Applicable OSHA Standards: 29 CFR 1910.134

1. Purpose

1.2. The purpose of this policy is to comply with the OSHA standards on Respiratory Protection.

2. Scope

2.2. This program applies to all Cleveland Integrity Services Inc. controlled work locations where an employee or a subcontract employee may be occupationally exposed to respiratory hazards.

3. Responsibilities

3.1. MANAGEMENT - It is management's responsibility to determine what specific applications require use of respiratory equipment. Management must also provide proper respiratory equipment to meet the needs of each specific application. Employees must be provided with adequate training and instructions on all equipment.

3.2. MANAGEMENT/SUPERVISORY - Superintendents, supervisors, foremen, or group leaders of each area are responsible for insuring that all personnel under their control are knowledgeable of the respiratory protection requirements for the areas in which they work. They are also responsible for ensuring that their subordinates comply with requirements of this respiratory program, including proper respirator inspection, use, cleanliness, sanitation, storage and maintenance.

3.3. EMPLOYEES - It is the responsibility of the employee to have an awareness of the respiratory protection requirements for their work areas (as explained by management), according to proper instruction, and for maintaining equipment in a clean, sanitary and operable condition.

4. Requirements & Guidelines

4.1. The Company Safety Coordinator is designated as the program administrator and will be qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

4.2. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program will be to prevent atmospheric contamination.

4.3. This will be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials).

4.4. Respirators, medical evaluation, fit testing and training will be provided by the Company at no cost to employees when such equipment is necessary to protect the health of the employee. The Company will provide the respirators which are applicable and suitable for the purpose intended. The Safety Coordinator will be responsible for the establishment and maintenance of a respiratory protection program.

4.5. The guidelines in this program are designed to help reduce employee exposures against occupational dusts, fumes, mists, radionuclide, gases and vapors.

4.6. The primary objective is to prevent atmospheric exposure to these contaminants.

4.7. Where feasible, exposure to contaminants will be eliminated by engineering controls (for example, general and local ventilation, enclosure or isolation, and substitution of a less hazardous process or material).

4.8. When effective engineering controls are not feasible, use of personal respiratory protective equipment may be required to achieve this goal and will include the following components, as applicable:

4.9.1. Selection of respirators

4.9.2. Medical evaluation

4.9.3. Fit testing

4.9.4. Types of respiratory equipment and their use

4.9.5. Maintenance and care of respirators

4.9.6. Breathing air quality and use

4.9.7. Identification of filters, cartridges, and canisters

4.9.8. Employee training and information

4.9.9. Program evaluation

4.10. In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required, the Company will establish and implement a written respiratory protection program with worksite-specific procedures. The program will be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer will include in the program the following provisions of this section, as applicable:

4.10.1. Procedures for selecting respirators for use in the workplace;

4.10.2. Medical evaluations of employees required to use respirators;

4.10.3. Fit testing procedures for tight-fitting respirators;

4.10.4. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

4.10.5. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

4.10.6. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

4.10.7. Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

4.10.8. Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

4.10.9. Procedures for regularly evaluating the effectiveness of the program.

4.11. The Company will select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

4.12. The Company will select a NIOSH-certified respirator. The respirator will be used in compliance with the conditions of its certification.

4.13. The Company will identify and evaluate the respiratory hazard(s) in the workplace. This evaluation will include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the Company cannot identify or reasonably estimate the employee exposure, the employer will consider the atmosphere to be IDLH.

4.14. The Company will select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

4.15. The employer will provide the following respirators for employee use in IDLH atmospheres:

4.15.1. A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

4.15.2. A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

4.15.3. Respirators provided only for escape from IDLH atmospheres will be NIOSH-certified for escape from the atmosphere in which they will be used.

4.16. All oxygen-deficient atmospheres will be considered IDLH, except if the Company can demonstrate that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in the table at right (for the altitudes set out in the table at right), then any atmosphere-supplying respirator may be used.

TABLE II

Altitude (ft.)	Oxygen deficient Atmospheres (% O_2) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.0–19.5
3,001–4,000	16.4–19.5
4,001–5,000	17.1–19.5
5,001–6,000	17.8–19.5
6,001–7,000	18.5–19.5
7,001–8,000[1]	19.3–19.5.

