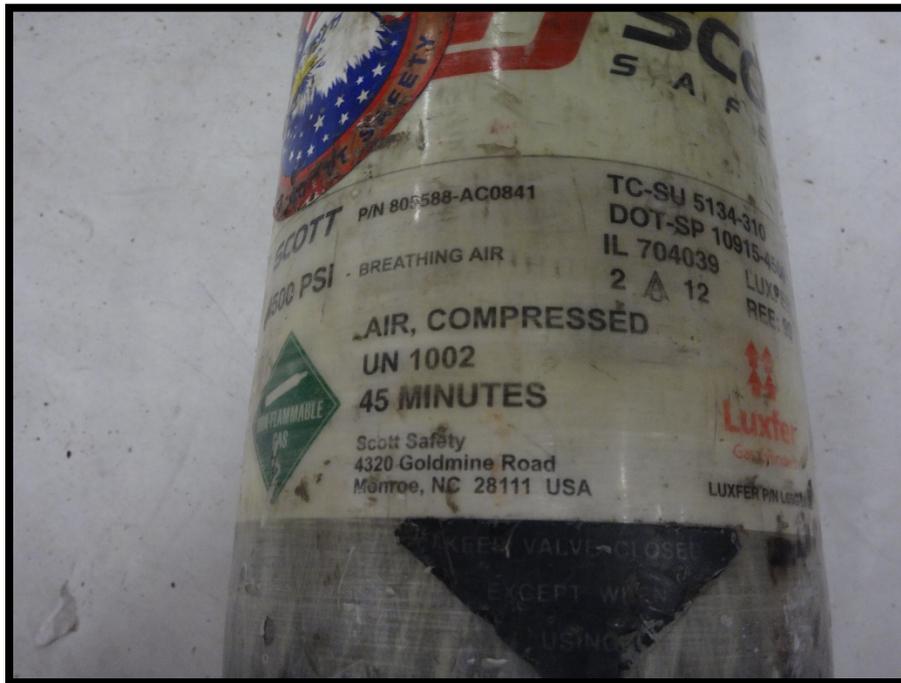


Figure 34: Compressed air cylinder



Figure 35: Gauge, threads, cylinder valve, and rubber bumper

Disclaimer

The purpose of this effort was to determine the conformance of a 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.



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