SELF CONTAINED BREATHING APPARATUS (SCBA)

SCBA EQUIPMENT REPLACEMENT PLAN CONSIDERATIONS

NFPA 1852, Standard on Selection, Care and Maintenance of Open Circuit Self-Contained Breathing Apparatus (SCBA). This standard establishes requirements for the selection, care, and maintenance of self-contained breathing apparatus (SCBA) as required by the respiratory protection program in NFPA 1500: Fire Department Occupational Safety and Health Program to reduce health and safety risks associated with improper maintenance, contamination, or damage.

There are several factors to consider with regards to the purchase of SCBA equipment.

1. What are the latest NFPA 1852 standard?
2. What are the agencies SBCA design and performance needs?
3. What manufacturer can provide the design and performance needs at a competitive cost?
4. How many SCBA packs are needed for GLFPD?

All manufacturers of structural firefighting SCBA equipment are required to meet the standing NFPA 1852 standards on the date of manufacturing. Having said that, agencies must remain vigilant on the NFPA 1852 standard throughout the life on the purchased SCBA equipment. If there is a standard change, agencies run the risk of having to repurchase SCBA equipment, or parts thereof, in order to remain compliant with NFPA 1852. Furthermore, NFPA 1852 requires all SCBA equipment to be tested on recommended schedule – See Table 2 Structural Firefighting SCBA and Equipment Testing Schedule per Type.

SCBA equipment design is a very fluid concept. The SCBA pack themselves have an array of design concepts and builds. This includes pack frame construction materials, adjustable lumbar, digital psi display, securing system, integrated bailout kits, and integrated Bluetooth. These design needs tend to follow the specific requirements and standards set forth by the agency or the individual firefighter. GLFPD currently owns MSA G1 with remote quick full system SCBA packs. For the planned foreseeable future, GLFPD will remain with the stated SCBA pack for the simple reason that our mutual aid fire department currently operates with the same SCBA equipment which allows for integrable use while operating on a mutual aid incident.

GLFPD SCBA Equipment Numerical Needs:

Equipment	Totals
SCBA Pack	20
SCBA Bottles	30

Table 1
Structural Firefighting SCBA and Equipment Replacement Schedule per Type

Equipment	Front Line	Backup / Reserve	Decommission
SCBA Pack	15 years	N/A	15 years
SCBA Bottles	15 years	N/A	15 years

NFPA 1851 standard requires all structural firefighting SCBA equipment to be tested on an annual schedule.

Table 2 Structural Firefighting SCBA and Equipment Testing Schedule per Type	
Equipment	Testing Years
SCBA Pack	3 years
SCBA Bottles	3 years

Table 3 Structural Firefighting SCBA and Equipment Replacement Schedule per Type (P) = Purchase A = Group A B = Group B			
Equipment	Group A	Backup / Reserve	Decommission
(10 A) SCBA Pack	2018 to 2025	2025 to 2033	2033
(10 B) SCBA Pack	2018 to 2033	N/A	2033
(10 A) SCBA Pack	(P) 2025 to 2040	N/A	2040
(10 B) SCBA Pack	(P) 2033 to 2040	2040 to 2048	2048
(15 A) SCBA Bottles	2018 to 2025	2025 to 2033	2033
(15 B) SCBA Bottles	2018 to 2033	N/A	2033
(15 A) SCBA Bottles	(P) 2025 to 2040	N/A	2040
(15 B) SCBA Bottles	(P) 2033 to 2040	2040 to 2048	2048

SMALL EQUIPMENT REPLACEMENT PLAN

THERMAL IMAGING CAMERA

THERMAL IMAGING CAMERA REPLACEMENT PLAN CONSIDERATIONS

NFPA 1801 standard contains requirements for new thermal imagers used by fire service personnel during emergency incident operations.

There are several factors to consider with regards to the purchase of extrication equipment.

1. What is the latest NFPA 1801 standard?
2. What are the agencies thermal imaging performance needs?
3. What manufacturer can provide the performance needs at a competitive cost?
4. What apparatus needs to be upfitted with extrication equipment?

All manufacturers of thermal imaging equipment are required to meet the standing NFPA 1801 standards on the date of manufacturing. NFPA 1801 standard is developed from data that is provided by the Fire Research NIST and UL studies focused on thermal variances, thermal and barrier penetration imaging, and fire behavior. There is not a tremendous amount change in science behind the thermal variances, however the technologies on the thermal and barrier penetration imaging technologies are always evolving. Display screen, battery life, and device durability is a constant consideration. The biggest risk with thermal imaging cameras, is the software updates and service support programs that are provided by the manufacturer.

