

BP SOUTH HOUSTON
BPSH HSE POLICY MANUAL
SH-PPE-5: PERSONAL PROTECTIVE EQUIPMENT-RESPIRATORY PROTECTION

I. PURPOSE

The purpose of this policy is to prevent occupational respiratory illness by establishing procedures that protect employees against harmful airborne contaminants encountered during routine, turnaround, and emergency work activities. Respiratory protection is to be used whenever engineering or administrative controls have not reduced potential exposures to acceptable levels, or during the implementation of engineering/administrative controls.

II. SCOPE

This policy applies to all BP personnel and contractors who use or may be required to use air purifying or supplied-air respirators during routine, TAR or emergency conditions. Specific contractor respiratory protection guidelines can be found in Section XIII. BP employees that are included in the respirator program are identified in Section X.

III. EXCEPTIONS

Exceptions to this policy can only be granted by the Texas City Performance Unit Leader, the Texas City Process Safety Committee Chair, the Chocolate Bayou Works (CBW) Works General Manager, the Chocolate Bayou Works Process Safety Committee Chair, or their delegates. Exceptions must be documented and filed with the HSE Department.

IV. GENERAL REQUIREMENTS

- A. Respiratory protection will be used only after feasible engineering or administrative controls have been considered and cannot reduce potential exposures to acceptable levels.
- B. To wear a respirator, an employee must be medically qualified, fit tested annually, and have no facial hair in the sealing surface of the respirator.
- C. All respiratory protection equipment intended for BP personnel must be approved by the HSE Department. BPSH will only stock respiratory protection that has been approved by the HSE Department. See Attachment A for HSE Department approved respiratory protective equipment.

V. RESPIRATOR SELECTION AND USE

- A. Respirators will be selected on the basis of potential hazards to which the worker may be exposed. A respirator selection matrix (Attachment B) has been developed to assist in the selection of appropriate respiratory

protection within BPSH. Manufacturer's guidelines on respirator fitting and usage shall be followed. Only respirators that have NIOSH certification shall be used. Regardless of the respirator selected, each time a respirator is donned, the employee must perform a positive and negative pressure test (fit check) to ensure a proper seal has been achieved.

- B. Employees trained in respirator selection and their limitations will identify the proper respirator for a given situation by referring to Attachment B. As outlined in training, factors that must be considered when selecting a respirator are chemical state, physical form, duration of wear, expected physical work, temperature, humidity and a reasonable estimate of exposure based on actual, historical, or objective data. However, there will be instances when hazards are encountered that are not covered by Attachment B. In these instances, ONLY supplied air respirators will be used. If an employee has any questions regarding the respirator selection for a specific application, they should contact the HSE Department.

C. **Definitions**

1. Air Purifying Respirators (APR's)
 - a) APR's are respirators that purify inhaled air through the use of a filter/cartridge. Atmospheric monitoring or knowledge of the process conditions will be utilized to determine the contaminant(s), approximate concentrations, and appropriate cartridges/filters to be used. APRs will be cleaned and stored appropriately after each use. APR cartridges will be discarded when use has exceeded time limits outlined in Attachment C, or if warning properties are noted (chemical odor breakthrough or limited airflow due to particulate buildup.)
 - b) APR's are not appropriate in areas that are Immediately Dangerous to Life and Health (IDLH) or in areas with less than 19.5% oxygen. These situations require the use of supplied-air respirators.
2. Supplied-Air Respirators
 - a) Supplied-air respirators provide their own air supply. They are typically worn in IDLH atmospheres; atmospheres that contain less than 19.5% oxygen, where toxics are suspected but unknown, or where APR's are otherwise inappropriate (see Attachment B.)
 - b) Within BPSH, supplied-air respirators are either the self-contained breathing apparatus (SCBA) or the airline respirator. Both shall be the "positive-pressure" type with an

emergency egress air supply or a low-pressure alarm.

When using airline respirators in an IDLH situation, a rescue line shall be attached to the employee's safety harness.

- c) Airline hoses from air supplying cylinders shall be protected from damage, including cutting, kinking, crushing, or burning. Hose couplings shall be protected against inadvertent disconnection. Trailing airline hoses will be arranged to minimize tripping hazards and to permit escape. No individual hose line shall exceed 300 feet in length or three (3) couplings (whichever is less.)
- d) The air cylinder regulator shall be set to maintain a normal operating pressure of 125 psi. All air cylinders will be set up per manufacture specifications. See Attachment G for an example setup. Any variance from this system must be approved by the HSE Department.
- e) When supplied air respirators are used in confined space entry, BPSH confined space entry policy requirements shall be met.

