CHAPTER 5: RESPIRATORY PROTECTION
RESPIRATORY PROTECTION PROGRAM

POLICY

Many substances exist in the industrial environment that can prove harmful to a person's respiratory system and overall health. We at J.T. Thorpe & Son, Inc. (JTT) are committed to meeting our moral and legal obligation to protect our employees from these substances and the serious effects they can have.

Some substances can be controlled through engineering techniques, such as ventilation systems. There are, however, situations in which such techniques cannot be applied, and the use of respirator protective equipment becomes necessary.

JTT has established minimum standards for the use of respiratory protection equipment for certain conditions. These minimum standards are detailed below; equipment meeting or exceeding these standards shall be used.

The JT Thorpe and Son Regional Directors and will audit and ensure implementation of the program

- Doyle Tyree Western Operations
- Tony Foster Eastern Operations

The program administrators are the JTT Regional Manpower/Safety Managers

- Richmond – Safety Manager (Neal Garcia)
- La Mirada-Safety Manager (John Towning)
- Tucson- Safety Manager (Larry Duke)
- Salt Lake City-Safety Manager (Chris Craner)
- Chicago- Manpower and Safety Manager Dan Donkin)
- Kentucky- Regional Safety Manager (Ryan Hieneman)
- Pittsburgh Manpower Safety Manager (Daniel Donkin)
- Louisiana – Manpower Safety Manager (Randal Strange)
- Houston – Manpower and Safety Manager (Justin Kasperitis)

They are responsible for providing the following:

MINIMUM RESPIRATORY EQUIPMENT STANDARDS

Respirators for each job are selected based on exposure levels and other workplace factors. The following is a list of respirators that historically provide the minimum protection needed for the specified exposure:

A. Welding in a confined space with positive ventilation ventilation can be achieved. 3M 1/2 Face Respirator 6.000
Some customers require the use of supplied air for any welding performed within a confined space (Shell Oil). Check on customer requirements for respirator use. When they are stricter than Thorpe policy, the customer policy will be followed.

B. Welding in a confined space where positive ventilation cannot be achieved  
Air-supplied

C. Tear-out in a confined space where positive ventilation cannot be achieved  
3M Full-face Respirators 7,000 series with HEPA P100 series filters

D. Tear-out in confined space where positive ventilation can be achieved  
3M Full-face Respirator 6,000 series with HEPA P100 series filters

E. Material mixing operations  
3M 1/2 Face Respirators 6,000 series with HEPA P100 series filters

F. Gunite operations, mixing or shooting  
3M 1/2 face Respirators 6,000 series with HEPA P100 series filters

NOTE: If material being installed is man-made ceramic fibers (MMCF), tear-out is performed on MMCF that has been heated above 1800 degrees °F, resulting in the formation of cristobalite, or if the material being installed or torn out contains cristobalite, additional personal protective equipment consisting of paper coveralls and gloves is required. Be aware that a site-specific safety plan may be written, and thus, followed.

G. Phosphoric acid or acid containing products  
3M 1/2 Face Respirators 6,000 series with stacked Acid/organic vapor cartage 6003 series with HEPA P100 series filter.

The above guidelines have been established to assist field management in the proper selection and use of respirator equipment on the job site. This information ensures that respirator protection meets or exceeds the requirements of state or federal OSHA for
any given exposure. However, there may be instances when there are special requirements; when the client mandates that a different type of respirator be used; or, after careful reevaluation in consultation with JTT safety, JTT management deems a change in the quality of protection necessary.

It is also essential to be familiar with the various Safety Data Sheets (SDS) for any chemicals or construction products requiring the use of respiratory protection. Generally speaking, the equipment and exposures listed will cover over 90% of the job sites that are a part of JTT’s operations.

RESPIRATORY HAZARDS

First, identify and evaluate the hazards present before selecting the appropriate respirator. Respiratory hazards come in the form of dusts, fumes, mists, vapors, and gases. The hazard comes from the presence—or in cases of oxygen, the lack—of a material. A respiratory hazard is a situation when a material can enter the body via inhalation and cause illness or bodily damage.