GLFPD has no need for thermal imaging camera that exceed or surpasses the NFPA 1801 standards. The TIC technology is vast in its current capabilities. GLFPD goal is to purchase TIC equipment that is cost effective, rugged in build and utility purposes, and has a warranty that covers the equipment software component.

There are currently 12 manufacturers of thermal imaging camera. The technology is not broadly shared amongst these manufacturers. However due to the open market demand for TICs, and the wide variety of different entities needing them, there is a constant competition for the latest and greatest features, software, and other technologies. Most fire service TIC market research results in three main manufacturers that meet the fire service needs; Bullard, MSA, and FLIR. These three manufacturers are on a constant cost competition which has created a large range of feature options.

GLFPD has needs for thermal imaging camera equipment on both the first due Engine and Ladder.

Table 1
Thermal Imaging Camera Replacement Schedule

Equipment	Front Line	Backup / Reserve	Decommission
TIC	8 years	8 years	16 years
Batteries	10 years	NA	10 years

Table 2 GLFPD Actual Thermal Imaging Camera Purchase and Replacement Schedule (P) = Purchase			
Equipment	First Due Engine	First Due Ladder	Decommission
TIC group 1	(P) 2022 to 2030	2030 to 2038	2038
TIC group 2	(P) 2030 to 2038	2038 to 2046	2046
TIC group 3	(P) 2038 to 2046	2046 to 2054	2054

Table 3 GLFPD Actual Thermal Imaging Camera Battery Purchase and Replacement Schedule (P) = Purchase			
Equipment	Range	Reserve	Decommission
Battery group 1	2022 to 2030	2030 to 2032	2032
Battery group 2	2030 to 2038	2038 to 2040	2040
Battery group 3	2030 to 2038	2038 to 2040	2040
Battery group 4	2038 to 2046	2046 to 2048	2048
Battery group 5	2038 to 2046	2046 to 2048	2048
Battery group 6	2046 to 2054	2054 to 2058	2058

EXTRICATION EQUIPMENT

EXTRICATION EQUIPMENT REPLACEMENT PLAN CONSIDERATIONS

NFPA 1936 This standard specifies performance requirements for powered rescue tools and components that are used by emergency services personnel to facilitate the extrication of victims from entrapment.

There are several factors to consider with regards to the purchase of extrication equipment.

1. What is the latest NFPA 1936 standard?
2. What is the agencies extrication performance needs?
3. What manufacturer can provide the performance needs at a competitive cost?
4. What extrication equipment types are needed?
5. What apparatus needs to be upfitted with extrication equipment?

All manufacturers of extrication equipment are required to meet the standing NFPA 1936 standards on the date of manufacturing. NFPA 1936 standard is derived from an array of lab testing that compares the cutting and spreading strengths of extrication equipment for their ability to defeat the current metallurgy of vehicle manufacturers. As with structural firefighting PPE, agencies must remain vigilant on the NFPA 1936 standard throughout the life on the purchased extrication equipment. If there is a standard change, agencies run the risk of owning and operating underpowered extrication equipment.

GLFPD has no general need of extrication equipment that surpasses the current NFPA 1936 strength performance standard. GLFPD is unique in that our specific performance need falls to battery powered extrication equipment. This means that GLFPD does not have to purchase hydraulic extrication pumps or remote extrication hydraulic hoses.

Extrication equipment manufactures on constantly competing on the market for the best price, newest cutting-edge technology, and bulk sales. GLFPD currently owns, and has the intention of remaining with, Hurst Extrication Tools. Hurst has the cutting edge on battery powered extrication tools for both battery life, performance strengths, warranty, and equipment service.

Extrication Equipment Types Needed:

- Power Cutters
- Power Spreaders (Jaw of Life)
- Power Combi (Cutter / Spreader)
- Power Ram

Apparatus that requires extrication equipment:

First Due Engine	
Power Cutters	1
Power Spreaders	1
Power Ram	1
Batteries	6

First Due Ladder	
Power Cutters	1
Power Spreaders	1
Power Ram	1
Power Combi	1
Batteries	8

Extrication Equipment Totals per Type

First Due Engine	
Power Cutters	2
Power Spreaders	2
Power Ram	2
Power Combi	1
Batteries	14

