SOP 701 – SELF-CONTAINED BREATHING APPARATUS

1. USAGE

a) SCBA's will be used at the following alarms, or any alarm or situation that the officer in charge feels it necessary to protect the health of the firefighters: Signal 13's, 14's, 23's (dumpster, haz-mat), 26's and 27's, or any condition where the atmosphere may be immediately dangerous to life or health. An integrated SCBA PAK-ALERT SE distress alarm Personal Alert Safety System will be automatically activated when donning the SCBA.

2. SELECTION

a) SCBA's will be supplied by the District and be of the positive pressure type with only the donning switch style acceptable. The SCOTT Air-Pak *Fifty* Pressure-Demand Self Contained Breathing Apparatus (SCBA) Model 4.5 provides complete respiratory protection with dual redundant low air alarms and is approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) as air breathing apparatus for work in contaminated environments. This SCBA together with full structural firefighting clothing make up the framework of firefighters' personal protective equipment.

b) The Scott AIR-PAK SCBA consists of:

- A cylinder and valve assembly to store a supply of breathing air under pressure.
- A back-frame and harness assembly to support the cylinder and valve assembly and pressure reducer on the body.
- A back-frame mounted pressure reducer to supply air to the breathing regulator.
- A full face piece and head harness to secure the face piece to the face.
- Two independent low air / end of service indicators, a remote pressure gauge mounted on the wearer's right shoulder strap and a VIBRALERT alarm located inside the breathing regulator.
- Shoulder straps, waist straps and a head harness made of Kevlar.
- Scott PAK-ALERT SE distress alarm Personal Alert Safety System.

3. GENERAL DESCRIPTION

a) The face piece utilized by the SCBA's described in this SOP is available in four (4) color-coded sizes: small, large, extra large, and large Comfort Seal. The face piece design incorporates a nose cup, two inhalation valves, heads up display and dual voice miter assemblies. The face piece may be readily detached from the breathing regulator to allow for utilization of the best fitting and most comfortable size face piece for an individual user. All members assigned to the structural firefighting category must be custom fit for face piece sizing during their annual department physical. Individual users must use only the face piece size assigned to them as correctly fitting when donning an SCBA.

b) The regulator utilized by the Scott SCBA is a pressure-demand-breathing regulator

mounted directly to the face piece. The regulator may be removed from the face piece by operating a spring-loaded thumb latch, rotating the regulator 90 degrees and lifting it from the face piece. The breathing regulator is equipped with an air saver / donning switch that can be activated by depressing the rubber covered switch. The regulator is also equipped with a red purge knob. The purge knob is an emergency control that allows air to flow into the face piece without breathing on the respirator. The purge control is also used to release residual air from the respirator after the cylinder valve is turned off.

c) The back-frame-mounted pressure-reducing regulator is a redundant dual path reducing system. During normal use, air is supplied from the cylinder and valve assembly to the mask mounted breathing regulator through the primary air path of the pressure reducer. In the event that the primary path of the pressure reducer should become blocked or should fail closed, the secondary pressure reducing air path will automatically begin supplying air to the breathing regulator. When the secondary path is in operation the VIBRALERT alarm will be actuated to warn the user the primary pressure reducer path has malfunctioned. The user should notify his buddy and the OIC and prepare to leave the contaminated area.

d) The end of service / low air indicator VIBRALERT alarm is mounted inside the breathing regulator. When actuated, the VIBRALERT alarm vibrates the breathing regulator and face piece to warn the user of diminishing air supply by both sound and feel. The VIBRALERT actuates to warn the user that approximately ¾ of the total air supply has been used. As stated above, the VIBRALERT alarm will actuate if the primary pressure reducer malfunctions or becomes blocked. When the bell alarm actuates, an air powered striker impacts the bell housing mounted on the wearer's left shoulder strap to alert the user of diminishing air supply by sounding of the bell. Whenever the VIBRALERT or the bell alarm actuates, the user should notify his buddy and the OIC and prepare to leave the contaminated area.

e) The heads up display (HUD) is a visual display of the SCBA's air status. It is integrated into the regulator located on the left side and seen though the face piece. It consists of 4 colored display lights (green, yellow and red). The lights display indicates the air pressure within the cylinder. The color air display is indicated as follows; two (2) green lights equal full cylinder, one (1) green light equals 75% cylinder, one (1) yellow slow flashing light equals 50% cylinder and one (1) red rapid flashing light equals 25% cylinder.

f) The PAK-ALERT SE distress alarm is a PERSONAL ALERT SAFETY SYSTEM (PASS) intended to assist in locating a member who is incapacitated or in need of assistance.