The types of respiratory hazards to which workers may be exposed can be classified as either acute or chronic. Acute hazards are those hazards that immediately dangerous to life or health (IDLH) and can cause immediate instant or near-instant death (i.e., oxygen deficiency, H2S, Chlorine). Chronic hazards are those hazards that cause permanent damage to health following exposure over a period of time (i.e., asbestos, benzene).

In order to determine the proper respiratory protective equipment to use, classify the materials to which workers will be exposed must be classified into one of the categories listed below:

- **Dusts**: Solid particles generated by handling, crushing, or grinding of organic or inorganic materials. Mixing of dry materials create dusts.

- **Fumes**: Solid particles formed when a molten solid, such as a metal, cools and condenses. Welding is an example of this process.

- **Mists**: Suspended liquid droplets generated from condensing gas to liquid or from breaking up a liquid by splashing or spraying. Spray painting is an example of this process.

- **Vapors**: The gaseous form of a substance normally in the solid or liquid state. Hazardous types include benzene and different types of solvents.

- **Gases**: Normally formless fluid that can only be changed to a liquid by combining pressure and temperature. Examples are H2S, chlorine, ammonia, S02, methane, butane.

OXYGEN DEFICIENCY
The single, most life-threatening respiratory hazard is oxygen deficiency. Normal air contains 21% oxygen by volume. Oxygen levels of 16% or less cannot safely support the respiratory needs of a person. This is why oxygen levels must always be taken into account when evaluating a worker’s respiratory protection equipment.

Oxygen levels must be at least 19.5% by volume if air purifying type respiratory protective equipment is to be used. An oxygen deficient atmosphere is a condition often found in poorly ventilated, confined spaces. This atmosphere is classified as immediately dangerous to life or health (IDLH), can occur in two (2) ways: 1) oxygen is used up by a chemical reaction or 2) oxygen is displaced by another gas.

EVALUATION OF THE HAZARD

Hazard evaluation must be performed by a qualified individual trained in the operation of the proper detection equipment that is provided in each office. If you are not qualified, contact the owner’s personnel or the local JTT Manpower Safety representative to properly evaluate the hazard.

If the hazard identification and evaluation is performed by a person or persons other than yourself, they should advise you in writing of their findings (i.e. stated on the vessel entry permit).

ASSIGNED PROTECTION FACTOR

Each type of respirator is given an “Assigned Protection Factor” (APF), which represents how much protection is provided by that type of respirator. The APF times the chemical’s exposure limit (PEL or TLV®) is the maximum concentration that an employee can be exposed to when wearing a properly fitted respirator. The table below lists the APFs for the respirators that we commonly use.

<table>
<thead>
<tr>
<th>Respirator Type</th>
<th>Assigned Protection Factor (APF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-Purifying Half-mask</td>
<td>10</td>
</tr>
<tr>
<td>Air-Purifying Full-face piece</td>
<td>50</td>
</tr>
<tr>
<td>Supplied-Air (Airline) Respirator Demand Half-mask</td>
<td>10</td>
</tr>
<tr>
<td>Supplied-Air (Airline) Respirator Demand Full face mask</td>
<td>50</td>
</tr>
<tr>
<td>Supplied-Air (Airline) Respirator Continuous flow Half-mask</td>
<td>50</td>
</tr>
<tr>
<td>Supplied-Air (Airline) Respirator Continuous flow Full-face mask or Hood</td>
<td>1000</td>
</tr>
<tr>
<td>Supplied-Air (Airline) Respirator Pressure-demand Full-face mask</td>
<td>1000</td>
</tr>
<tr>
<td>Self-Contained Breathing Apparatus (SCBA) - Pressure-demand mode</td>
<td>10,000</td>
</tr>
</tbody>
</table>
RESPIRATORS AND THEIR LIMITATIONS

There are two main categories of respirators we use in our work: air purifying respirators and air-supplied respirators.

