MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

LABEL IDENTIFIER: Life-Saver 60

PRODUCT INDENTIFIER: P/N 815500 Life-Saver 60 Self-Contained Self Rescuer (SCSR)
P/N 815800 Life-Saver 60 Self-Contained Self Rescuer (SCSR) w/Mounting Bracket

PRODUCT DESCRIPTION: This device is an oxygen generating escape breathing apparatus containing potassium superoxide and a chlorate candle for ignition.

COMPANY IDENTIFICATION: MINE SAFETY APPLIANCES
1100 Cranberry Woods Drive
Cranberry Township, PA 16066
CUSTOMER SERVICE: 1-800-MSA-2222 (8:30 a.m. – 5:00 p.m., USA local time)
EMERGENCY: 1-800-255-3924 (CHEM-TEL, INC.)

2. Composition/Information on Ingredients

	%	Synonym(s)
Canister Body Contents: approx. 800 grams		
Potassium superoxide (CAS 12030-88-5)	>80	KO_2, Potassium hyperoxide
Oxygen Candle: approx. 40 grams		
Sodium chlorate (CAS 7775-09-9)	<90	$NaClO_3$
Barium peroxide (CAS 1304-29-6)	<10	BaO_2
Flash Powder (CAS 7778-74-7)	<0.1	$KClO_4$

OSHA REGULATORY STATUS: Hazardous by definition of Hazard Communication Standard, 29 CFR 1910.1200.

3. Hazards Identification

EMERGENCY OVERVIEW: Device is a black oval-shaped canister and cover approximately 7.37 inches long, 4.87 inches wide, and 5.87 inches high, weighing about six pounds, with no odor. Material in canister is a strong oxidizer, contact with combustible material may cause fire. Material reacts vigorously with water generating heat, oxygen and corrosive solution. Material causes eye and possible skin burns.

PHYSICAL HAZARD:
Canister: strong water reactive oxidizer, reacts violently with water generating oxygen heat and caustic potassium hydroxide solution. Some organics (such as ethyl alcohol) will spontaneously combust on contact with KO_2.

Candle: oxidizer; candle primer assembly is supplemented with flash powder ($KClO_4$).

POTENTIAL HEALTH HAZARDS:
Canister:Potassium superoxide is a canary yellow solid, either fine powder or granules, with no order. Strong Oxidizer. Contact with other material may cause fire. Causes severe eye, skin, and respiratory tract burns.

Candle: Irritation. Toxic by ingestion. Chlorate poisoning is characterized by a latent period of a few hours, followed initially with nausea, vomiting, and diarrhea, followed by cyanosis, hemolysis and subsequent renal failure.

4. First Aid Measures

EMERGENCY AND FIRST AID PROCEDURES: Exposure to chemical solids contained in canister is not anticipated under intended conditions of use and overexposure is highly unlikely. First aid procedures are listed here should overexposure somehow occur.

CHEMICAL CAUSES SEVERE ALKALI AND THERMAL BURNS! SEND TO A PHYSICIAN IN ALL CASES.

EYES: Immediately flush eyes with plenty of water for 15 minutes, holding eyes open.

SKIN: Immediately shake any material from skin, remove contaminated clothing, then flush skin with copious amounts of water for at least 15 minutes. Discard contaminated clothing and shoes.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

INGESTION: Do not induce vomiting. Give demulcent such as milk, olive oil, or margarine in small amounts up to 2 or 3 ounces. Never give anything by mouth to an unconscious person.

GET MEDICAL ATTENTION IMMEDIATELY IN ALL CASES.

5. Fire Fighting Measures

FLASH POINT: N/A
Candle and KO_2 decompose releasing oxygen LEL N/A UEL N/A

EXTINGUISHING MEDIA: Water – Use extinguishing media appropriate for surrounding fire. Do not use powdered graphite.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Containers may rupture in fire. Liberated oxygen will intensify fire. Water will leach strong alkaline material from canister producing a caustic run-off solution. Avoid skin contact with run-off water.

