APPENDIX C

SELECTED NIOSH RESPIRATOR USER NOTICES

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505

January 15, 1982

NIOSH EMERGENCY INFORMATION BULLETIN ON THE USE OF SELF-CONTAINED BREATHING APPARATUS IN LOW TEMPERATURES

Extreme caution should be exercised by all persons using open circuit self-contained breathing apparatus (SCBA) in hazardous environments during sub-freezing weather. SCBAs are widely used by fire fighters combatting winter fires. All users who wear SCBAs in cold temperatures should take particular note of the following important precautions:

1. Moisture in the air cylinders must be kept at an absolute minimum since small amounts of moisture in the air supply may freeze and result in failure of the breathing apparatus.

2. Always use a nosecup in the SCBA facepiece when temperatures are below freezing. Failure to use a nosecup under such circumstances can result in facepiece fogging and severely impaired vision. Chemical anti-fog agents may not perform adequately in low temperatures.

3. Carefully read the approval label on the respirator to determine if it is necessary to install special accessories prior to use of the SCBA in sub-freezing weather. Certain older U.S. Bureau of Mines approved SCBAs require such low temperature accessories (SCBAs approved prior to March 25, 1972).

4. When leaving an extremely hot environment, such as a fire scene, and entering cold air (below or near freezing), always place the SCBA facepiece in your turnout coat to keep it warm if it is to be quickly reused. SCBAs when not being actively breathed can freeze-up very quickly.

5. Use special care after washing SCBA facepieces and breathing tubes to remove all moisture to prevent water drainage and freeze-up of the regulator.

6. SCBA alarms can fail in low temperatures; therefore, visual checks of remaining service time should be made when SCBAs are used in sub-freezing conditions.

7. Be familiar with procedures on how to cope with exhalation valves which can freeze open or closed in low temperatures. (Contact the manufacturer or the State Fire Training Officer for specific instructions.)

8. SCBAs are NIOSH laboratory approved for use in temperatures down to -25° F. Therefore, if SCBAs are to be used in temperatures below -25° F, extreme caution should be used.

9. Also observe the following general precautions:

   a. Use G-7.1, Type I, Grade D air or air of equivalent specification.

   b. Follow all information listed on the NIOSH/ MSHA or BOM approval label for the specific SCBA in use.

   c. Follow the manufacturer's recommendations included in their instruction and maintenance manual accompanying the SCBA.

   d. Follow all applicable Federal, State, and Local regulations concerned with the use of SCBAs.

   e. Keep SCBAs in a warm location between uses.

James A. Oppold, Ph.D., PE
Director
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505–2888

November 15, 1982

RESPIRATOR INFORMATION NOTICE
ON
MSA Powered Air Purifying Respirator
Mine Safety Appliance Company, Pittsburgh, PA
Model Numbers: 463354, 466607, 466608
Approval Number: TC-21C-186

On April 24, 1981, NIOSH issued a Respirator Information Notice which described the results of a NIOSH study of the MSA high efficiency powered air purifying respirator (PAPR) during use in a silica flour mill. The observed workplace protection factors (defined as the ratio of the concentration of contaminant outside the facepiece to the concentration of contaminant inside the facepiece measured while the respirator is worn) were significantly below the anticipated workplace protection factor of 1000. As a result, NIOSH stated that workers wearing the MSA PAPR may not receive the protection they anticipated. NIOSH stated further than the Institute had no evidence that the problem discovered in that study existed in other industries or situations of use. NIOSH also stated that the Institute would conduct further studies to evaluate the performance of the MSA PAPR against substances physically and chemically different from silica flour to determine whether results with silica flour were indicative of a problem associated with conditions of exposure or related to the malfunction of equipment.

Staff of NIOSH subsequently conducted a field evaluation of the half-mask MSA high efficiency PAPR at a primary lead smelter. The challenge aerosols contained predominantly lead dust and or lead fume. From this and other NIOSH studies, additional information has been developed and this Notice supersedes the Notice of April 24, 1981.