3. Special Use Respirators

- a) Special use respirators are respirators that are designed and used for specific work activities or for specific conditions (i.e. welding, sandblasting, etc.) Special use respirators shall only be used for their associated work activity.

4. Emergency Use Respirators

- a) SCBA's are generally used for emergencies. They are found at various locations throughout BPSH.
- b) Emergency egress bottles provide short duration (~ 5 minutes) breathing air and are designed for escaping emergency situations. Examples within BPSH include the Scott Skat-pak and ISI-Elsa. Emergency egress air supplies should only be used in emergencies and their valves never opened unless an emergency situation exists.

VI. RESPIRATOR CARE

A. Inspection

- 1. All respirators shall be inspected by the user before each use. Supplied air respirators will also be inspected by the user after each use. Worn or deteriorated parts on air supplied respirators shall be noted and the respirator sent to the applicable Texas City, Chocolate Bayou, or Deer Park Respirator Repair Center (RRC.) At Texas City, the authorized repair center is the Warehouse Safety

Shop, at Chocolate Bayou-Firehouse, and at Deer Park-Webb Murray.

2. Supplied-air respirators will be inspected monthly by the group controlling the respirator. Unit or Area respirator inspections shall be conducted in accordance to manufacturer's guidelines. Supplied-air respirator inspection dates with findings shall be recorded during monthly inspections. These monthly inspection records will be kept in a file maintained by the group controlling the respirator. These records must be maintained for one year and be retrievable on demand. See Attachment D for an example of an inspection record.
3. If any defects are noted during the facility monthly inspection, the respirator shall be removed from service and sent to the applicable RRC for repair and a replacement respirator shall be supplied. Damaged air-purifying respirators shall be discarded and replaced with new air-purifying respirators.
4. Emergency use supplied-air respirators will be inspected by the applicable RRC after each use (exception: Fire Department will inspect their own equipment). All supplied air units will be sent to the applicable RRC *at least every other year* for a thorough inspection and cleaning. All associated regulators will be returned to the manufacture at the manufacturer recommended frequency for a thorough inspection in accordance with their recommendations. SCBA cylinders will be hydrostatically tested every three (3) years and escape bottles will be tested every five (5) years. The applicable RRC will maintain records of respirator inspections, regulator inspections, hydrostatic tests, and maintenance/repair records.

B. Respirator Repair and Maintenance

1. The applicable RRC will be responsible for the repair and maintenance of all supplied air respiratory equipment. Repairs will be done only by qualified RRC personnel with parts designed for the respirator and in accordance with manufacturer's recommendations. A qualified person is one that is trained to repair the respirator.
2. The air-purifying respirators at Texas City Refinery and Chocolate Bayou Works are limited use and can be discarded if a part is missing or not working properly. For the Texas City Chemical plant, the respirator can be turned into the Firehouse for repair if it is not a limited use facepiece.

C. Cleaning and Disinfecting

1. For the Texas City Refinery and Chocolate Bayou Works, the air purifying respirator should be cleaned by the individual. A respirator wipe can be used. For the Texas City Chemical plant, the air purifying respirator can be returned to the firehouse for cleaning and disinfecting as outlined in Appendix E.
2. Supplied-air respirators shall be cleaned and disinfected as frequently as necessary or after every use. Supplied-air respirators will be cleaned and disinfected per manufacture's recommendations. Refer to Attachment E for guidance on cleaning/disinfecting respirators.

D. Storage

1. After inspection, cleaning, and necessary repair, respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals. Respirators will be packed or stored with the facepiece and exhalation valve resting in a position that does not damage or impair the elastomer facepiece. Respirators will NOT be stored in places such as lockers or tool boxes unless they are in a sealed carrying case, bag, or carton.
2. Supplied-air respirators placed at stations and work areas for emergency use shall be stored in compartments built for that purpose, be quickly accessible at all times, and clearly marked.
3. Each operating unit will provide proper storage facilities for the respiratory equipment normally used on the unit. The applicable RRC will provide proper storage facilities for respiratory equipment not normally stored on operating units. The respiratory equipment used by the site Fire Department will be the responsibility of the site Emergency Response Coordinator.