EXTRICATION EQUIPMENT REPLACEMENT SCHEDULE

Table 1
Extrication Equipment Replacement Schedule per Type

Equipment	Front Line	Backup / Reserve	Decommission
Power Cutters	16 years	N/A	16 years
Power Spreaders	16 years	N/A	16 years
Power Combi	16 years	N/A	16 years
Power Ram	16 years	N/A	16 years
Batteries	10 years	N/A	10 years

Table 2 GLFPD Actual First Due Engine Extrication Equipment Replacement Schedule per Type			
Equipment	First Due Engine	First Due Ladder	Decommission
Power Cutters	2020 to 2028	2028 to 2036	2036
Power Spreaders	2020 to 2028	2028 to 2036	2036
Power Ram	2020 to 2028	2028 to 2036	2036
Batteries	2020 to 2030	N/A	2030

The power cutters, spreaders, and ram will rotate from the first due engine to the first due ladder every 8 years. This will allow the agencies to spread the purchase value out and maintain an up-to-date performance standard.

Table 3 GLFPD Actual First Due Ladder Extrication Equipment Replacement Schedule per Type			
Equipment	Front Line	Backup / Reserve	Decommission
Power Cutters	2028 to 2036	N/A	2036
Power Spreaders	2028 to 2036	N/A	2036
Power Combi	2025 to 2041	N/A	2041
Power Ram	2028 to 2036	N/A	2036
Batteries	2025 to 2035	N/A	2035

STABILIZATION EQUIPMENT

STABILIZATION EQUIPMENT REPLACEMENT PLAN CONSIDERATIONS

NFPA 1936 This standard specifies performance requirements for powered rescue tools and components that are used by emergency services personnel to facilitate the extrication of victims from entrapment.

There are several factors to consider with regards to the purchase of stabilization equipment.

1. What is the latest NFPA 1936 standard?
2. What is the agencies stabilization equipment performance needs?
3. What manufacturer can provide the performance needs at a competitive cost?
4. What apparatus needs to be upfitted with stabilization equipment?

All manufacturers of stabilization equipment are required to meet the standing NFPA 1936 standards on the date of manufacturing. NFPA 1936 standard for stabilization equipment takes into consideration the information and data collected from vehicle manufactures that looks at vehicle heights, lengths, weights, and variable rollover energy values. Other considerations are the stabilization equipment is also used for trench rescue and building collapse shoring. Manufacturers of stabilization equipment build top strength specs the supersede what GLFPD needs are.

GLFPD is unique it that we need stabilization equipment that falls into the multipurpose function. Due to limited staffing, and apparatus compartment space, stabilization equipment must

be able to meet the strength integrity for vehicle, trench rescue, and structure stabilization all in the same equipment. At the same time, GLFPD has need to employ a pneumatic support system within the stabilization equipment that would allow one firefighter to either actively or remotely control equipment lengths and lifting.

To meet these performance needs, GLFPD purchased the ParaTech Highway Kit in 2020. ParaTech equipment beat the market cost for equipment that met GLFPD multipurpose needs.

GLFPD has needs to equipment the first due Engine and Ladder with stabilization equipment.

Table 1
Stabilization Equipment Replacement Schedule per Type

Equipment	Front Line	Backup / Reserve	Decommission
Lift struts	15 years	15 years	30 years
Struct extension	15 years	15 years	30 years
Anchor bases	15 years	15 years	30 years
Multi-base heads	15 years	15 years	30 years
Ratchet system	10 years	10 years	20 years

Table 2
GLFPD Actual First Due Engine Stabilization Equipment Replacement Schedule per Type

Equipment	First Due Engine	2nd Due Engine	Decommission
Lift struts	2020 to 2035	2035 to 2050	2050
Struct extension	2020 to 2035	2035 to 2050	2050
Anchor bases	2020 to 2035	2035 to 2050	2050
Multi-base heads	2020 to 2035	2035 to 2050	2050
Ratchet system	2020 to 2030	2030 to 2040	2040

Table 3
GLFPD Actual First Due Ladder Stabilization Equipment Replacement Schedule per Type

Equipment	Front Line	Backup / Reserve	Decommission
Power Cutters	2020 to 2050	N/A	2050
Power Spreaders	2020 to 2050	N/A	2050
Power Combi	2020 to 2050	N/A	2050
Power Ram	2020 to 2050	N/A	2050
Batteries	2020 to 2030	N/A	2030

AIR BAGS

AIR BAG EQUIPMENT REPLACEMENT PLAN CONSIDERATIONS

NFPA 1936 This standard specifies performance requirements for powered rescue tools and components that are used by emergency services personnel to facilitate the extrication of victims from entrapment.