This field evaluation of the MSA PAPR produced the following preliminary results. The workplace protection factors associated with the respirator was found to be approximately lognormally distributed. The MSA PAPR produced a geometric mean workplace protection factor of 376 with a geometric standard deviation of 2.64 against lead fume and lead dust. Approximately 95% of the observed workplace protection factors for the MSA PAPR exceeded 77 while 84% of the observed workplace protection factors were below 1000. During this study no wearer of the MSA PAPR was exposed to concentrations of lead exceeding the permissible exposure limit (PEL).

Subsequent to issuance of the Respirator Information Notice of April 24, 1981, NIOSH and MSHA commenced proceedings to withdraw the certification of the MSA PAPR. That action was predicated upon the determination by

NIOSH that the MSA PAPR, during use in a silica flour mill, apparently did not provide the anticipated level of protection, i.e., a workplace protection factor of 1000. That action was subsequently voluntarily dismissed by the agencies pending the results of further studies. This study and additional studies of the PAPR class conducted by NIOSH indicate that the previously anticipated protection factor of 1000 expected of the entire class of PAPRs is inappropriately high. In view of this, the certification withdrawal proceedings against the MSA PAPR, which were previously dismissed will not be reinstituted. However, NIOSH recommends that users of PAPRs not rely upon them to consistently provide a workplace protection factor of 1000.

The results of the additional PAPR studies will be addressed in a subsequent Respirator Information Notice. For more information on this subject, contact the Testing and Certification Branch, Division of Safety Research, NIOSH, 944 Chestnut Ridge Road, Morgantown, West Virginia 26505, (304) 291-4331.

James A. Oppold, Ph.D., PE, CSP
Director
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505–2888

March 3, 1983

RESPIRATOR INFORMATION NOTICE

ON

3M Powered Air Purifying Respirator
3M, St. Paul, Minnesota
Model Number: W-344
Approval Number: TC-21C-246

Racal Powered Air Purifying Respirator
Racal Airstream, Inc., Frederick, Maryland
Model Number: AH3
Approval Number: TC-21C-212

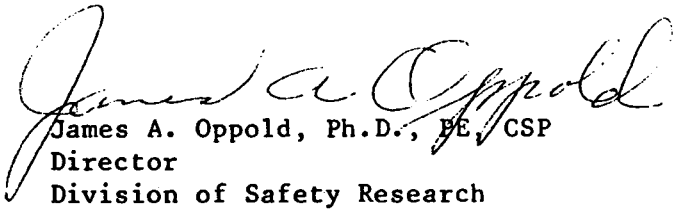
In a Respirator Information Notice dated November 15, 1982, NIOSH recommended that powered air purifying respirators (PAPRs) with high efficiency filters not be relied upon to consistently provide a workplace protection factor of 1000. That recommendation was based upon the results of the two studies of PAPRs with tight fitting facepieces described in that Notice as well as the additional NIOSH study of helmeted PAPRs described in this Notice.

The NIOSH study of helmeted PAPRs with high efficiency filters was conducted by NIOSH on the 3M W-344 PAPR and the Racal AH3 PAPR at a secondary lead smelter. In this study the challenge aerosols contained lead dust and/or lead fume.

This study produced the following preliminary results. The workplace protection factors associated with both respirator models were found to be approximately lognormally distributed. The results of the t-tests indicate that there is no significant difference ($P < .05$) between the mean workplace protection factors of the 3M and Racal PAPRs under the particular circumstances of these studies. For both the 3M and Racal PAPRs, approximately 98% of the observed workplace protection factors were below 1000. Approximately 95% of the observed workplace protection factors for both the 3M and Racal PAPRs exceeded 33. The geometric mean workplace protection factor for 3M and Racal PAPRs was 182 with a geometric standard deviation of 3.2.

As stated in the November 15, 1982, Respirator Information Notice, the preliminary results of the NIOSH studies of the MSA, 3M and Racal PAPRs indicate that the protection factor expected from this class of respirators is inappropriately high.