VII. SPECIAL CONSIDERATIONS

A. Breathing Air Quality

1. Breathing air must be certified Grade D as described in ANSI/Compressed Gas Association (CGA) Commodity Specification for Air (G-7-1-1989).
2. Breathing air cylinders will be charged with certified breathing air meeting requirements for "Grade D" air as defined by the CGA. Breathing air cylinders shall be clearly labeled as such.
3. Airline couplings will be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with non-respirable gases or oxygen.

B. Breathing Air Compressors

1. In certain situations, compressors can be used to provide supplied air. In these situations, only breathing-air type compressors shall be used. The breathing air supplied by the compressors must meet "Grade D" requirement listed above. In addition, non-oil lubricated compressors for supplying air shall have alarms to indicate high temperature and compressor failure. Oil lubricated compressors for supplying air must be equipped with high temperature and carbon monoxide alarms. Breathing air compressors must have their air intakes placed in areas providing clean air. Airline couplings will be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with non-respirable gases or oxygen.
2. Breathing air compressors used on the site by outside contractors must be reviewed by HSE prior to use.

VIII. TRAINING AND FIT TESTING

- A. Each employee whose job may require respirator usage will be given detailed training annually on proper use, care, selection, inspection and limitations of respirators. If work conditions change that render previous training obsolete, or if issues arise that indicate retraining is necessary for safer respirator use, more frequent training will be conducted. Every respirator wearer will receive instructions including demonstrations and practice in how the respirator will be worn, adjusted, and how to determine if it fits properly. Training records will be retained by the BPSH Learning and Development Department for the duration of employment
- B. Employees that are required to wear respirators will be given annual quantitative fit testing. Fit testing may be conducted more frequently if a respirator user has a change in facial structure which would invalidate previous fit testing (e.g. dramatic loss of weight, significant dental work, etc.) Fit testing records will be retained by the BPSH HSE Department for one year or until the next fit testing is conducted.

IX. RESPIRATOR SEAL

- A. The purpose of any respirator is to isolate the wearer from the surrounding contaminated atmosphere by providing a leak-tight seal between the mask and the face.
- B. All BP employees and contractors included in the Respiratory Protection Program shall not have facial hair present that may protrude into the sealing portion of a respirator. Facial hair that lies along the sealing area of the respirator, such as beards, mustaches, or even a few days growth of stubble is not permitted.

- C. Supervision will have the ability to field fit test by requiring the employee to don a respirator. If the facial hair protrudes into the sealing surface, the employee will be required to shave. An example is to use shaving cream on the facepiece, apply the face piece to the employee's face. Any shaving cream on facial hair would require shaving.
- D. Personal protective equipment (e.g. safety glasses) shall not be worn in a manner that will interfere with the respirator facepiece-to-face seal. Employees who need prescription safety glasses and use supplied air respirators will be provided clear prescription lenses, frames (excluding temple pieces) and a lens holder assembly. Contact lenses may be worn instead of the assembly kit

X. MEDICAL EVALUATION

- A. The BPSH Medical and HSE Departments will determine which job assignments require or may require respiratory protection within BPSH. No one shall be assigned to a task requiring the use of respirators unless they are medically "qualified" to use respiratory protective equipment. Each employee included in the program will complete a medical questionnaire to be evaluated by the BPSH Medical Department. The BPSH Medical Department shall make the decision as to the fitness of the individual to wear a respirator and if an additional medical examination is necessary. The BPSH Medical Department will issue a written recommendation on the employee's ability to wear a respirator. Re-evaluation will be based on Medical, HSE, or supervisor recommendation, or if the employee reports signs or symptoms of difficulty wearing a respirator.
- B. BP personnel included in the respirator program are personnel that work in the process units, labs, or a member of the ERT. Examples are operators, lab and analyzer (ATLS) employees, maintenance personnel, unit and reliability engineers, inspection, and security.
 - All BP Operations personnel, such as operators, unit assigned engineers, working team leaders, shift supervisors, asset superintendents, MDL,
 - All BP Maintenance personnel (except Admin Assistants)
 - All ATLS personnel
 - HSE (field personnel)
 - Shift Superintendents
 - BP Security Officers
 - Engineering & Inspection
- C. BP personnel not required to be in the respirator program are:
 - Administrative Assistants
 - BPSH Leadership team
 - HR

- Storehouse personnel
 - Commercial Manager
 - Major Capital Projects
 - Facilities & Services
 - Learning & Development
 - Finance
 - Tax
 - Transformation Personnel
 - Optimization & Planning
 - Government & Public Affairs, Procurement
 - Digital Business
- D. If one of the above needs to be included in the respirator program, arrangements can be made through Medical. Personnel on the Emergency Response Teams regardless of position will be in the respirator program. Personnel that go into a respirator required area must be in the respirator program.
- E. Voluntary users of respirators in non-hazardous (non-required) situations must still meet the medical qualification requirements outlined above. This does not include exclusive nuisance dust (comfort) mask users that do not require fit tests.