PROTECTION OF FIRE FIGHTERS: Wear full protective clothing, including protective gloves and boots. For respiratory protection, wear a NIOSH approved self-contained breathing apparatus with full facepiece operated in a positive-pressure mode. Protect against corrosive smoke, dust, and waters.

6. Accidental Release Measures

PROCEDURES FOR SPILL OR LEAK CLEANUP: Avoid contact with chemicals. Wear recommended protective equipment. Scoop solids into properly labeled, unpainted, DRY metal container and cover. Take immediately to a waste handling area. Handle in compliance with all local, state, and federal laws and regulations.

7. Handling and Storage

HYGIENIC PRACTICES: Direct Exposure to KO_2, $NaClo_3$ and $KClO_4$ is not anticipated during normal canister usage.

STORAGE: Store in a cool, dry area protected from crushing or impact forces. Store separate from incompatible materials such as organics or combustibles.

8. Exposure Controls/Personal Protection

EXPOSURE LIMITS:

	TLV
Canister Body Contents:	
Approx. 800 grams KO_2(CAS 12030-88-5)	Not Listed
Oxygen Candle: approx. 40 grams	
$NaCl0_3$ (CAS 7775-09-9)	Not Listed
$Ba0_2$ (CAS 1304-29-6)	0.5% mg/M^3*
	*Ba soluble compounds
$KClO_4$ (CAS 7778-74-7)	10mg/M^3 Total dust with no Asbestos

PERSONAL PROTECTIVE EQUIPMENT WHEN EXPOSURE IS POSSIBLE: Wear chemical protective goggles; faceshield; chemically resistant and water impervious clothing; chemically resistant neoprene, vinyl, or rubber gloves; rubber boots; NIOSH approved self-contained breathing apparatus with a full facepiece operated in a positive–pressure mode.

WORK PRACTICES: Follow detailed instructions supplied with apparatus.

9. Physical and Chemical Properties

APPEARANCE AND ODOR (Combination):	Canister: Contains yellow $K0_2$ granules, odorless Candle: Light grey solid mass, odorless
DISSOCIATION TEMP (KO_2 Granules):	$K0_2$ decomposes at 425°C
SPECIFIC GRAVITY (Candle):	Approximately 2.2
BULK DENSITY ($K0_2$ Granules):	Approx. 0.8
VAPOR DENSITY:	(AIR = 1) - N/A
PERCENT VOLATILE BY VOLUME:	N/A
FORMULA:	Apparatus contains Potassium superoxide ($K0_2$), Sodium chlorate ($NaCl0_3$), Barium peroxide ($Ba0_2$), and a primer assembly.

10. Stability and Reactivity

CONDITIONS OR MATERIALS TO AVOID: Avoid easily oxidized materials, organics (including fuels, solvents, greases, lubricants), acids, combustibles. Contact of these materials with canister contents will cause a violent reaction and rupture of the canister.

11. Toxicological Information

This product has not been tested for health hazards. The assumption is made in the OSHA Hazard Communication Standard that an untested mixture will present the same health hazards as do the components which comprise one percent or more.

Potassium superoxide readily reacts with water in the body to form potassium hydroxide. KO_2, KO_2 dust, and potassium hydroxide are caustic and will cause caustic burns to the eyes and may cause burns to the skin or mucous membranes of the respiratory tract.

Skin will turn red and may turn black. Exposure may cause an itching or burning sensation which may go away. A severe burn may be less painful than a minor one because tissue and nerves will be destroyed.

KO_2 is not listed in the National Toxicology Program (NTP) Annual Report on Carcinogens, not found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs, and not listed as an OSHA carcinogen.