AIR PURIFYING RESPIRATORS

Air purifying respirators do just what the words imply—they purify the air by removing airborne contaminants—however, they do not supply oxygen if there is a deficiency. Air purifying respirators with filters are designed to remove particulate (dusts, mists, or fumes) from the air. This is the type of respirator used for the majority of our work. The 3M half-face and full-face, used with the different filter cartridges, are air purifying respirators.

LIMITATIONS OF AIR PURIFYING RESPIRATORS—DO NOT USE

DO NOT USE AIR PURIFYING RESPIRATORS UNDER THE FOLLOWING CONDITIONS:

- Oxygen deficient atmospheres
- Atmospheres immediately dangerous to life or health (IDLH)
- Atmospheres where the contaminant level is greater than the APF for the respirator times the allowable exposure (PEL or TLV®).

BREAKTHROUGH

Air-purifying respirators for gas or vapor contaminants have a fixed capacity to remove the contaminant. If the air-purifying element becomes saturated, “breakthrough” occurs, meaning respirator wearer will begin to inhale the contaminant. To prevent breakthrough, OSHA regulations require that a respirator cartridge change-out schedule be determined from air sampling data. Always change the respirator cartridge (or discard a single-use respirator) at the interval specified in the respirator job instructions. For some chemicals, taste, smell, or irritation may signal breakthrough, but for many chemicals, there will be no warning that breakthrough has occurred.

AIR-SUPPLIED RESPIRATORS

Occasionally, we must work in environments that require the use of air-supplied respirators. No one will be allowed to use air-supplied respirators until they have been specifically trained on the equipment to be used, including the emergency escape pack.
**RESPIRATOR EQUIPMENT PURCHASE**

All respirator equipment must be "approved" equipment for the protection against the particular contaminant found. All respirator equipment shall have NIOSH approval certification. Unless the customer requires a different type of respirator, all JTT respirators will be 3M type for the purpose of continuity between the JTT offices. This allows JTT workers fit tested in one office to use respirators assigned from another.

**EMPLOYEE SCREENING/MEDICAL EVALUATION**

OSHA standards require that any employee required to wear respiratory protection first be able to pass a medical/physical examination demonstrating their ability to wear the equipment without being a threat to their health. All employees are required to pass a pre-placement physical exam prior to being issued respirator equipment. An exam must meet or exceed the specifications established by OSHA. This includes the specific OSHA medical questionnaire.

In addition, any other medical evaluation that a client may require, or JTT management deems necessary will be performed (e.g., Pulmonary Function tests (PFTs)). All records regarding medical evaluations will be maintained in accordance with 29CFR 1910.1020.

**ISSUANCE OF RESPIRATORY EQUIPMENT**

Our half-face respirators will be assigned to each worker; equipment shall not be transferred from one worker to another. A new respirator will be provided upon request.

**RESPIRATOR FIT TEST**

Fit tests are essential to ensuring that respirator masks form a good seal against the wearer’s face, preventing the leak of contaminants.

When a respirator is first issued, the wearer should try a variety of sizes to get a comfortable fit. For air purifying half- or full-face masks, a qualitative test using irritant smoke will be administered by a JTT employee who has been certified to perform fit testing. All JTT workers will also be trained to perform a Negative pressure fit and Positive pressure fit test each time they put a respirator on.

**EQUIPMENT MAINTENANCE**

All JTT employees will be trained how to inspect and maintain their half-face respirator by the worker administering the fit test. All workers shall store their respirator in the plastic bag provided. Prior to placing the face piece in the bag, the worker must clean the face piece with the provided wipes and remove the filters. If there is any question about the cleanliness of the respirator, the worker will be assigned a new face piece.
All full-face respirators must also be stored in the plastic bag provided. The respirator is to be wiped clean and filters removed prior to storage.

If the full-face respirator has been damaged or contaminated, or the worker is finished with the assigned respirator, it should be turned in to the tool room to be sent back to the JTT yard. The respirator is then cleaned and inspected for proper working condition prior to being made ready to be sent out to the job. This is done by an employee who has been properly trained and approved to perform respirator maintenance work.