There are several factors to consider with regards to the purchase of air bag equipment.

1. What is the latest NFPA 1936 standard?
2. What is the agencies stabilization equipment performance needs?
3. What manufacturer can provide the performance needs at a competitive cost?
4. What apparatus needs to be upfitted with stabilization equipment?

All manufacturers of air bag equipment are required to meet the standing NFPA 1936 standards on the date of manufacturing. NFPA 1936 standard for airbag equipment takes into consideration the information and data collected from vehicle manufactures that looks at vehicle weights. NFPA also looks at the most reliable materials that the air bags are constructed with.

GLFPD air bag needs are similar to what most rural departments need. GLFPD Preference is towards the low volume, high pressure bags. These bags have a higher weightlifting capacity as well as require less storage space on the apparatus. Due to limited staffing, the air bag equipment must have a controller interface that would one firefighter to either actively or remotely control equipment inflate and deflate.

There are several manufacturers of air bag equipment, however ParaTech produces the exact product needed by GLFPD at a very cost-effective range -Maxiforce Air Lifting Bags

GLFPD has needs to equipment the first due Engine and Ladder with stabilization equipment.

Apparatus that requires air bag equipment:

First Due Engine	
Multiforce Bag	1
Man and Machine Kit	1

First Due Ladder	
Multiforce Bag	1
Man and Machine Kit	1

Air Bag Equipment Totals per Type

First Due Engine	
Multiforce Bag	2
Man and Machine Kit	2
Batteries	4

Table 1
Air Bag Equipment Replacement Schedule per Type

Equipment	First Due Engine	First Due Ladder	Decommission
Multiforce Bag	15 years	15 years	30 years
Man and Machine Kit	15 years	15 years	30 years

Table 2 GLFPD Actual First Due Engine Stabilization Equipment Replacement Schedule per Type (P) = Purchase			
Equipment	First Due Engine	First Due Ladder	Decommission
Multiforce Bag	(P) 2023 to 2038	2038 to 2053	2053
Man and Machine Kit	(P) 2023 to 2038	2038 to 2053	2053

LIFE SAFETY ROPE

LIFE SAFETY ROPE REPLACEMENT PLAN CONSIDERATIONS

NFPA 1983 Standard on Life Safety Rope and Equipment for Emergency Services. This standard specifies requirements for life safety rope and associated equipment used to support emergency services personnel and civilians during rescue, firefighting, or other emergency operations, or during training.

NFPA 1858 Standard on Selection, Care, and Maintenance for Life Safety Rope and Equipment for Emergency Services.

There are several factors to consider with regards to the purchase of Life Safety Rope and associated Rope Rescue Equipment.

1. What is the latest NFPA 1983 standard?
2. What is the latest NFPA 1858 standard?
3. What is the agencies life safety rope and associated equipment performance needs?
4. What manufacturer can provide the performance needs at a competitive cost?
5. What apparatus needs to be upfitted with life safety rope and associated equipment?

NFPA 1983 standard sets for the minimal breaking strength (MBS) for rope rescue equipment. NFPA utilizes the statistical method, in cooperation with data obtain from the Cortage Institute, to set these said standards that focus on “Low-Stretch Kernmantle Life Safety Rope”. NFPA and the Cortage Institute also look at the most reliable materials that the rope and other associated equipment are constructed of.

NFPA 1858 standard has established a methodology for care, maintenance, and track logging of rope recue and associated equipment. This includes how to clean, store, inspect, and when equipment needs to be pulled from service. In 2021, GLFPD has established a set of operational policies that mirror and support these standards, including a new system of track logging equipment use for training or emergency incidents.

GLFPD has no needs for performance the exceed the NFPA 1983 and the Cortage Institute Cl1801 standards.

GLFPD has chosen CMC as a manufacturer to purchase rope rescue equipment hardware and PMI for harnesses and PPE. These two manufacturers not only build high quality product, but they also provide cutting edge and up to date equipment at very competitive prices.

GLFPD currently has two apparatus upfitted with a full compliment of rope rescue equipment. The first due engine and the Chief Officer command vehicle. With future planning and considerations, the goal is to equip the first due engine, the Chief Officer command vehicle, and the agencies QRV/Rescue.

The below replacement plan takes into consideration a standard replace. It does not include an emergency event replacement. An emergency event is any time the rope, or associated equipment, is shock loaded as a result of a failure or sever damage. If at anytime the equipment is shock loaded or becomes damages, it will require immediate removal from service and replacement.