For more information on this subject, contact Glendel J. Provost, Division of Safety Research, NIOSH, 944 Chestnut Ridge Road, Morgantown, West Virginia 26505. Commercial telephone number is (304) 291-4595 and the FTS number is 923-4595.



James A. Oppold, Ph.D., PE, CSP
Director
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505–2888

December 16, 1983

RESPIRATOR USER'S NOTICE

Effects of Chemicals on Rubber and Plastic Parts of Self-contained Breathing Apparatus

The National Institute for Occupational Safety and Health (NIOSH) has received several reports of damage to parts of self-contained breathing apparatus that have apparently been exposed to concentrations of chemicals. These exposures have occurred during emergency response activities after accidental chemical vapor release and/or chemical discharge. The most recent report concerned a leak of dimethyl amine in Benicia, California, on August 12 and 13, 1983. Self-contained breathing apparatus and other equipment used during control of this leak were reportedly rendered unserviceable after exposure.

In view of these reports, fire fighting personnel who are engaged in emergency response activities should be equipped with proper chemical protective clothing in addition to respiratory protection. Information on the protective capabilities of such clothing should be obtained from the clothing manufacturer.

NIOSH is conducting a study of permeation of protective clothing materials by chemicals. Part of this study involves preparation of a data base of information on that subject. As part of this data base, NIOSH would appreciate receiving information on further cases of reported damage to self-contained breathing apparatus by chemicals. Reports should be addressed to the Testing and Certification Branch, Division of Safety Research, NIOSH, 944 Chestnut Ridge Road, Morgantown, WV 26505-2888. Reports should include the name of the chemical, Chemical Abstracts Service (CAS) Registry number, if known, identification and/or type of material damaged, extent of damage, and either the approximate concentration of the chemical or details of the exposure (e.g., exposure to liquid and/or vapor, temperature, wind conditions, and degree of enclosure of exposure).

Thomas C. Purcell, Ph.D.
Acting Director,
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505–2888

December 16, 1983

RESPIRATOR USER'S NOTICE

Effects of Heat and Flames on Rubber and Plastic Parts of Self-contained Breathing Apparatus

The National Institute for Occupational Safety and Health (NIOSH) has received several reports of damage to parts of self-contained breathing apparatus that have apparently been exposed to excessive heat and/or flames during fire fighting activities. A preliminary investigation of these reports indicates that development of new turnout gear for fire fighters permits them to enter and remain in higher temperatures and flame exposures. These higher temperatures and flame exposures can apparently damage some presently-used rubber and plastic parts of self-contained breathing apparatus.

NIOSH is proposing to include requirements for high-temperature performance of self-contained breathing apparatus in Title 30, Code of Federal Regulations, Part 11 (30 CFR 11), the regulations governing approval of respirators. NIOSH has been advised by self-contained breathing apparatus manufacturers that they are developing new materials with greater resistance to heat and flames. NIOSH recommends that fire fighters avoid overexposure of breathing apparatus parts to high heat and/or flames, where possible.

NIOSH requests that fire fighting personnel and others report further incidents of heat and flame damage of self-contained breathing apparatus. Such reports should be sent to the Testing and Certification Branch, Division of Safety Research, NIOSH, 944 Chestnut Ridge Road, Morgantown, WV 26505-2888.

Thomas C. Purcell, Ph.D.
Acting Director,
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
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944 Chestnut Ridge Road
Morgantown, WV 26505–2888

November 6, 1984

RESPIRATOR USERS' NOTICE

USE OF UNAPPROVED SUBASSEMBLIES

The National Institute for Occupational Safety and Health (NIOSH) has received many questions and complaints in regard to interchangeability of respirator subassemblies and unapproved modifications to MSHA/NIOSH certified respirators. Further, some problems reported to NIOSH have, upon investigation, been found to have been caused by user's modifying certified respirators which have resulted in the modified respirator failing to perform as anticipated, thus jeopardizing the respirator user.