[1] Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

4.17. The Company will provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

4.18. The Company will not permit respirators with tight-fitting face pieces to be worn by employees who have:

4.18.1. Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

4.18.2. Any condition that interferes with the face-to-facepiece seal or valve function.

4.19. If an employee wears corrective glasses or goggles or other personal protective equipment, the Company will ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

4.20. For all tight-fitting respirators, the Company will ensure that employees perform a user seal check each time they put on the respirator using safety procedures in 29 CFR 1910.146 Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1.

4.21. Appropriate surveillance will be maintained of work area conditions and degree of employee exposure or stress.

4.22. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the Company will reevaluate the continued effectiveness of the respirator.

4.23. The Company will ensure that employees leave the respirator use area:

4.23.1. To wash their faces and respirator face pieces as necessary to prevent eye or skin irritation associated with respirator use; or

4.23.2. If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece; or

4.23.3. To replace the respirator or the filter, cartridge, or canister elements.

4.24. If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, the Company must replace or repair the respirator before allowing the employee to return to the work area.

4.25. For all IDLH atmospheres, the Company will ensure that:

4.25.1. One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

4.25.2. Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

4.25.3. The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

4.25.4. The Company representative or designated supervisor is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue; and

4.25.5. The representative or designated supervisor authorized to do so by the Company, once notified, provides necessary assistance appropriate to the situation.

4.26. Employee(s) located outside IDLH atmospheres are equipped with:

4.26.1. Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

4.26.2. Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

4.26.3. Equivalent means for rescue where retrieval equipment is not required.

4.27. Appropriate surveillance will be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the Company will reevaluate the continued effectiveness of the respirator.

5. Maintenance & Care of Respirators

5.1. The Company will provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

5.2. The Company will provide each respirator user with a respirator that is clean, sanitary, and in good working order. The Company will ensure that respirators are cleaned and disinfected using procedures required by OSHA, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness.

5.3. The respirators will be cleaned and disinfected at the following intervals:

5.3.1. Respirators issued for the exclusive use of an employee will be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

5.3.2. Respirators issued to more than one employee will be cleaned and disinfected before being worn by different individuals;

5.3.3. Respirators maintained for emergency use will be cleaned and disinfected after each use; and

5.3.4. Respirators used in fit testing and training will be cleaned and disinfected after each use.

5.4. The Company will ensure that all respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they will be packed or stored to prevent deformation of the face piece and exhalation valve.

5.5. Additionally, emergency respirators will be:

5.5.1. Kept accessible to the work area;

5.5.2. Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

5.5.3. Stored in accordance with any applicable manufacturer instructions.

5.6. The Company will ensure that respirators are inspected as follows:

5.6.1. All respirators used in routine situations will be inspected before each use and during cleaning;

5.6.2. All respirators maintained for use in emergency situations will be inspected at least monthly and in accordance with the manufacturer's recommendations, and will be checked for proper function before and after each use; and

5.6.3. Emergency escape-only respirators will be inspected before being carried into the workplace for use.

5.7. The Company will ensure that respirator inspections include the following:

5.7.1. A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

5.7.2. A check of elastomeric parts for pliability and signs of deterioration.

5.8. In addition to other requirements of this program, self-contained breathing apparatus will be inspected monthly. Grade D air cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The Company will determine that the regulator and warning devices function properly.

5.9. For respirators maintained for emergency use, the Company will:

5.9.1. Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

5.9.2. Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information will be maintained until replaced following a subsequent certification.

6. Selection Of Respirators

6.1. Respirators are selected and approved by management. The selection is based upon the physical and chemical properties of the air contaminants and the concentration level likely to be encountered by the employee.

6.2. The respirator program administrator will make a respirator available immediately to each employee who is placed as a new hire or as a transferee in a job that requires respiratory protection. Replacement respirators/pre-filters will be made available as required. The Respirator Program Administrator for Cleveland Integrity Services Inc. is the Company Safety Director.

6.3. Standard respirators currently approved by this Company are:

6.3.1. 3M "EASI-AIR" 7200S -- Dual Cartridge Respirator

6.3.2. 3M 8210 -- N95 Particulate Respirator

6.3.3. MSA "COMFO II ELITE" 7-201 -- Dual Cartridge Respirator

6.3.4. Gerson 1730 -- N95 Particulate Respirator

6.4. More than one hazard may exist for a given operation and more than one respirator could be used to protect against a number of different air contaminants. Correct respirator selection for each situation however, is a complex job.