XI. RECORDKEEPING

- A. The applicable RRC will maintain records of their respirator inspections, regulator inspections, hydrostatic tests, and maintenance/repair records. Inspection records will be maintained for one year.
- B. The BPSH Medical Department will maintain respiratory protection program medical records (ie. medical questionnaires). Records will be maintained for the duration of employment plus 30 years.
- C. The HSE Department will maintain the fit testing records for one year or until the next fit test is conducted.
- D. Unit or area supervision will maintain unit/area monthly inspection records for a period of one year.
- E. BPSH's Learning and Development Department will maintain all respiratory protection related training records for the duration of employment.

XII. RESPIRATORY PROTECTION POLICY EVALUATION

- A. Once every 3 years an evaluation to determine the continued effectiveness of this respirator program will be conducted by the HSE Department. The evaluation will include:

- B. Assessment of workplace conditions to ensure that the approved respirators are still adequate for the contaminant and concentrations encountered.
- C. Evaluation of actual respirator usage; including:
 - 1. Visual inspection of employees on the job to see that respirators are worn properly and on the job(s) specified.
 - 2. Examination of respirators in storage to check for proper maintenance.
 - 3. Solicitation of wearer comments.
- D. Any deficiencies will be recorded, assessed, and corrected. Additionally, the Respiratory Protection Policy will be modified if needed.

XIII. CONTRACTORS

- A. Most contractors that work at BPSH must have a respirator program. For a list of contractors that are required to have a respirator program, please reference Attachment H. Contractors whose work falls under the OSHA Respiratory Protection Standard (29 CFR 1910.134) must:
 - 1. Maintain a written program that meets or exceeds the requirements of this policy and applicable standards.
 - 2. Ensure employee compliance with their written program.
 - 3. When requested, provide compliance documentation (i.e. fit test, medical qualification, training records, etc.) to BP.
 - 4. Supply their personnel with respiratory protection equipment (unless otherwise specified in the contract).
 - 5. Compliance with the Facial Hair section of this policy.

XIV. REFERENCES

- A. 29 CFR 1910.134, OSHA Respiratory Protection Standard
- B. NIOSH Guide to Industrial Respiratory Protection
- C. ANSI Z88.2 - 1980, American National Standard Practices for Respiratory Protection
- D. 3M, Respirator Selection Guide
- E. NIOSH, Pocket Guide to Chemical Hazards
- F. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents - Biological Exposure Indices



APPROVED BY:

D. L. Parus
Director BPSH

Revision Log

Revision Date	Authority	Custodian	Revision Details
26-Mar-04	D. L. Parus	D. Malloy	Original issue. Policy combines previous site respirator programs. Substantial change to all policies regarding facial hair.

ATTACHMENT A

BPSH HSE DEPARTMENT APPROVED RESPIRATORY PROTECTION

RESPIRATOR TYPE	TEXAS CITY REFINERY	TEXAS CITY CHEMICAL	CHOCOLATE BAYOU	DEER PARK
<i>Air Purifying</i> half-mask full-face	3M- 6000 series North- 3000 series N/a N/a	Scott-66 series North-7700 series Scott-65 series North-7600 series	3M- 6000 series North-7700 series n/a North-7600	3M-6200 series Scott-Scottoramic
<i>Air Supplied</i> SCBA Airline Escape	Survivair- Sigma Survivair-Sigma Hippack Scott-Skat Pak	Survivair-Sigma Survivair-Sigma Hippack ISI-Elsa	Survivair-Sigma Survivair-Sigma Hippack n/a	
<i>Specialty</i> Sandblasting dust mask	Bullard-88 Type C 3M- 8511 N95	NA 3M- 8511 N95	NA 3M- 8511 N95	NA 3M- 8511 N95

This table only applies to BP personnel.