After maintenance and cleaning, the full-face respirator is placed in a sealed plastic bag and stored in the proper designated area in the warehouse, away from sunlight.

**PROGRAM AND SITE EVALUATION**

Periodic inspections and safety surveys will be performed to ensure that the necessary respiratory program is effectively being implemented in the field. Changes will be made if surveys indicate they are required.

Since each job site is different, hazard identification must be coordinated with the owner. Proper respirator selection must be based on hazard surveys and the owner's requirements.

**SUPPLIED AIR BREATHING SYSTEM**

**AIR SUPPLY**

This equipment is designed for protection against dust, silica, or airborne fibers only. This equipment is NOT to be used in any area immediately hazardous to your health.

When using an air compressor or electric air pump as the air supply, the equipment must be equipped with two safety alarms. One alarm will sound if the compressor shuts down for any reason. The second alarm will sound if the temperature of the discharge air exceeds normal operating temperature. It is important that the air supply equipment be placed so that it does not draw contaminated air into the air intakes.

**RESPIRATORY AIR FILTER SYSTEM**

**MODEL 3SS-3C**

A ¾” air-line is used from the compressor or air pump to the filter system. Blow out the air supply line before connecting to the filter system. The filter system is rated for 300 psi air pressure. Normal air pressure readings are in the 90 to 110 psi range. The air valve next to the supply line connection should be in the “off” position when connecting the ¾” supply line.
Next, open the water trap valve at the bottom of the first filter and turn the system on, letting air-flow through the water trap for two minutes. Drain the water from the filter system at least twice a day. Set the outlet pressure to 100 psi by rotating the cap at the bottom of the regulator.

The moisture indicator located next to the pressure relief valve on top of the filter system should be blue in color when air is flowing through the system. A change in the color of the moisture indicator from blue to pink indicates excess moisture in the system. When this occurs, change the three disposable cartridges as instructed in the operating instructions under “Maintenance.”

Inline filters must be in place. The filters should be replaced if there is any change in the odor or taste of the air. The compressor will be placed in a clean atmosphere. Inline purification system will be tagged to indicate date of change out. A carbon monoxide monitor will be in place with alarm set at 10 PPM. All fittings for the system will be incompatible with non-respirable gasses and containers.

**TESTING**

By law, all airline-breathing systems must be tested daily for air quality. A carbon monoxide (CO) tester is provided with each filter system. A reading of 10 ppm (parts per million) is the maximum allowable. A written record of the test must be kept even if a zero reading is recorded. Instructions for the use of the CO tester are included with the instrument.

**AIR BREATHING SETTINGS FOR ELECTRIC COMPRESSOR**

- AUTOMATIC START SET AT 100 PSI.
- AUTOMATIC STOP SET AT 125 PSI.
- HIGH TEMPERATURE SHUTDOWN SET AT 350 DEGREES F.
- RELIEF VALVE SET AT 150 PSI.
- USE SAE 30 wt. OIL ONLY (DO NOT OVERFILL)
- MOTOR WIRED FOR 440 VOLTS, 3 PHASE.
- 5 H.P.
- 208-230/460 VOLTS
- 14.8-14/7 AMPS.
- 1725 RPM.
- 40-C-AMD-CONT-F RATING.
CUSTOMER SUPPLIED BREATHING AIR

Our filter system should not be used with customer supplied breathing air unless all the following questions have been answered completely:

1. *Do you have any other air line respirators in the plant?*

2. *Where is the compressor intake?*

   This is a key question. The intake may be near sources of CO and other contaminants. Is the intake near furnace exhaust or other similar equipment?

3. *Does the compressor use much oil? How much?*

   Sometimes the compressor is so worn that gallons of oil can flow by the piston rings each day.

4. *What concentrations of CO are in the compressed air?*

5. *Do you have any water condensation problems in your air lines?*

6. *What type of back-up system do you have for your compressor?*

   Most plants have a standby compressor that can supply the plant if the main compressor breaks down, but a few plants use compressed nitrogen as a back-up system. Find out what type of back-up system the customer has, and if it is not air be certain it is not in use and locked out.

