SELF CONTAINED BREATHING APPARATUS RECOMMENDATION

Randy Deicke

August, 2004

Purpose

The purpose of this report is to explain why the fire department requires new self contained breathing apparatus (SCBA), outline the procedures used to determine which model would best meet our needs, and make a recommendation to the chief and board of trustees.

Existing SCBAs

Currently the Lombard Fire Department is using SCBAs manufactured by Interspiro and purchased in 1994. At that time we purchased 52 SCBAs and 52 spare air bottles. The air bottles have a service life of 12 years, which means they have to be replaced in 2006. At the time the Interspiro SCBAs met all of the NFPA requirements. Since then the standards have changed, today they would not meet current NFPA and NIOSH requirements. The new standards include the following:

- Heads-Up-Display (HUD) – which are LED indicators inside the mask indicating amount of air remaining.
- Rapid Intervention Crew/Universal Air Coupling (RIC UAC) – which is quick filling air supply connection that is the same for all makes of SCBAs.
- Integrated Personal Alert Safety System (PASS) device – a device that automatically turns on and alarms when the wearer is motionless so as to alert others to his whereabouts.
- Chemical, Biological, Radiological and Nuclear (CBRN) agent certified – made to withstand exposure under those conditions.

Because all of the air bottles will need to be replaced in 2006 and the packs will be 12 years old, it was originally anticipated that we would need to purchase all new SCBAs in that year.

Grant

The federal Department of Homeland Security (DHS) has been offering grants to local fire departments in an effort get them better equipped and to bring them up to current standards. Anyone awarded a grant will need to pay for 10% of the project themselves while 90% will be paid for by the federal government. In 2002 we were awarded such a grant to help us purchase Thermal Imaging Cameras.

The problem is that each year you don't know if the grants will be offered again the following year. Because of that, last year we decided to apply for a grant for new SCBAs, even though it would mean we replace our SCBAs a year or two early. We did not want to take a chance of the grant program ending. Plus, the federal government had just

increased the amount of money allocated for the grant program. This led us to believe it was one of our best chances at being awarded another grant.

In the grant request we asked for 52 SCBAs, 52 spare air bottles and 10 extra facemasks for a total cost of $194,132.00. Based upon our number of vehicles and our manpower, DHS determined that we were asking for too many SCBAs. They offered to give us a grant for the purchase of 40 SCBAs, 44 spare bottles and 10 facemasks for a total of $152,812.00. That meant a cost to us of $15,281.20 and a federal amount of $137,530.80. After reevaluating our needs, we accepted the grant.

SCBA Committee

After being awarded the grant a committee was formed to determine the following:

- What options will we be seeking?
- How to test and evaluate each SCBA.
- Which manufacturer of SCBAs best meets our needs?

The committee consisted of the following firefighters:

- Lt. Randy Deicke, Chairperson (Red Shift)
- Lt. James Streu (Black Shift)
- Lt. Greg Feely (Gold Shift)
- Greg Orlando (Gold Shift)
- Peter Davis (Gold Shift)
- Craig Scott(Red Shift)
- Tim Moran(Black Shift)
- Brad DelaTorre(Black Shift)

We contacted each known manufacturer and requested a presentation on their SCBAs and a chance to use a couple of their SCBAs for a few months. All of the manufacturers we contacted accepted. They included:

- Drager
- ISI
- Interspiro
- Scott
- Surviveair
- MSA

Each presentation was witnessed by the committee members and the members of that day's shift. Each manufacturer met the current standards of both NFPA and NIOSH. Because we were dealing with six manufacturers and limited time it was decided that only the committee members would do the initial evaluation on each SCBA. Through that evaluation process it was our desire to reduce the competition down to three manufacturers.

Initial Testing & Evaluation

We designed an obstacle course that we could go through that would allow us to evaluate many different aspects of the SCBAs. The course included carrying items, climbing ladders, crawling, dragging dummies, donning and doffing, chopping, buddy-breathing, and changing bottles. A diagram of the course is included.

The results of each test were recorded on preprinted evaluation forms. The forms have 31 questions on all different aspects of SCBA comfort, functionality, and use. The evaluator rates each question for each SCBA on a one to five scale, five being the best. A comment section was also available after each question. A copy of the evaluation form is included.