ATTACHMENT B
BPSH RESPIRATOR SELECTION MATRIX (1 of 3)

Contaminant	Exposure level	Respirator ¹	Cartridge (color) ²	PEL/TLV ^{3,6}	STEL ^{4,6}	IDLH ^{5,6}	Notes
Acetonitrile	Less than 40 ppm	None Required	-	40 ppm	60 ppm	500 ppm	
	40 – 200 ppm	Half Mask	OV (black or yellow)				
	201 – 500 ppm	Full Face	OV (black or yellow)				
	Greater than 500 ppm	Supplied Air	-				
Ammonia	Less than 25 ppm	None Required	-	25 ppm	35 ppm	300 ppm	Half mask at 50 ppm or less with appropriate eye protection acceptable if eye irritation
	25 –50 ppm	Half Mask	Ammonia (green)				
	51 – 300 ppm	Full Face	Ammonia (green)				
	Greater than 300 ppm	Supplied Air	-				
Asbestos	Less than 0.1f/cc	None Required	-	0.1f/cc	1.0 f/cc	None Determined	
	0.1 – 1.0 f/cc	Half Mask	HEPA (purple)				
	1.1 f/cc – 10.0 f/cc	Full Face	HEPA (purple)				
	Greater than 10.0 f/cc	Supplied Air	-				
Benzene	Less than 1 ppm	None Required	-	1 ppm	5 ppm	500 ppm	
	1 - 10 ppm	Half Mask	OV (black or yellow)				
	11 – 50 ppm	Full Face	OV (black or yellow)				
	Greater than 50 ppm	Supplied Air	-				
Butadiene (1,3-)	Less than 1 ppm	None Required	-	1 ppm	5 ppm	2000 ppm	
	1 - 10 ppm	Half Mask	OV (black or yellow)				
	11 – 50 ppm	Full Face	OV (black or yellow)				
	Greater than 50 ppm	Supplied Air	-				
Carbon Dioxide	>5000 ppm	Supplied air	-	5000 ppm	30,000 ppm	50,000 ppm	Air purifying respirator is not appropriate
Carbon Monoxide	> 25 ppm	Supplied Air	-	25 ppm	NA	1500 ppm	Air purifying respirator is not appropriate
Chlorine	Less than 0.5 ppm	None Required	-	0.5 ppm	1 ppm	10 ppm	
	0.5 – 10 ppm	Full Face	AG (white or yellow)				
	Greater than 10 ppm	Supplied Air	-				
Dust (not otherwise specified)	Less than 10 mg/m ³	None Required	-	10 mg/m ³	None Determined	None Determined	Some dusts may contain metals requiring more stringent Protection.
	10 – 100 mg/m ³	Half Mask	HEPA (purple)				
	101 – 500 mg/m ³	Full Face	HEPA (purple)				
	Greater than 500 mg/m ³	Supplied Air	-				

ATTACHMENT B
BPSH RESPIRATOR SELECTION MATRIX (2 of 3)

Contaminant	Exposure level	Respirator ¹	Cartridge (color) ²	PEL/TLV ^{3,6}	STEL ^{4,6}	IDLH ^{5,6}	Notes
Ethyl Benzene	Less than 100 ppm	None Required	-	100 ppm	125 ppm	800 ppm	Half mask at 500 ppm or less with appropriate eye protection acceptable if eye irritation
	100 - 500 ppm	Half Mask	OV (black or yellow)				
	501 - 800 ppm	Full Face	OV (black or yellow)				
	Greater than 800 ppm	Supplied Air	-				
Hexane (n-)	Less than 50 ppm	None Required	-	50 ppm	None Determined	1100 ppm	Half mask at 500 ppm or less with appropriate eye protection acceptable if eye irritation
	50 - 500 ppm	Half Mask	OV (black or yellow)				
	501 - 1100 ppm	Full Face	OV (black or yellow)				
	Greater than 1100 ppm	Supplied Air	-				
Hydrochloric Acid	Less than 5 ppm	None Required	-	None Determined	(c) 5 ppm	50 ppm	
	5 -25 ppm	Half Mask	AG (white or yellow)				
	26 - 50 ppm	Full Face	AG (white or yellow)				
	Greater than 50 ppm	Supplied Air	-				
Hydrofluoric Acid	Less than 3 ppm	None Required	-	3 ppm	(c) 3 ppm	30 ppm	
	Equal/Greater than 3	Supplied Air	-				
Hydrogen Sulfide	Less than 10 ppm	None Required	-	10 ppm	15 ppm	100 ppm	
	Equal/Greater than 10	Supplied Air	-				
Lead	Less than 0.05 mg/m ³	None Required	-	0.05 mg/m ³	None Determined	100 mg/m ³	
	0.05 - 0.50 mg/m ³	Half Mask	HEPA (purple)				
	0.51 - 5.0 mg/m ³	Full Face	HEPA (purple)				
	Greater than 5.0 mg/m ³	Supplied Air	-				
Methanol	Less than 200 ppm	None Required	-	200 ppm	250 ppm	6000 ppm	
	Equal/Greater than 200	Supplied Air	-				
Sodium Hydroxide	Less than 2 mg/m ³	None Required	-	2 mg/m ³	(c) 2 mg/m ³	10 mg/m ³	Half mask at 20 mg/m ³ or less with appropriate eye protection acceptable if eye irritation
	2 - 20 mg/m ³	Half Mask	HEPA (purple)				
	21 - 200 mg/m ³	Full Face	HEPA (purple)				
	Greater than 200 mg/m ³	Supplied Air	-				
Styrene	Less than 20 1ppm	None Required	-	20 ppm	40ppm	700 ppm	Half mask at 200 ppm or less with appropriate eye protection acceptable if eye irritation
	100 - 200 ppm	Half Mask	OV (black or yellow)				
	201 - 700 ppm	Full Face	OV (black or yellow)				
	Greater than 700 ppm	Supplied Air	-				