7. *Are outlets of your non-air system incompatible with the air line couplings on your compressed air system? In other words, is there any way that we could be plugged into something other than air?*

   Take as much time on this point as needed to be confident that this cannot happen.

8. After your equipment is connected to the air supply, let the system operate a few minutes before putting anyone into a mask. Watch the moisture indicator for any obvious signs of oil or water build up.

BOTTLED BREATHING AIR

The Robert Shaw respirator can also be used with a bottled air supply. When using bottled air, the filter system is not required. Bottled air works well if supplying one or two masks for a short period of time, but bottles cannot supply the volume of air necessary to operate our mask longer than an eight-hour period. The air bottle must be equipped with a regulator that reduces the outlet pressure to 100 psi or less.
If breathing air is to be supplied it will be “GRADE D BREATHING AIR”. OSHA requires that if we purchase breathing air from an outside vendor, the vendor must provide a “Certificate of Quality” stating that it meets Grade D criteria.

**RESPIRATORY PROTECTION PROCEDURE**

1.0 **Purpose**

A. This procedure details the proper selection, use, and care of respiratory protective equipment. Adherence to these procedures provides protection to the employee and meets the respiratory protection requirements of the Occupational Safety and Health Act.

B. This procedure shall not be used as a substitute for generally accepted engineering control measures against air contaminants.

2.0 **General**

A. Respirators shall be worn at all times where work is necessary in contaminated areas or oxygen deficient atmospheres.

B. The employee shall use the provided respiratory protection in accordance with instructions and training.

C. Persons shall not be assigned to tasks requiring use of respirators unless they are determined physically capable of performing the work when utilizing the equipment.

3.0 **Approved Respirators**

A. In order to assure the maximum amount of respiratory protection, NIOSH certified respirators shall be used for the specific hazard to be encountered.

B. Certified respirators shall only be used for their originally intended purpose and shall not be modified in any way.

4.0 **Selection**

A. In selecting a respirator, the following factors shall be considered:

   1. Nature of the hazard
   2. Extent of the hazard
   3. Contaminant(s) present
   4. Concentration of the contaminant(s)
5. Characteristics and limitations of the available respirators

6. Expected activity of the worker

B. Tables 1 and 2 shall be referenced in selecting a respirator.

C. Only the following respiratory protective apparatus shall be used in oxygen deficient atmospheres, or where the contaminant might be immediately dangerous to life:

1. Self-contained breathing apparatus.

2. Combination air-line respirator and self-contained breathing apparatus.

D. Self-contained breathing apparatus rated for at least 30 minutes of service time shall be used for entry into an irrespirable atmosphere. These apparatus shall have a "remaining service life" indicator or warning for compressed breathing air (except for self-rescue).

E. When the device is a combination self-contained breathing apparatus and air-line respirator, either a manual or automatic valve shall be provided to change to the self-contained air supply in case the air-line supply fails. Fifteen (15) minute work shifts shall be used for emergency egress and not for rescue work or re-entry.

F. In areas where contaminant levels are expected to be higher than the designated level for an air-purifying respirator, all employees will be provided with an airline respirator.

5.0 Use and Limitations

A. Air-purifying respirators shall not be used for rescue work or for emergency work of any nature, due to the following reasons:

1. These respirators do not supply oxygen; therefore, they do not protect against possible oxygen deficiencies.

2. Chemical cartridge respirators are intended for use in low contaminant levels (10 times the PEL for half-masks and 50 times the PEL for full-face masks).

3. Respirators are issued for the exclusive use of an individual, and shall be marked with the individual's name or badge number.

B. Canisters and cartridges shall be specifically selected for the toxic gas and concentration to be encountered. Canister masks that bear the label "ALL-SERVICE," "ALL-PURPOSE," or "UNIVERSAL" or similar notations shall not be used.
C. An effective seal between the face piece and face to prevent inward leakage must be obtained. Air purifying respirators along with the demand type respirators operate under negative pressure when the wearer inhales, thus some inward leakage of contaminant may be possible.