MSHA/NIOSH respirator certification regulations, Title 30 Code of Federal Regulations Part 11 (30 CFR 11), state that approved respirators are ones that "are maintained in an approved condition and are the same in all respects as those respirators for which a certificate has been issued." [30 CFR 11, 11.2(b)] In addition, the regulations permit NIOSH/MSHA to only approve complete respirator assemblies and prohibit the approval of respirator subassemblies such as cylinders or air supply hoses. These requirements are intended to insure that one manufacturer has overall control and responsibility for the integrity of the approved respirator.

In some cases even minor modifications to respirators may make significant changes in the performance of the respirator. Manufacturers who modify certified respirators must test the modification to determine if the respirator continues to meet the minimum requirements of 30 CFR 11, and must submit the modifications to NIOSH. A user who modifies a certified respirator may not be able to determine whether a change will decrease respiratory protection. Several cases have been reported to NIOSH where unapproved modifications or use of an unapproved subassembly have resulted in respirator failures. Therefore, users of NIOSH/MSHA approved respirators are cautioned against interchanging subassemblies or making unapproved modifications to their respiratory protective devices.

John B. Moran
Director
Division of Safety Research

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
National Institute for Occupational
Safety and Health – ALOSH
944 Chestnut Ridge Road
Morgantown, WV 26505–2888

June 28, 1985

RESPIRATOR USERS NOTICE

Use and Maintenance of Pressure-demand Self-contained Breathing Apparatus

Since July 1, 1983, the Occupational Safety and Health Administration (OSHA) Fire Brigade Standard, Title 29, Code of Federal Regulations, Part 1910.156, has required that pressure-demand or other positive pressure self-contained breathing apparatus be worn by fire brigade members performing interior structural fire fighting. Although this standard is only applicable to all industrial fire brigades and to municipal fire departments in states with state-OSHA plans, other fire service organizations and industrial users of self-contained breathing apparatus (SCBA) have also recognized the superior protective capabilities of positive-pressure SCBA. As a result, there has been a steady change from demand to pressure-demand SCBA in the United States.

To provide the increased respiratory protection afforded by pressure-demand SCBA, it is generally necessary to increase the static pressure within the facepiece. The complex mechanics necessary to maintain this increased pressure and to control air flow when the facepiece is removed, together with the wearer's physiological response to the pressure-demand system, have presented problems to SCBA users.

Pressure demand SCBA requires more careful maintenance and different training, than is required for demand SCBA. Manufacturers have been providing maintenance and use instructions and training for purchasers of pressure-demand SCBA. The National Institute for Occupational Safety and Health (NIOSH) recommends that users of pressure-demand SCBA read those instructions, follow them carefully in apparatus use and maintenance, and take advantage of the manufacturer's training assistance. In addition to the manufacturers, training courses are offered by Fire Service organizations and by private organizations.

In the area of pressure-demand SCBA maintenance and repair, NIOSH strongly recommends that users have this service performed by a manufacturer-trained representative. This service is required to assure continued safe performance of pressure-demand SCBA.

Please advise NIOSH of any problems encountered in maintenance and use of pressure-demand self-contained breathing apparatus. Call the NIOSH Respirator Problem Coordinator, (304) 291-4595 (FTS 923-4595).

To assist you, NIOSH has prepared the following list of manufacturer's and fire service organization personnel who can provide further information on pressure-demand breathing apparatus training:

Clifton Precision
5100 State Road
Drexel Hill, PA 19026
Mr. Robert Gray (215) 622-1718

Globe Safety Equipment, Inc.
P.O. Box 7248
Dayton, OH 45407
Mr. Steven Bates (513) 224-7468

International Safety Instruments, Inc.
P.O. Box 846
Lawrenceville, GA 30246
Mr. Donald Dawson (404) 962-2552

MSA
600 Penn Center Boulevard
Pittsburgh, PA 15235
Mr. Jay Mears (412) 273-5145

North Safety Equipment
2000 Plainfield Pike
Cranston, RI 02920
Mr. Richard T. Flynn (401) 943-4400