ATTACHMENT B
BPSH RESPIRATOR SELECTION MATRIX (3 of 3)

Contaminant	Exposure level	Respirator ¹	Cartridge (color) ²	PEL/TLV ^{3,6}	STEL ^{4,6}	IDLH ^{5,6}	Notes
Sulfur Dioxide	Less than 2 ppm	None Required	-	2 ppm	5 ppm	100 ppm	Half mask at 20 ppm or less with appropriate eye protection acceptable if eye irritation
	2 – 20 ppm	Half Mask	AG (white or yellow)				
	21 – 100 ppm	Full Face	AG (white or yellow)				
	Greater than 100 ppm	Supplied Air	-				
Sulfuric Acid	Less than 1 mg/m ³	None Required	-	1 mg/m ³	3 mg/m ³	15 mg/m ³	Half mask at 10 mg/m ³ or less with appropriate eye protection acceptable if eye irritation
	1 – 10 mg/m ³	Half Mask	HEPA (purple)				
	11 – 15 mg/m ³	Full Face	HEPA (purple)				
	Greater than 15 mg/m ³	Supplied Air	-				
Toluene	Less than 50 ppm	None Required	-	50 ppm	(c) 300 ppm	500 ppm	Half mask at 300 ppm or less with appropriate eye protection acceptable if eye irritation
	50 – 300 ppm	Half Mask	OV (black or yellow)				
	301 - 500 ppm	Full Face	OV (black or yellow)				
	Greater than 500 ppm	Supplied Air	-				
Total Hydrocarbons (not otherwise specified)	Less than 300 ppm	None Required	-	300 ppm	500 ppm	None Determined	Respiratory protection required certain hydrocarbon types may be more stringent (ie. benzene, butadiene, toluene, xylenes, etc.)
	301 to 1000 ppm	Half Mask	OV (black or yellow)				
	1001 - 3000 ppm	Full Face	OV (black or yellow)				
	Greater than 3000 ppm	Supplied Air	-				
Xylenes	Less than 100 ppm	None Required	-	100 ppm	150 ppm	900 ppm	Half mask at 500 ppm or less with appropriate eye protection acceptable if eye irritation
	101 to 500 ppm	Half Mask	OV (black or yellow)				
	501 - 900 ppm	Full Face	OV (black or yellow)				
	Greater than 900 ppm	Supplied Air	-				
Welding Fume (not otherwise specified)	Less than 5 mg/m ³	None Required	-	5 mg/m ³	None Determined	None Determined	Some fumes contain certain that require more stringent protection.
	5 – 50 mg/m ³	Half Mask	HEPA (purple)				
	51 – 500 mg/m ³	Full Face	HEPA (purple)				
	Greater than 500 mg/m ³	Supplied Air	-				

¹ If the BPSH location does not utilize full face air purifying respirators, then supplied air respirators shall be used within the designated full face respirator exposure concentration range

² OV = organic vapor (black), AG = acid gas (white), OV/AG = organic vapor/acid gas (yellow), HEPA = high efficiency particulate air (purple)

³ PEL/TLV = average exposure allowed over an 8-hour period, 40 hour work week as established by the Occupational Safety and Health Administration (PEL = Permissible Exposure Limit) or American Conference of Governmental Industrial Hygienists (TLV = Threshold Limit Value). The lower of the two exposure limits are followed by BP in most cases and shown in the table above.