Sodium chlorate is an eye, skin, and respiratory irritant. Several reports of accidental or suicidal swallowing of sodium chlorate indicate that chlorate poisoning is characterized by a latent period of a few hours, followed initially with nausea, vomiting and diarrhea, followed by cyanosis, hemolysis and subsequent renal failure. Blood effects (hemolytic anemia and methemoglobinemia) as well as kidney and stomach effects were reported. Similar effects on the blood (anemia) have been noted in laboratory animals at high dose levels. Other effects noted in animal tests were: immediate vomiting, death, slight decreases in adrenal weights, decreases in body weight gain, and effects on red blood cells indicative of anemia and decreased fragility in osmotic fragility of red blood cells. In controlled clinical studies with human volunteers administered 500 ml of a 5 ppm solution of sodium chlorate in water for 12 weeks, no adverse effects were found. Skin allergy was not observed in guinea pigs following repeated skin exposure. Both positive and negative mutagenic effects were observed in bacterial cells and flies; several studies in animals and animal cells have been negative. No adverse effects on the mother or fetus were noted in rats given oral doses during pregnancy at levels up to 1000 mg/kg/day.

Barium peroxide may cause skin or eye irritation with redness, swelling, itching, tearing of eyes, and pain. Inhalation may irritate the respiratory tract with coughing, shortness of breath, laryngitis, sore throat and runny nose. If sufficient amounts are inhaled and absorbed, symptoms may resemble those in acute indigestion. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Ingestion may cause gastroeneritis (inflammation of the lining membrane of the stomach and intestines) with abdominal pain, nausea, vomiting and diarrhea. Systemic effects may follow and may include ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremors. This product is not listed in the National Toxicology Program (NTP) Annual Report on Carcinogens, not found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs, not listed by OSHA.

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE: Persons with preexisting skin conditions may be more susceptible to the effects of this product.

12. Ecological Information

Potassium superoxide: No data available. KO_2 reacts with water to produce potassium hydroxide (KOH) that will increase the pH of water and/or soil to create conditions that may kill fish and other living organisms. Ecotoxicity data for KOH: TLm(Mosquito fish) is 80 ppm/24 hr fresh water. Conditions of bioassay not specified.

Sodium chlorate was reported to be "practically nontoxic" in tested species. 48 hour LC50 Daphnia: >1,000 mg/l; 96 hour EC50 Freshwater Algae (static) 133 mg/l; 96 hour LC50 Mysid Shrimp (flow-through): >1,000 mg/l; 96 hour LC50 Bluegill (flow-through): >1,000 mg/l; 96 hour LC50 Rainbow Trout (flow-through): >1,000 mg/l; 96 hour LC50 Sheepshead Minnow (flow-through): >1,000 mg/l; 96 hour LC50 oyster shell deposition (flow-through): >1,000 mg/l.

The single dose oral LD50 of sodium chlorate in Mallard ducks was greater than 2510 mg/kg. The five day dietary LC50 to Mallard ducks and northern Bobwhite Quail were both greater than 5620 ppm. A single spraying of the equivalent of 348 pounds per acre of sodium chlorate produced a significant impairment of growth, seed germination and seedling emergence in 10 non-target plant species.

13. Disposal Information

WASTE DISPOSAL: The procedure below is an option for potential use by permitted hazardous waste management facilities. Hazardous waste management facilities should comply with local, state and federal requirements.

When discarded by a United States generator, a Life-Saver 60 canister is a hazardous waste with the U.S. EPA Hazardous Waste Numbers of D001 and D005, any applicable state waste codes, and any additional codes that should be applied based on the unique situation of the generator and the conditions of the product's use. The D001 code applies because the potassium superoxide in the canister is a U.S. Department of Transportation oxidizer; the D005 code applies because the candle within the device contains barium. Generators should use this information and any user-specific data to make their own hazardous waste determination.

The following procedure is included solely to address safe handling and deactivation of Life-Saver canisters and is intended for use by permitted hazardous waste management facilities. Because waste management regulations depend on generator status and location, this generic procedure may not meet treatment standards required by applicable laws and regulations. Those employing these procedures must therefore independently assure compliance with all local, state, and federal requirements. Read the entire procedure first!