6.5. Before proper respiratory protection can be assigned, we must consider the nature of the hazard, extent and limitations of respirators. It is important to select the right equipment for the job.

6.6. Evaluation of exposure to a toxic air-borne material necessitates:

6.6.1. Identifying the type of contaminant (mist, dust, vapor, gas, and fume).

6.6.2. Logging the name of the contaminant.

6.6.3. Listing pertinent physical and chemical properties (LEL, Flash Point, etc.)

6.6.4. Estimating or monitoring the concentration of the contaminant in the breathing zone and immediate work area.

6.6.5. Noticing the Threshold Limit Value (TLV) -- both OSHA and ACGIH recommended levels.

6.6.6. Comparing the surveyed levels to the recommended exposure limits. (Ceiling, short term, time-weighted average).

6.6.7. Noting odor threshold, IDLH level, warning properties and if contaminant is an eye irritant.

6.6.8. Evaluating whether the contaminant can be trapped by a given sorbent efficiently; or would react with filter media.

6.6.9. Recording if the contaminant may cause systemic poisoning by absorption through the skin.

6.7. The toxicology of a given contaminant can be assessed when all information outlined above is evaluated on a respirator selection work sheet.

6.8. The overall protection afforded by a given respirator design (and mode of operation) may be defined in terms of its assigned protection factor (APF). The APF is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of contaminant in the ambient atmosphere to that inside the enclosure (usually inside the face piece) under conditions of use.

6.9. Respirators should be selected so that the concentration inhaled and the APFs are selection and use guides. These guides should only be used when the employer has established a minimal acceptable respirator program as defined in Section 3 of the ANSI Z88.2-1969 Standard.

6.10. In addition to face pieces, this includes any type of enclosure or covering of the wearer's breathing zone, such as supplied-air hoods, helmets or suits.

6.11. Review should include dusts, mists, and fumes only. Consideration does not apply when gases or vapors are absorbed on particulates and may be volatilized or for particulates volatile at room temperature. Example: coke oven emissions.

6.12. Review also should be given to any single-use dust respirator (with or without valve) not specifically tested against a specified contaminant.

6.13. Dust filter refers to a dust respirator and includes all types of media -- that is, both non-degradable mechanical type media and degradable resin- impregnated wool felt or combination wool-synthetic felt media.

6.14. Fume filter refers to a fume respirator approved by the lead fume test. All types of media are included.

6.15. High-efficiency filter refers to a high-efficiency particulate respirator filter with at least 99.9% efficiency against 0.3 microns in accordance with NIOSH specifications.

6.16. For gases and vapors, an APF should only be assigned when published test data indicate the cartridge or canister has adequate sorbent efficiency and service life for a specific gas or vapor. In addition, the APF should not be applied in gas or vapor concentrations that are: (1) immediately dangerous to life, (2) above the lower explosive limit, and (3) cause eye irritation when using a half mask.

6.17. A positive pressure supplied-air respirator equipped with a half-mask face piece may not be as stable on the face as a full face piece. Therefore, the APF recommended is half that for a similar device equipped with a full face piece.

6.18. A positive pressure supplied-air respirator equipped with a full face piece provides eye protection but is not approved for use in an atmosphere that is immediately dangerous to life.

6.19. The design of the supplied-air hood, suit, or helmet (with a minimum of 170 liters/min. of air) may determine its overall efficiency and protection. For example, when working with the arms over the head, some hoods draw the contaminant into the hood-breathing zone. This may be overcome by wearing a short hood under a coat or overalls. Other limitations specified by the approval agency must be considered before using in certain types of atmospheres.

6.20. The SCBA operated in the positive pressure mode has been tested and the face piece recorded as < 0.01% penetration. Therefore, a PF of 1,000 + is recommended. At this time, the lower limit of detection 0.01% does not warrant listing a higher number. A positive pressure SCBA for an unknown concentration is recommended. This is consistent with the 1,000 + that is listed. It is essential to have an emergency device for use in unknown concentrations. A combination supplied-air respirator in pressure-demand or other positive pressure mode, with

auxiliary self-contained air supply, is also recommended for use in unknown concentrations of contaminants immediately dangerous to life. Other limitations, such as skin absorption of HCN or tritium, must be considered.