D. If the temple bars of eyeglasses extend through the sealing edge of full-face masks, a proper seal cannot be obtained.

1. Glasses with short temple bars or without temple bars may be taped to the wearer's head. Full-face masks have been developed with systems for mounting corrective lenses inside the face piece.

2. The wearer's use of spectacles or goggles should not interfere with a half-mask face piece.

E. A heavy beard or sideburns interfere with obtaining a proper seal. Where the use of respirators is required, restrictions on facial hair shall be strictly enforced.

F. An extensive list of instructions in use and precautions for each type of respirator are given in ANSI Z88-2, *Practices for Respiratory Protection*. 
G. A standby person equipped with a Scott air pack is required for all work that involves the following:

1. Self-contained breathing apparatus.

2. Combination of air-line respiratory and self-contained breathing apparatus.

3. Work in confined spaces, which require air-line respiratory protection (for purposes other than nuisance odor or nuisance dust).

6.0 Precautions

A. Respirators usually provide a satisfactory pathway for speech transmission over short distances in relatively quiet areas. An alternate form of communication between workers shall be established where respirators are used in noisy areas.

B. To prevent face pieces from fogging up in low temperatures, anti-fog compounds should be used to coat the inside of the eyepiece.

C. Pure oxygen shall not be used in supplied air respirators.

D. Although self-contained breathing apparatuses have no concentration limit, many toxic gases are flammable. Working in or near the flammable range of a gas or vapor is prohibited. Company confined space entry procedures shall be observed.

E. Hoses for air supply should be selected to resist possible damage from chemicals to which they may be exposed.

7.0 Respirator Care

A. A centralized maintenance, cleaning and storage station shall be used to care for respiratory protective equipment.

1. Inspection

   a. All air purifying respirators in use shall be inspected frequently and the results of inspection recorded on Form RP-1.

   b. Self-contained breathing apparatus and other emergency respirators shall be inspected and the results recorded monthly (Form RP-2). This is to be done before each use and during periods of storage.
c. The complete air line respiratory system should be checked before each use.

2. Maintenance

a. To replace worn or deteriorated part(s), only those made specifically for the device shall be used, and repair work shall be recorded (Form RP1).

b. Air-purifying cartridges should be replaced according to the time schedule for the job. Even before the specified replacement interval, replace at the first trace of contaminant odor or any increased resistance difficulty in breathing while wearing the respirator.

3. Cleaning and Disinfecting

a. Respirators for the exclusive use by one worker should be cleaned after each day’s use, or more often as necessary. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use.

4. Storage

a. Respirators shall be stored in a convenient, clean, and sanitary location, preferably in a protective plastic bag.

8.0 Training

A. Each employee using respiratory protective equipment shall be trained in the proper selection, use, maintenance and storage of the respirator. Respiratory protection training shall be documented (see section 3).

B. Every respirator wearer shall receive fitting instructions, including demonstration and practice in how to wear the respirator and how to determine if it fits properly. The employee will be trained in using the positive and negative pressure tests to determine the fit of the respirator. Quantitative or qualitative fit testing is required before using a respirator.

C. Prior to a respirator being assigned, users shall be instructed in the nature of the hazard for which respiratory protection is being provided and informed of the possible consequences if exposed without adequate protection. This training also includes information on fit, use, signs and symptoms of exposures, signs and symptoms of effective use, and other issues outlined in this program. Update training on the use of respirators will be provided annually.
FRESH AIR TRAINING OUTLINE

(“Fresh Air” is a term sometimes used for an air-line respirator supplied from a compressed air cylinder.)

1. **Purpose of Fresh Air**
   A. To provide breathing air in a toxic or dangerous atmosphere.