How the Scott PAK-ALERT SE Distress Alarm Works:

ACTIVATION

Provided proper batteries have been installed and the cylinder has air in it, the PAK-ALERT SE distress alarm is automatically activated when the respirator is pressurized by opening the cylinder valve of the respirator.

Three (3) quick audible chirps from the sensor module indicate activation. On activation, a green light located on the control console will begin to flash approximately once a second. The PAK-ALERT SE distress alarm is now in automatic mode.

If the batteries are in need of replacement, the PAK-ALERT SE distress alarm will indicate low battery voltage by a single audible chirp from the sensor module once every two seconds. In a low battery condition, the green light on the control module will not flash. However, the PAK-ALERT SE distress alarm will continue to operate normally. If batteries are completely discharged or have not been installed, there will be no light or sound that indicates that the unit will not work at all.

Once activated, the Scott PAK-ALERT SE distress alarm will remain activated until:

1. The respirator air cylinder is turned off with the residual air pressure purged from the regulator.

AND

2. The reset button on the control module has been pressed twice.

In the automatic mode the Scott PAK-ALERT SE distress alarm constantly monitors motion of the respirator back-frame. The motion sensor is located in the sensor module along with the audible alarm. If the sensor module does not sense motion of the respirator for 20 seconds the alarm will signal a pre-alarm condition. If there is still no motion of the respirator for the next 8 to 10 seconds the full alarm will sound.

PRE-ALARM

Once the respirator is pressurized, the alarm will automatically sound a pre-alarm if the respirator remains motionless for more than 20 seconds. If the user is not in need of assistance or incapacitated, movement of the respirator normally resets the pre-alarm. A pre-alarm may also be reset by pressing and holding the reset button on the side of the control console until three quick audible chirps are heard and the red flashing light on the control console is replaced by a green flashing light.

FULL ALARM

If the user is incapacitated or in need of assistance and cannot move, the alarm will go into full alarm 8 to 10 seconds after the pre-alarm starts. The full alarm condition can only be cleared by manually pressing twice on the reset button, located on the side of the control console.

MANUAL ALARM

If the user is in a situation where immediate assistance is required, the PAK-ALERT SE distress alarm provides a manual alarm button, located on the front of the control console on the user's right shoulder. The manual alarm causes the full alarm signal to be given. The manual alarm may be activated at any time, even when the respirator is not pressurized. Pressing the reset button twice can silence the manual alarm.

TURNING THE ALARM OFF

When the use of the respirator is no longer required, first close the cylinder valve on the respirator, then vent the residual air from the respirator by opening the regulator purge valve. After waiting until the airflow stops, close the regulator purge valve and turn off the alarm by pressing the reset button twice. The green flashing light will go out and a 15-second beep sequence will be heard as the residual air bleeds out from the system. After the air has completely bleed from the system, the unit will sound two quick chirps

and the PAK-ALERT SE distress alarm will be inactive.

4. PREPARATION FOR USE

The following consecutive steps will be followed when donning an SCBA before entering a toxic atmosphere:

a) Check the pressure gauge in the cylinder valve to ensure that the cylinder is full (4500 psi). If there is less pressure, the service life will be reduced accordingly. Ensure that the cylinder is firmly locked in position by the cylinder retention assembly.

b) Sit with your back against the back-frame of the SCBA. Make sure the shoulder straps are fully extended and place one arm in it at a time through each respective shoulder strap. Free the respirator from the mounting brackets. Connect the waist belt buckle and adjust by pulling forward on the two side mounted belt ends. Readjust the shoulder straps to ensure the weight is carried on the hips.

c) Fully depress the center of the air saver / donning switch on top of the regulator and release. The regulator should be installed in the user's personal face piece at this time. The regulator is retained in the face piece by a ¼ turn port and is locked in the face piece retainer with a lock tab.

d) Slowly open the cylinder valve fully by turning the valve knob counterclockwise until it stops. The VIBRALERT alarm will actuate and then stop. The PAK-ALERT SE distress alarm will actuate when the cylinder valve is opened and will sound three quick audible chirps accompanied by a flashing green light on the control console.

e) The user of the respirator is now in "standby" condition. To detach the regulator from the face piece while in "standby" condition, place your right hand over the cover with your thumb on the lock tab. Pull the lock tab toward the cover and rotate the regulator ¼ turn clockwise (viewed from inside the face piece). When the red purge valve is in the 12 o'clock position remove the regulator from the face piece. Attach the regulator to the regulator holder located on the user's belt.