Table 1
Rope Rescue Equipment and PPE Replacement Schedule per Type

Equipment	Front Line	Training	Decommission
Main Line Rope	10 years	5 years	15 years
Belay Line Rope	10 years	5 years	15 years
Pursiks	10 years	5 years	15 years
Pulleys	10 years	5 years	15 years
Carabiners	10 years	5 years	15 years
MPD	10 years	5 years	15 years
Webbing	5 years	5 years	10 years
Class 3 Harness	10 years	5 years	15 years
Helmets	10 years	5 years	15 years

Table 2
GLFPD Actual First Due Engine Rope Rescue Equipment and PPE Replacement Schedule per Type
(P) = Purchase

Equipment	First Due Engine	Training	Decommission
(1) 150’ Main Line Rope	2021 to 2031	2031 to 2036	2036
(1) 150’ Belay Line Rope	2021 to 2031	2031 to 2036	2036
(1) 200’ Support Rope	2021 to 2031	2031 to 2036	2036
(1) 200’ QRF Rope	2021 to 2031	2031 to 2036	2036
(24) Pursiks	2021 to 2031	2031 to 2036	2036
(4) Single Pulleys	(P) 2023 to 2033	2033 to 2038	2038
(4) Double Pullys	(P) 2023 to 2033	2033 to 2038	2038
(20) Carabiners	(P) 2023 to 2033	2033 to 2038	2038
(1) MPD	2020 to 2030	2030 to 2035	2035
(300’) Webbing	2021 to 2026	2026 to 2031	2031
(4) Class 3 Harness	2021 to 2031	2031 to 2036	2036
(6) Helmets	2021 to 2031	2031 to 2036	2036

Table 3 GLFPD Actual QRV/Rescue Rope Rescue Equipment and PPE Replacement Schedule per Type (P) = Purchase			
Equipment	QRV/Rescue	N/A	Decommission
(1) 150’ Main Line Rope	(P) 2025 to 2040	N/A	2040
(1) 150’ Belay Line Rope	(P) 2025 to 2040	N/A	2040
(1) 200’ Support Rope	(P) 2025 to 2040	N/A	2040
(1) 200’ QRF Rope	(P) 2025 to 2040	N/A	2040
(24) Pursiks	(P) 2025 to 2040	N/A	2040
(4) Single Pulleys	(P) 2025 to 2040	N/A	2040
(4) Double Pullys	(P) 2025 to 2040	N/A	2040
(20) Carabiners	(P) 2025 to 2040	N/A	2040
(1) MPD	(P) 2025 to 2040	N/A	2040
(300’) Webbing	(P) 2025 to 2035	N/A	2035
(2) Class 3 Harness	(P) 2025 to 2040	N/A	2040
(4) Helmets	(P) 2025 to 2040	N/A	2040

Table 4 GLFPD Actual Chief Officer Vehicle Rope Rescue Equipment and PPE Replacement Schedule per Type (P) = Purchase			
Equipment	Chief Officer	Training	Decommission
(1) 150’ Main Line Rope	(P) 2026 to 2036	2036 to 2041	2041
(1) 150’ Belay Line Rope	(P) 2026 to 2036	2036 to 2041	2041
(1) 200’ Support Rope	(P) 2026 to 2036	2036 to 2041	2041
(12) Pursiks	(P) 2026 to 2036	2036 to 2041	2041
(4) Single Pulleys	(P) 2026 to 2036	2036 to 2041	2041
(4) Double Pullys	(P) 2026 to 2036	2036 to 2041	2041
(10) Carabiners	(P) 2026 to 2036	2036 to 2041	2041
(1) MPD	(P) 2026 to 2036	2036 to 2041	2041
(300’) Webbing	(P) 2026 to 2036	N/A	2036
(2) Class 3 Harness	(P) 2026 to 2036	2036 to 2041	2041
(2) Helmets	(P) 2026 to 2036	2036 to 2041	2041

POSITIVE PRESSURE VENTILATION FANS (PPV)

PPV FANS REPLACEMENT PLAN CONSIDERATIONS

The National Institute of Standards and Technology (NIST) has a division called the Firefighting Technology Group. This Group focusses on providing research and data specific to fire service needs. Within one of these fire service research details is the science behind positive pressure ventilation. From this research, fire departments can look at what air movement values are needed in order to successfully change and influence IDLH environments.