2. **Some Chemicals Normally Found in a Refinery**
   A. H2S (Hydrogen Sulfide)
   B. SO2 (Sulfur Dioxide)
   C. Benzene
   D. Phenol
   E. Acid Gases

3. **Physical Properties of H2S**
   A. Found in refineries, sewers, chemical plants, sulfur-processing facilities, oil field drilling operations. H2S is not normally present in the areas where JJT performs work. Exposure to H2S would occur in the event of an emergency release. Depending upon location, site area monitors or personal H2S detectors will be used. If area monitors are used, JTT workers will be trained on the detectors. If personal detectors are used, JTT will supply a detector for each employee and train the worker on the manufacturer-recommended procedures for usage.
   
   B. H2S is heavier than air and settles in low-lying areas.
   
   C. Wind helps to disperse H2S.
   
   D. H2S has no color and burns pale blue.
   
   E. H2S will ignite without flame or spark at 518 degrees Fahrenheit.
   
   F. Some examples of possible ignition sources:
      1. Coffee pot heating element
      2. Quartz lights
      3. Catalytic converters
      4. Cigarettes
5. Static electricity discharge

G. Has a distinct rotten egg odor

H. Paralyzes the sense of smell at relatively low concentrations. You may not smell H2S after a while, but do not assume it is gone.

If the monitor alarms sound, all JTT workers must leave the area per the site-specific safety plan. Workers cannot re-enter until all is clear, regardless of air-supplied respirators with self-contained cylinders being available.

4. First Aid Information for H2S

A. H2S paralyzes the nerve that controls breathing and reduces the blood’s ability to carry oxygen.

B. In high concentrations of H2S, breathing can stop in a matter of seconds.

C. Symptoms can include chest pain, dizziness, headache, cough, weakness, irritated eyes, and throat.

D. Remove victim from danger, bring into fresh air, and call first aid.

5. Fresh Air Permits

A. Always read the permit for yourself; it is your life at stake.

B. Check for proper dates and times.

C. Follow all precautions listed on the permit. Do not assume that you can do something not listed, or that you cannot do something you should.

6. Fresh Air Checklist

A. The checklist is for the worker’s benefit and is designed to see that all safety aspects of the job are covered.

B. The supervisor must complete the checklist before each job.

7. Barricades

A. Barricade according to type of chemical, wind conditions, etc.

B. The bottle man and rescue man must be outside of the barricade and upwind.

8. Escape Route
A. Always know your escape route before starting the job.
B. Always have at least two escape routes besides the block and tackle, tugger, picker, etc.
C. Have a block and tackle, tugger, etc., set up for rescue when working above or below ground level.
D. Keep hose lines free and run along escape routes.
E. JTT workers will not re-enter the work area until the area is all clear of H2S.

9. Personal Precautions
A. Leave gum, cigarettes, chewing tobacco, sunflower seeds, etc., out of the barricaded area.
B. Use earplugs on H2S jobs.
C. Do not wear contacts or glasses for fresh air work.

10. Personnel Required To Do a Fresh Air Job
A. Supervisor or foreman
B. Bottle watch
C. Rescue man with Scott pack
D. Workers to do the job

11. Always Check Your Own Equipment
A. Pressure on gauge
B. Visual inspection of connections, hose lines, valves, straps, etc.

12. Cover the Scott Air Pack
A. 2.2 thirty-minute pack most commonly used in Citgo.
B. 4.5 forty-five minute pack has hose line for connection to a wheeled unit.
C. Ask for a volunteer to don pack and observe, stop, and demonstrate proper donning if necessary.
D. Show tank valve and gauge.
E. Show regulator assembly and explain valves.
F. Show where mask hose attaches.
G. Allow each person to don pack, if time allowed.