1. USE OF THE RESPIRATOR

a) If the regulator is not attached to the face piece, be sure the regulator gasket is in place around the outlet port of the regulator and not damaged. With the red purge valve in the 12 o'clock position, align the two flats of the outlet port with the corresponding flats in the face piece port and insert. Rotate the regulator counterclockwise (viewed from inside the face piece) so that the red purge valve knob is situated on the left side of the face piece. The lock tab on the mask-mounted regulator will lock into place with a click. If properly engaged, the regulator will not rotate.

b) To begin use of the respirator, don the face piece as follows:

1. Examine the face piece assembly to be certain the nose cup inhalation valves are installed, the nose cup is correctly positioned inside the face seal chin cup, and the nose cup is properly seated between the flanges of the voicemitter ducts.

2. Adjust the head straps to the full outward position.

3. Hold the head harness out of the way with one hand while placing the face piece on the face with the other hand. Ensure that the chin is properly located in the chin pocket of the face piece.
4. Pull the head harness over the head and ensure that the straps are lying flat against the head and neck with no twists.
5. Tighten the neck straps by pulling the two lower strap ends toward the rear of the head.
6. Stroke the head harness down the back of the head using one or both hands. Retighten the neck straps.
7. Adjust the temple straps by pulling the two upper strap ends toward the rear of the head.
8. Retighten the neck straps if required.
9. With face piece sealed to face, inhale sharply to actuate respirator. If air is not supplied on first inhalation, check that cylinder valve is fully open, remote gauge indicates pressure in the cylinder, and face piece is sealed to face.
10. Proceed with use of the respirator in accordance with our SOP's.
11. If any end of service / low air bell alarm, VIBRALERT alarm, or PASS alarm actuate, notify your buddy and the OIC and prepare to leave the contaminated area immediately.

6. EMERGENCY OPERATION

There are two major failure modes that require immediate corrective action: loss *of demand air supply* and *free flow of the air supply*.

a) Should you be unable to inhale easily, first verify that you have not run out of air by reading the pressure gauge. Next, check that the cylinder valve is fully opened. If your air supply is insufficient, turn the red purge knob (slowly) counterclockwise to add air. You can regulate the airflow easily by opening and closing this valve. Notify your buddy and the OIC and prepare to leave the contaminated area.

c) If the unit starts to free flow, you will notice air blowing into the face piece and out of the exhalation valve. Fully open the red purge valve by turning it counterclockwise and use the cylinder valve as the control to regulate the flow of air into the face piece, opening it as required. Notify your buddy and the OIC and prepare to leave the contaminated area.

7 TERMINATION OF USE

To doff the face piece proceed as follows:

a) Leave the contaminated area or be certain that respiratory protection is no longer required.

b) Loosen the neck straps by simultaneously lifting the lower buckle release levers outward and lifting the face piece away from the face. The buckle release levers are the "U-Shaped" extensions of the face piece buckle assembly.

c) To stop the flow of air from the face piece, fully depress the air saver / donning switch on top of the regulator and release.

d) Remove the face piece by pulling it up and over the head.

e) When respirator operations are complete and only when in a safe breathing area, check that the cylinder valve is closed, and vent the residual air from the respirator by opening the purge valve. After waiting until the air flow stops, close the purge valve. Turn of the PAK-ALERT SE distress alarm off by pressing the reset button twice.

f) The face piece should then be removed from the regulator and stored in the personal face piece bag. The regulator should then be returned to the regulator protector on the waist belt.

g) Slightly loosen the shoulder straps by lifting the ends of the shoulder strap slide buckles up, release waist belt buckle, and remove unit from your back.

h) Proceed with cylinder replacement and inspection, cleaning and storage of the respirator apparatus.

c) Log with the dispatcher and notify an officer of any problems with the apparatus. If the SCBA must be taken out of service, replace it on the truck with a spare and place the out of service pack, which should be cleaned and ready for operation, next to the mechanic's office.

8. CYLINDER REPLACEMENT PROCEDURE

Depleted or partially depleted SCBA cylinders should be replaced with full cylinders as soon as possible. To replace a depleted or partially depleted cylinder proceed as follows:

1. Leave the area requiring respiratory protection and be certain that respiratory protection is no longer required.

2. Doff the face piece.

3. Push in and rotate the cylinder valve knob clockwise and completely close the cylinder valve.

4. Release residual air pressure in the respirator system by opening the red purge valve knob slightly. When the flow of air from the face piece stops, close the red purge valve knob

fully. Remove the respirator or have an assistant perform the following steps.