1. Properly protect the eyes and skin of the individual performing the disposal procedure. Wear chemical protective goggles and caustic resistant impermeable gloves. See PERSONAL PROTECTIVE EQUIPMENT WHEN EXPOSURE IS POSSIBLE.

2. Select a well ventilated area, preferably outdoors, free from flammable materials. DO NOT puncture the canister underground.

3. Be certain the Life-Saver 60 SCSR's lid is removed.

4. Remove the mouthpiece plug and activate ("fire") the candle, if unused, by extending the mouthpiece. Avoid touching the metal part of the canister since it becomes quite hot. Allow the canister to cool for 10 to 15 minutes.

5. Remove the mouthpiece and breathing bag by removing the clamp. Cut off the neck and waist straps. Punch 6 equally spaced holes, at least 0.5 inch in diameter, on the front of the canister approximately mid point from top to bottom.

6. Fill a clean 10-gallon steel or polypropylene container with 5 to 6 gallons of clean tap water.

7. Dissolve 3 lbs. (1.4 kg) of 90+% pure sodium bicarbonate in the water.

8. Slowly place one punctured canister into the solution using tongs or other hand extension device. The canister must remain at least 3 inches under the water's surface. The water will bubble as the chemicals within the canister begin to dissolve. Avoid breathing mist generated in this procedure since it may be caustic and cause damage to respiratory passages.

9. When the bubbling stops, the pH of the water solution should be below 12.

10. Remove the canister from the water solution. DO NOT touch the canister without gloves! If the skin comes in contact with solution, wash the exposed area immediately and completely with water.

11. Drain the canister thoroughly, and allow it to dry.

12. The candle assembly (which contains approximately 2.0 grams of barium as salts) will be present in the canister. Handle the canister as a hazardous waste, and dispose of it according to local, state, and federal regulations. Alternatively, cut off the bottom of the canister, remove the candle within the canister and dispose these materials as hazardous waste. The empty canister body is disposed as separate scrap material.

13. The total concentration of metals in the water solution after canister immersion is normally below 25 parts per million, by weight. Filter solids from this solution using medium grade filter paper.

14. "Sludge" collected on the filter contains copper, lead, barium salts and ceramic. This material should be disposed according to local, state and federal regulations.

15. The filtered water can be routed to a permitted wastewater treatment facility if allowed by the treatment plant authority (consult treatment plant authority for guidance).

16. If more than one canister is to be disposed, the above procedure must be repeated for each canister.

14. Transport Information

This product is a U.S. Department of Transportation (DOT) Hazardous Material.

Proper Shipping Name:	Oxygen generator, chemical
Hazard Class or Division:	5.1
Identification Number:	UN3356
Packaging Group:	II

This device has been classified and approved for shipment by U.S. DOT in accordance with Classification Document DOT EX-9709047 and Approval CA-9709009. Shipper should carefully review these documents which are available from the Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 400 7th Street, SW, Washington, DC 20590-0001. Tel: 1-800-467-4922. Web site: www.rspa.dot.gov. Copies of these documents are also available at www.msanet.com/prism.

15. Regulatory Information

Canister:
SARA 313 Information: This item does not contain a toxic chemical or chemical subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

This item content is not subject to the Pennsylvania Worker and Community Right-To-Know Act.

Candle:
SARA 313 Information: This item contains 1-5% weight percent of barium peroxide, a barium compound, CAS Number: 1304-29-6, a toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

Pennsylvania: This product contains sodium chlorate and barium peroxide which are subject to the Pennsylvania Worker and Community Right-To-Know Act.

California: The sodium chlorate component sometimes contains trace amounts of chromium (up to 25 parts per million). The following warning is provided to comply with California law. Warning! This product contains a chemical known to the State of California to cause cancer.

16. Other Information

WARNING: This is a hazardous chemical product. By following the directions and warnings provided with this product, the hazards associated with the use of this product can be greatly reduced but never entirely eliminated. Mine Safety Appliances Company makes no warranties, expressed or implied, with respect to this product and EXPRESSLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using or storing this product.