13. **Cover Bottle Cart**

A. Hook up bottles and explain working and backup tanks.
B. Explain when to use backup tank, for emergencies and to switch working tanks.
C. Explain gauge and regulator assembly. Switch working tanks at 500 lbs.
D. Operate between 90 and 100 PSI.
E. Show connections at manifold and escape pack.
F. Show donning of escape pack and connections.
**TABLE I**

**GUIDE FOR THE SELECTION OF RESPIRATORS**

<table>
<thead>
<tr>
<th>HAZARD</th>
<th>RESPIRATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXYGEN DEFICIENCY (Including possible H2S exposures)</td>
<td>Self-contained breathing apparatus. Combination air-line respirator with auxiliary self-contained air supply or an air storage receiver with alarm.</td>
</tr>
<tr>
<td>GAS AND VAPOR CONTAMINANTS</td>
<td>Self-contained breathing apparatus. Air purifying, full-face piece respirator with chemical canister (gas mask). Self-rescue mouthpiece respirator (for escape only.) Combination air-line respirator with auxiliary self-contained air supply or an air storage with alarm.</td>
</tr>
<tr>
<td>Immediately dangerous to life or health</td>
<td>Air-line respirator. Air purifying, half-mask respirator with chemical cartridge.</td>
</tr>
<tr>
<td>Not immediately dangerous to life or health</td>
<td></td>
</tr>
<tr>
<td>PARTICULATE CONTAMINANTS</td>
<td>Self-contained breathing apparatus. Combination air-line respirator with auxiliary self-contained air supply or an air storage receiver with alarm.</td>
</tr>
<tr>
<td>Immediately dangerous to life or health</td>
<td>Air purifying, half-mask, or mouthpiece with filter pad or cartridge. Air-line respirator. Air-line abrasive blasting respirator.</td>
</tr>
<tr>
<td>Not immediately dangerous to life or health</td>
<td></td>
</tr>
<tr>
<td>COMBINATION GAS, VAPOR, PARTICULATE CONTAMINANTS</td>
<td>Self-contained breathing apparatus. Combination air-line respirator with auxiliary self-contained air supply or an air storage receiver with alarm.</td>
</tr>
<tr>
<td>Immediately dangerous to life or health</td>
<td></td>
</tr>
<tr>
<td>Not immediately dangerous to life</td>
<td>Air-line respirator. Air purifying, half-mask respirator with chemical cartridge and appropriate filter.</td>
</tr>
</tbody>
</table>

**Note:** For abrasive blasting, a NIOSH approved Type CE air-line respirator is required.
### TABLE 2

**BREATHING AIR QUALITY**

*(COMPRESSED GAS ASSOCIATION G-7.1 SPECIFICATIONS)*

<table>
<thead>
<tr>
<th>GAS</th>
<th>CONTENT ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESPIRATORS AND THEIR LIMITATIONS</strong></td>
<td>19.5% minimum to 23% maximum</td>
</tr>
<tr>
<td>There are two main categories of respirators we use in our work: air purifying respirators</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>10 ppm maximum</td>
</tr>
<tr>
<td>CO2</td>
<td>1000 ppm maximum</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>5 mg/m³ maximum (as condensable)</td>
</tr>
<tr>
<td>H2O</td>
<td>Dew point less than the lowest temperature to be encountered</td>
</tr>
<tr>
<td>Odor</td>
<td><strong>RESPIRATORS AND THEIR LIMITATIONS</strong></td>
</tr>
<tr>
<td></td>
<td>There are two main categories of respirators we use in our work: air purifying respirators</td>
</tr>
</tbody>
</table>
FACIAL HAIR POLICY

California OSHA Regulations require that respiratory protection be worn under certain conditions. These regulations require a gas- have been found to hinder the seal of the respirator protection device and therefore endanger the wearer.

Customers are now enforcing this regulation for all persons working in their refineries and chemical plants. For our mutual benefit, J.T. Thorpe & Son requires that all of its employees, subcontractors, vendors, and employees be clean-shaven so that respirators seal properly. Trimmed mustaches are permissible, provided they do not pass through the respirator mask-to-face seal area or otherwise interfere with the seal.

The following is a partial list of elements and conditions that, when present, require respirator use:

- S02 GAS
- H2S GAS
- Toxic fumes from acid mortars
- Toxic fumes from special glues
- Ceramic fiber dust
- Refractory dust
- Carbon dust

These conditions not only present themselves on field jobsites, but also in our maintenance yard.

Employees who are not in compliance will be turned back without compensation.

Due to unpredictable work assignments along with the necessity for flexibility, no one is exempt from this policy.