Rexnord
45 Great Valley Parkway
Malvern, PA 19355
Mr. Justin Mills (215) 647-7200 *

Scott Aviation
225 Erie Street
Lancaster, NY 14086
Mr. Dennis Browner (716) 683-5100

U.S.D.
3323 West Warner Avenue
Santa Ana, CA 92702
Mr. Brian Miller (714) 241-4601

National Draeger, Inc.
P.O. Box 120
Pittsburgh, PA 15230
Mr. Les Boord/Ms. Karen Cox/Mr. Richard Weaver (412) 787-8383

International Association of Fire Chiefs
1329 18th Street, NW
Washington, DC 20036
Mr. Jan Thomas (202) 833-3420

International Association of Fire Fighters
1750 New York Avenue, NW
Washington, DC 20006
Mr. Richard Duffy (202) 737-8484

International Society of Fire Service Instructors
20 Main Street
Ashland, MA 01721
Mr. Ed McCormack (617) 881-5800

John B. Moran
Director
Division of Safety Research

* New contact for reporting respirator problems (replaced Mr. John Moffa)

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

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January 17, 1986

RESPIRATOR USERS NOTICE

Inspection of Certain Aluminum Cylinders for Breathing-gas Pressure

The light weight and high charging pressure of aluminum cylinders have resulted in their widespread acceptance and use with self-contained breathing apparatus (SCBA). The National Institute for Occupational Safety and Health (NIOSH) estimates that more than half of the SCBA of 30- and 60-minute duration in regular use today are equipped with aluminum cylinders.

Since first receiving reports of defective fiber-glass wrapped aluminum cylinders in 1983, NIOSH has advised users of potential hazards associated with use of certain fiber-glass wrapped aluminum cylinders. At this time, NIOSH believes there is sufficient evidence to warrant issuance of this NOTICE regarding inspection of fiber-glass wrapped aluminum cylinders.

The presently available evidence indicates that fiber-glass wrapped aluminum cylinders manufactured under Department of Transportation (DOT) exemptions DOT-E 7235 and DOT-E 8059 (including 2216 and 4500 psi) may, upon aging, develop neck cracks and may leak breathing gas during storage and use. This may result in significant loss of breathing gas from an unattended cylinder. If undetected, this loss of breathing gas could be dangerous to the user.

Based on this, NIOSH recommends that where SCBA are equipped with fiber-glass wrapped aluminum cylinders, inspection for cylinder pressure should be made at least weekly, for stored units. When used on a daily basis, as in fire fighting, cylinder pressure should be checked daily and immediately before use.

If a leak is suspected, the cylinder and cylinder valve should be tested as prescribed in American National Standard, Z88.5-1981, Practices for Respiratory Protection for the Fire Service, Section 6.2.4.2.

Leaks in cylinders should be reported to the SCBA manufacturer who will, in turn report them to the cylinder manufacturer. The numbers and charging pressures of leaking cylinders should also be reported to DOT (Mr. Art Mallen, DOT Office of Hazardous Materials, 400 7th St. SW, Washington, DC 20590) and to NIOSH (Mr. John Moran at the address shown at the top of this letter).

Aluminum cylinders used with SCBA, with exemption numbers other than DOT-E 7235 and DOT-E 8059 are not covered in this notice. Self-contained self rescuers used in mines are also not included.

MORE

R E M I N D E R

January 17, 1986

Manufacturers of MSHA/NIOSH-approved SCBA Incorporating DOT-E 7235 4500 Fiber-glass Wrapped Aluminum Cylinders

The following manufacturers incorporate DOT-E 7235 4500 cylinders in their MSHA/NIOSH-approved SCBA:

- o Bendix
- o Clifton Precision
- o Draeger
- o Siebe Gorman
- o Scott
- o U.S.D. (SurvivAir)

DOT-E 7235 4500 cylinders must be retrofitted by Luxfer (Telephone: 714-684-5110) with steel neck rings, to prevent explosive rupture. DOT regulations prohibit charging of any DOT-E 7235 4500 cylinder that has not been fitted with a steel neck ring. Any apparatus utilizing a DOT-E 7235 4500 cylinder without a neck ring, is considered unapproved by MSHA/NIOSH.