The results from the evaluations are as follows:

	Drager	Interspiro	ISI	MSA	Scott	Surviveair
Deicke	98	84	85	85	103	94
Streu	111	90	103	-	131	89
Feely	122	107	133	116	109	103
Scott	97	76	81	81	108	74
Moran	62	53	51	93	146	52
DelaTorre	124	74	54	88	147	87
Orlando	114	111	112	103	102	91
Davis	96	125	133	121	-	79
Average	103	90	94	98	120	84
S.D.	21.2	25.2	34.3	15.6	21.3	16.6

From those results we eliminated Interspiro, ISI and Surviveair. Drager, Scott and MSA went on to the next testing and evaluation phase.

Second Testing & Evaluation

The next evaluations were done by all of the firefighters and were completed over a period of two months. The same obstacle course used in the initial evaluation was used to get each of the firefighters familiar with each SCBA. After each firefighter used each SCBA on the course they were offered an evaluation sheet on which they could keep notes about their experience. These evaluations were not collected, but kept by the firefighter for future reference.

As a second evaluation we borrowed a smoke-trailer from another department and had the firefighters try the different SCBAs under those conditions. The conditions included donning and doffing, confined space, climbing, crawling and snag hazards, all in complete darkness. This course was also strenuous to the point of testing the SCBAs for their ability to provide air quickly and adequately. Several firefighters ran out of air in the trailer due to the difficulty and complexity.

During the two month period the firefighters were encouraged to play with the new SCBAs and try them in various ways. After the smoke-trailer testing, final evaluations were handed out to each firefighter. These evaluations were similar to the ones completed in the initial evaluation phase. The committee had determined that some of the questions on the initial evaluations were not pertinent or necessary and that a one to five scale was excessive. So the new evaluations had only 21 questions with a one to three scale, three being the best. A copy of the evaluation form is included.

Results

To give the committee a better idea of the good aspects and the bad aspects of each SCBA a score was computed for each question on each SCBA. The results of the evaluations in both graph and chart form are included. (To conserve space, the questions on the graph and chart were abbreviated by using only the first letter of each word. For ease of viewing the questions on the graph and chart are listed in the same order as on the evaluation.)

As can be seen on the graph, Scott got a higher score than Drager and MSA on every question. In fact, on all but six questions Scott was at least one whole standard deviation from the other two manufacturers. Drager and MSA were closer to each other in scoring. Drager outscored MSA 11 times while MSA outscored Drager 10 times. Short of that, very little can be said about the difference in evaluations between Drager and MSA.

Other Information

Manufacturer	Warranty on Pack	Warranty on Electronics
Drager	Life	3 years
MSA	Life	2 years
Scott	10 years	3 years

Recommendation

After reviewing the results of the surveys, the committee met to look at the potential positives and negatives of choosing Scott SCBAs. The committee was impressed by the technology advancements that Scott had over the other SCBAs. This included LED lights on the back of the SCBA used for accountability and as an indicator of air pressure. The air bottles were also unique in that they clip on to the SCBA instead of screw on, which is much faster. The potential negative is that the new bottles will not be interchangeable with other SCBAs from other departments. The committee felt this was not a significant negative since that is not a common or recommended practice.

The committee felt that the Scott SCBA met or exceeded all of our needs and that the results of the surveys represented an excellent choice of SCBA. Because of this, the committee is recommending the Scott SCBA.

The committee was asked to recommend two manufacturers so that cost comparisons could be done. The results make naming two manufacturers difficult because of how Drager and MSA ended up in a near tie. After reviewing the findings from both the initial and the final evaluations and based upon committee preference, we choose Drager as the next runner up.

The committee wants to be clear on its recommendation. We chose Drager as the next best SCBA but, based upon the firefighter surveys and the committee evaluations, it does not truly compare with Scott who clearly ranked better in all categories. Our recommendation is Scott.

Pricing and Comparison

Several departments that have purchased the new Scott SCBAs were contacted to see if they have any comments or input into our decision. Their comments are as follows:

Department	Comments
Pawcatuck, CT	Good, had 2 minor problems with bottles releasing.
Mendota, IL	Good, have not been put into full service yet.
Roberts Park, IL	Good, have not been put into full service yet.
Hudson, NH	Good, have not been put into full service yet.

A price quote was requested from both Scott and Drager. The quotes are included.