5. Unthread the pressure reducer hose coupling from the cylinder valve by rotating it counterclockwise.

6. Disengage the cylinder latch by pressing on the thumb release while lifting on the end of the latch.

7. Grasp the cylinder below the retention strap, push the locking tab below the valve, then lift the cylinder free from the bottom hook and remove.

8. Replace with a fully charged cylinder and valve assembly of the same pressure rating. Slide the top of the cylinder upward under the strap.

9. Engage the cylinder hanger in the hook at the bottom of the back-frame.

10. Secure the cylinder in place by pushing the latch toward the back-frame to lock the cylinder latch and fully engage the cylinder latch assembly.

11. Inspect the high pressure coupling of the respirator to be certain the nipple seal is present and undamaged. If the gasket is present and undamaged, align the high pressure coupling with the outlet of the cylinder valve and tighten the hose coupling to the cylinder valve by hand.

12. If SCBA use is not continued, the respirator apparatus must be cleaned and inspected before storage.

13. The removed cylinder shall be inspected and refilled by authorized personnel.

9. INSPECTION, CLEANING AND STORAGE

Clean the SCBA after each use as follows:

a) Inspect the equipment for worn or aging rubber parts, worn or frayed harness webbing or damaged components.

b) Remove the breathing regulator from the face piece.

c) Carefully wash the face piece assembly with warm water and mild soap or detergent solution. Thoroughly rinse in clean water. To disinfect, sponge face piece with a 70% solution of isopropyl alcohol.

d) After disinfecting, thoroughly rinse the face piece with warm running water. Shake excess water off and then dry with a clean lint free towel or gently blow dry with a hand dryer.

e) The mask-mounted regulator may be cleaned by damp sponging the exterior of the regulator. Do not submerge the regulator in any liquid. Regulators requiring additional cleaning must be removed from service and tagged for disassembly, cleaning and reas-

semble by qualified personnel.

f) Check to ensure the gasket is present between the face piece and the mask-mounted regulator and is not damaged.

g) Connect the regulator to the waist mounted regulator holder and place your personal face piece in its carrying bag.

h) Damp sponge dirt accumulations from the rest of the respirator and wipe dry.

i) If any damage or deterioration is noted, remove the SCBA from service and tag it for repair. Notify the OIC and place a spare SCBA into service on the apparatus. The dispatcher must be notified to log the out of service SCBA in the mechanics book.

j) Inspect the SCBA according to the check list located in SOP 701A.

10. REQUIREMENTS FOR TRAINING

a) Prior to initial training, personnel shall be examined and certified by a physician as being medically and physically fit in accordance with chapter 2 of NFPA 1001, Standard for Firefighter Professional Qualifications.

b) All personnel who may be required to use a SCBA shall be medically certified by a physician on a annual basis in accordance with 5-3.6 of NFPA 1500, Fire Department Occupational Safety and Health Program.

c) Beards or facial hair that interfere with the face piece seal shall be prohibited for personnel required to wear SCBA. If eyeglasses are worn, the person shall use frames that do not pass through the seal area of the face piece.

d) Any probationary member of the department who has not completed Essentials of Firefighting (Suffolk County Fire School or its equivalent) and the Dix Hills F.D. Fire School, shall not wear a SCBA. Upon completion of these requirements, the Company Captain will grant permission.

e) All SCBA users shall annually demonstrate their ability to meet the performance standards of the Office of the Chief.

f) All firefighters shall meet the training and performance requirements of this program prior to actual emergency operations.

g) Required training:

1. Training shall include the identification of SCBA components, terminology, and equipment specifications:

    A. Operation of SCBA and related equipment.
    B. Inspection and maintenance and equipment.
    C. Donning methods.
    D. With SCBA donned, perform related emergency operations: hose line advancement, ladder climbing, window entry, confined space operations, search and rescue techniques, etc.
    E. Demonstrate an understanding of DHFD policies and procedures concerning

safety, emergency operations, use, inspection and maintenance.
F. Perform activities under simulated emergency conditions.
G. Successfully meet all performance standards set forth within.

2. All personnel shall be evaluated on their ability to recognize hazards that may be encountered:

   A. Identify hazardous environments that may require the use of a SCBA.
   B. Identify the primary gases produced by combustion.
   C. Identify the primary gases that may be present or generated by processes other than combustion.

3. All personnel shall be evaluated on their ability to understand the components of the SCBA:

   A. Identify the components of the face piece, regulator, harness, and cylinder.
   B. Demonstrate the operation of a SCBA.
   C. Demonstrate the incompatibility of different makes and models of SCBA.