Change in Address of Manufacturer's Contact

The following address change has been reported to NIOSH for manufacturer's personnel who are responsible for handling reports of problems with MSHA/NIOSH-approved respirators:

Clifton Precision: New Address: 750 West Sproul Road, Springfield, PA 19064-4084
Contact: Mr. Martin Ziegler

John B. Moran
Director, Division of Safety Research

APPENDIX D

SAMPLE MSHA/NIOSH APPROVAL LABELS

Figure 1. Sample MSHA/NIOSH Approval Label for Pressure Demand SCBA.

PERMISSIBLE

30 Minute
Self Contained Pressure Demand
Compressed Air Breathing Apparatus

United States Department of Labor
MSHA
Mine Safety and Health Administration

U.S. Department of Health and Human Services
Centers for Disease Control
NIOSH
National Institute
for Occupational Safety and Health

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH

APPROVAL NO. TC-13F-000

ISSUED TO

ABC Company
Anywhere, USA

SAMPLE

LIMITATIONS

Approved for respiratory protection during the entry into or escape from oxygen deficient atmospheres, gases and vapors at temperatures above -22°F. Approved only when compressed air reservoir is fully charged with air meeting the requirements of the Compressed Gas Association Specification G-7-1 for Type 1, Grade D air or equivalent specifications. The container shall meet applicable DOT specifications. Demand mode shall be used only when donning aparatus. At temperatures above 32°F use without nosecup is permitted.

CAUTION

Use adequate skin protection when worn in gases or vapors that poison by skin absorption (for example, hydrocyanic adic gas). In making renewals and repairs, part identical with those furnished by the manufacturer under the pertinent approval shall be maintained. This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, and other applicable regulations.

SAMPLE

MSHA — NIOSH Approval TC-13F-000

Issued to ABC Co., February 31, 2000

The approved assembly consists of the following part numbers:

000-000
000-000
etc.

Figure 2. Sample MSHA/NIOSH Approval Label for Pressure-Demand SAR

PERMISSIBLE

Combination Ten Minute Self-Contained Compressed Air Breathing Apparatus for Escape Only Pressure Demand Type C Supplied Air Respirator

United States Department of Labor
MSHA
Mine Safety and Health Administration

U.S. Department of Health and Human Services
Centers for Disease Control
NIOSH
National Institute for Occupational Safety and Health

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

APPROVAL NO. TC-13F-000

ISSUED TO

ABC Company
Anywhere, U.S.A.

SAMPLE

LIMITATIONS

Approved for respiratory protection during entry and escape from oxygen deficient atmospheres, gas, and vapors, when using air-line air supply. Approved for escape only, when using self-contained air supply. Approved for use at temperatures above -25°F.

Approved only when compressed air reservoir is fully changed with air meeting the requirements of the Compressed Air Gas Association Specifications G-7-1 for type 1, Grade D air, or equivalent specifications. The containers shall meet applicable DOT specifications.

This approval applies only when the device is supplied with respirable breathing air through 12.5 to 300 feet of hose at air pressures between 78 and 80 pounds per square inch gage or from self-contained air supply. If the supplied-air fails, open cylinder valve and proceed to fresh air immediately.

CAUTION

Use with adequate skin protection when worn in gases and vapors that poison by skin absorption (for example: hydrocyanic-acid gas). In making renewals and repairs, parts identical with those furnished by the manufacturer under the pertinent approval shall be maintained. This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, and other applicable regulations.

SAMPLE

MSHA — NIOSH Approval TC-13F-000

Issued to ABC Company, February 31, 2000

The approval assembly consists of the following part numbers:

000-000
000-000
etc.