⁴ STEL = Short Term Exposure Limit. The average exposure allowed over a 15-minute period as established by OSHA or ACGIH

⁵ IDLH = Immediately Dangerous To Life and Health. IDLH concentrations presented were set to ensure the worker can escape in the event of respiratory protection equipment failure.

⁶ c = ceiling value, f/cc = fibers per cubic centimeter, mg/m³ = milligrams per meter cubed, ppm = parts per million

ATTACHMENT C
AIR PURIFYING RESPIRATOR CARTRIDGE CHANGEOUT SCHEDULE

Contaminant	Exposure level	Respirator	Maximum Cartridge Life
Butadiene (1,3-)	Less than 5 ppm	Half Mask	4 hours
	5 – 10 ppm	Half Mask	3 hours
	11 – 25 ppm	Full Face	2 hours
	26 – 50 ppm	Full Face	1 hour
	Greater than 50 ppm	Supplied Air	-

Note: Cartridges must be labeled with the time and date the cartridge was installed on the respirator. For all other contaminants, cartridges must be changed out when there is odor breakthrough or if breathing through the filter media becomes difficult.

ATTACHMENT D

**EXAMPLE TEXAS CITY MONTHLY SURVIVAIR AIR-PAK / HOSE LINE WORK UNIT
 SCOTT SKAT-PAK (EMERGENCY ESCAPE) UNIT
 RESPIRATOR INSPECTION REPORT**

Facility : _____ Date : _____ Inspected By : _____

To complete form, place a check (√) if item is OK or an (X) if it needs repair. Contact the warehouse at ext. 1631 if repairs are needed.

	AIR PAK #	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#	AIR PAK#
Location										
Cylinder Pressure										
Connections Tight										
Mask & Headband Condition										
Mask Straps Extended										
Harness Straps Extended										
Condition Of Lenses										
Red Bypass Valve Closed										
Mask Stored In Plastic Bag										
Facility Air Manifold System In Service										
Hydrostatic Test Date										
Remarks										

Inspection records shall be kept at each operating unit.

ATTACHMENT E

RESPIRATOR CLEANING REQUIREMENTS

- A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure- demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- B. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
- C. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain.
- D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
 - 1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or,
 - 2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,
 - 3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
- E. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
- F. Components should be hand-dried with a clean lint-free cloth or air-dried.
- G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
- H. Test the respirator to ensure that all components work properly.