4. All personnel shall be evaluated on their understanding of the safety features and limitations of a SCBA:

   A. Describe the operational principles of warning devices required on SCBA.
   B. Identify the limitations of the SCBA.
   C. Describe the limitations of the SCBA's ability to protect the body from absorption of toxins through the skin.
   D. Describe the procedure to be utilized if unintentionally submerged in water while wearing a SCBA.
   E. Demonstrate alternative means of communications while wearing a SCBA.

5. All personnel shall be evaluated in the ability to don and doff a SCBA:

   A. Demonstrate the ability to don and doff a SCBA while wearing protective gear.
   B. Demonstrate the ability to show a proper face to face piece seal has been achieved.

6. Practical application of skills using SCBA:

   A. Demonstrate knowledge of the components of respiratory protection.
   B. Demonstrate the use of a SCBA in conditions of obscured visibility.
   C. Demonstrate the use of a SCBA in limited or confined spaces.
   D. Demonstrate the emergency operations that may be required when a SCBA fails.
   E. Demonstrate emergency techniques using a SCBA to assist other firefighters conserve air and in the use of the bypass valve.

7. Training shall be conducted under simulated stressful conditions to promote an immediate response to emergency operations.

8. Annual SCBA training shall be given to each person required to use self-contained breathing apparatus. This shall include re-evaluation of the individual for acceptable face piece seal.

9. Personnel shall be evaluated in their knowledge of maintenance and testing of a SCBA:

    A. Demonstrate the proper procedure for conducting routine and post-incident inspections of a SCBA.
    B. Demonstrate a thorough examination and test of the SCBA.
    C. Demonstrate the proper procedure for reporting a defective SCBA.

10. Personnel shall be evaluated in their knowledge of storage of SCBA and reserve a SCBA cylinders:

    A. Demonstrate the proper procedure for storage of a SCBA mounted on apparatus.
    B. Demonstrate the proper procedure for storage of reserve air cylinders.

11. EMERGENCY PROCEDURES

DAMAGED FACE PIECE.

ACTIONS: Limit air loss.

1. Leave the face piece and mask assembly on. (Do not remove it.)
2. Place one hand over the damaged area to conserve air.
3. If damage is too severe to control with your hand, turn the red purge valve on fully, by rotating it counterclockwise.
4. Notify your buddy and the OIC and prepare to leave the contaminated area.

LOW AIR WARNING DEVICES SOUND.

ACTIONS: Leave contaminated area.

1. Be aware that the low air-warning devices sound with approximately 1125 psi remaining in your cylinder. This is about six minutes worth of air.
2. Notify your buddy and the OIC and prepare to leave the contaminated area.

YOUR SCBA PREVENTS PASSAGE BY AN OBSTACLE OR OF A NARROW SPACE.

ACTION: Reduced Profile Maneuver.

1. Fully loosen the right shoulder strap and remove it.
2. Grasp the waist strap with the right hand.
3. Grasp the neck of the cylinder with the left hand.
4. Twist the SCBA assembly to the left far enough to allow you to pass the obstacle.

5. Pass the obstacle.
6. Return the harness to the normal position.
7. Slide your right hand straight back along your right side to secure the right shoulder strap.
8. Adjust the shoulder straps.

Note: Facepiece shall remain on if this maneuver is preformed in a contaminated atmosphere

YOUR SCBA HARNESS OR BACKPACK BECOMES ENTANGLED IN THE REAR.

ACTION: Quick Release Escape. (Performed on your knees)

1. Do not remove face piece.
2. Extend the right and left shoulder straps.
3. With your left grasp the left shoulder strap above the low air alarm bell.
4. Remove the right shoulder strap by slipping your right hand between the strap and your body.
5. Release the waist strap buckle with your right hand.
6. Turn to your left 180 degrees so that you are facing the entangled assembly, free the assembly and don pack again.

YOUR SCBA WILL NOT FIT THROUGH A CONFINED SPACE OPENING.

NEVER ENTER A CONFINED SPACE UNLESS YOU ARE CERTIFIED TO DO SO.

ACTION: Low Profile Maneuver. (Performed on your knees)

1. Do not remove face piece.
2. Extend the right and left shoulder straps.
3. With your left grasp the left shoulder strap above the low air alarm bell.
4. Remove the right shoulder strap by slipping your right hand between the strap and your body.
5. Release the waist strap buckle with your right hand.
6. Swing the assembly to your left and let it fall in front of you.
7. Push the assembly in front of you, on the cylinder, through the confined opening
8. Return the assembly to its normal position as soon as space allows.