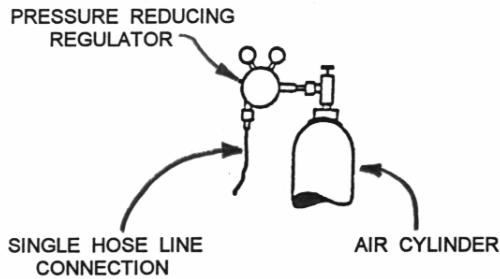
ATTACHMENT F

DEFINITIONS

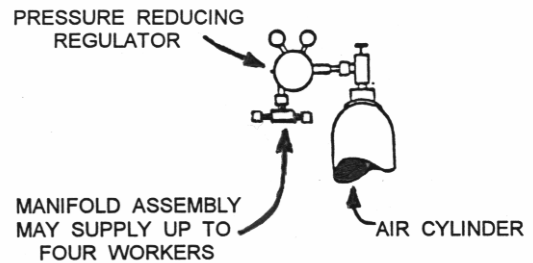
- A. **SUPPLIED AIR RESPIRATOR** - Respirators that provide a respirable atmosphere to the wearer, independent of the ambient air. They are either an airline respirator or SCBA.
1. **AIRLINE (HOSELINE) RESPIRATOR** - Respirable air is supplied through a small diameter airline from a compressor or compressed air cylinder(s). The airline is attached to the wearer by a belt and can be detached rapidly in an emergency. A regulator is provided to govern the rate of airflow to the wearer.
 2. **SELF CONTAINED BREATHING APPARATUS (SCBA)** - Supply of air, oxygen, or oxygen generating material is carried by the wearer and is normally equipped with a full facepiece respirator.
- B. **AIR-PURIFYING RESPIRATOR** - Any respirator equipped with air-purifying cartridges to remove gases, vapors, and particulate matter from the ambient air prior to its inhalation. Air-purifying respirators must not be used in oxygen deficient atmospheres as they do not provide oxygen.
- C. **CEILING VALUE** - The ceiling value is a concentration that should never be exceeded at any time during the day. In the event that instantaneous monitoring is not feasible, then the ceiling value shall be assessed as a 15-minute exposure. (why is this line here...is it needed)
- D. **HAZARDOUS ATMOSPHERE** - Any atmosphere which is either oxygen deficient or which contains a toxic or disease-producing contaminants exceeding the legally established permissible exposure limit (PEL) or, where applicable, the Threshold Limit Value (TLV).
- E. **IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)** - Any atmosphere that poses an immediate hazard to life or produces immediate, irreversible, or debilitating effects on health (i.e. less than 20% oxygen, toxic atmosphere greater than listed IDLH value in Attachment B).
- F. **PEL** - Permissible Exposure Limit as promulgated by OSHA. PEL's are the average airborne exposure to a substance in any 8-hour work shift of a 40-hour work week which shall not be exceeded.
- G. **STEL** - The short term exposure limit is a 15-minute average exposure that an employee shall not exceed at any time during a workday.
- H. **TLV** - Threshold Limit Value as developed by the American Conference of Governmental Industrial Hygienists. TLV's are the average airborne exposure to a substance in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

ATTACHMENT G

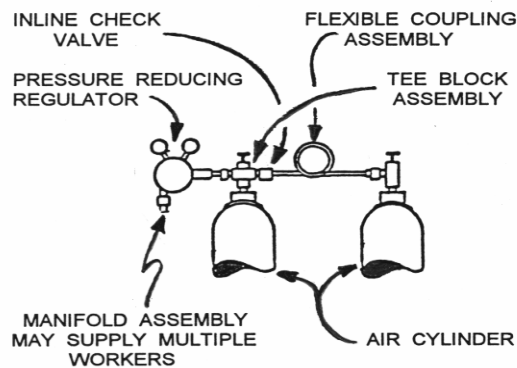
TYPICAL AIR CYLINDER SYSTEM FOR FIELD USE OF SUPPLIED AIR RESPIRATORY PROTECTIVE EQUIPMENT



TYPICAL SINGLE CYLINDER



TYPICAL SINGLE CYLINDER SYSTEM FOR MULTIPLE USERS



TYPICAL CASCADE BREATHING AIR SYSTEM

GENERAL NOTES:

1. Only compressed breathing air cylinders will be used.
2. Maximum allowable hose length per worker is 300 feet (maximum of 3 sections of hoses).
3. A person will monitor compressed breathing air cylinders at ALL times while equipment is in usage.
4. Make sure all hose line connections are tight and not leaking.
5. All compressed breathing air cylinders will be properly secured in an upright position.
6. If a backup person is deemed necessary, due to working environment, the backup person shall work off of a separate breathing air cylinder. Also refer to the respiratory protection procedure for additional instructions.

ATTACHMENT H

CONTRACTORS REQUIRED & INCLUDED TO HAVE A RESPIRATOR PROGRAM

TAR	Civil work (concrete, sewer)	HVAC repair
Routine Process Maintenance	Cooling tower	Insulation work (refractory, fire brick, insulation)
Boiler Repair	Flare	Pest control (weed, insects)
Demolition	Precipitator	Inspection work (tanks, NDT, etc)
Dock Repair	Industrial Cleaning	Vacuum trucks
Drilling	Pipeline construction	Spill cleanup
Tube Repair	Machining	Fire protection
Heat Tracing	Leak repair	Emergency response
Exchanger	Compressor repair	Sulfur drivers
Painting	Valve repair	Coke drivers
Abrasive blasting	Laborers(attendants & firewatches)	
Tank work	Pump & Blower repair	
Hydroblasting	I&E: transmitter work	

CONTRACTORS NOT INCLUDED & NOT REQUIRED TO HAVE A RESPIRATOR PROGRAM

Rail repair	Elevator repair	Crane repair
Rail switching	Fence repair	IT/DCS work
Re-railing	Scale work	Truck/delivery (except sulfur & coke drivers)
Electrical (switchgear, transformers, polelines)	Plumbing	
Janitorial	Consultants	
	Rental companies	