6.21. The protection a respirator may provide for a worker is dependent upon his type of unit and the fit. A respirator protection factor is an indicator of how much protection a respirator may provide. The factor is the ratio of the contaminant concentrations outside vs. inside the respirator, P = C/C. This is determined by quantitative testing. The general rule of thumb, however, says the protection factor is the approximate average effectiveness of a given respirator in qualitative tests with good face seal. Under normal operating conditions, the time-weighted average (TWA) concentration x protection factor = maximum concentration of a contaminant against which a particular type of respirator may be used.

6.22. For example: If an employee were spray painting with an enamel paint cut with toluol solvent and the measured TWA concentration was 200 ppm, and the TLV (ACGIH) is 100 ppm, then a half mask air purifying respirator with organic vapor trapping cartridges is satisfactory.

7. Work Area Monitoring

7.1. To ensure the adequacy of a respiratory protection program, monitoring will be conducted on exposure hazards as a basis to provide for a continuing healthful environment for employees. Personal sampling equipment may be used in accordance with accepted industrial hygiene standards to sample each work area. Results of these samples will pinpoint areas where respiratory protection is required. A "Job Description -- Respirator Specification" Form will also document what type of equipment should be worn for specific hazards present.

8. Cartridge Change Schedule

8.1. Using the present available air monitoring data, cartridges will be changed as follows:

8.1.1. Organic vapor cartridges -- 1 time per week or when need for change is otherwise indicated

9. Medical Evaluation

9.1. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this program specifies the minimum requirements for medical evaluation that the Company will implement to determine the employee's ability to use a respirator.

9.2. The Company will provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator

in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

9.3. The Company will identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

9.4. The medical evaluation will obtain the information requested by the questionnaire required in this program.

9.5. The Company will ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2 of the questionnaire, whose initial medical examination demonstrates the need for a follow-up medical examination.

9.6. The follow-up medical examination will include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

9.7. The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire will be administered in a manner that ensures that the employee understands its content.

9.8. The Company will provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

9.9. Each employee required to wear a respirator will fill out a Medical Evaluation Questionnaire.

9.10. The Medical Evaluation Questionnaire will be read by a PLHCP. If the PLHCP determines a follow-up examination is necessary, the employee will make themselves available, during regular business hours, for the follow-up examination. Once the PLHCP has performed all the required duties a written recommendation will be rendered by the PLHCP for the type of respirator which can be worn.

10. **Limitations and Surveillance**

10.1. Employees should be physically fit and able to perform job duties while wearing a respirator. If a physician determines that a worker has a severe cardiovascular or pulmonary dysfunction that would be aggravated by wearing a respirator; then by a written PLHCP opinion, that person would be exempted from a job requiring the use of a respirator.

10.2. Conditions that may prevent a person from using an atmosphere supplying respirator may include:

10.2.1. Emphysema

10.2.2. Chronic pulmonary obstructive disease

10.2.3. X-ray evidence of pneumoconiosis

10.2.4. Coronary artery disease

10.2.5. Heart attack

10.2.6. Bronchial asthma

10.2.7. High blood pressure

10.2.8. Epilepsy

10.2.9. Diabetes

10.2.10. Restrictive heart abnormalities

10.2.11. Experiencing anxiety or any problems when wearing a respirator

10.2.12. Open hole in the eardrum

10.3. Persons should not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A "yes" answer to any of the preceding questions would constitute a warning sign regarding the use of respirators. A medical opinion to confirm any of the above situations (answered "yes") should then be obtained. The respirator user's medical status should be reviewed periodically (for instance, annually).

10.4. No beards or facial hair should interfere with the sealing surfaces of any respirator. If respiratory protective equipment is required for a job, no beards or long sideburns will be allowed, as they will not permit a good face seal.

10.5. Contact lenses cannot be worn in an atmosphere that necessitates the use of respirators. No glasses may be worn with a full face piece respirator, unless the face piece is fitted with an adapter.

10.6. Should a worker have exposure to certain toxic materials, periodic medical examinations such as urinalysis, blood chemistries, or bioassay may be required even though the employee wears the proper respiratory protective equipment.

11. **Fit Testing**

11.1. Before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This section specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

11.2. The Company will ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

11.3. The Company will ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

11.4. The Company will conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

11.5. If after passing a QLFT or QNFT, the employee subsequently notifies the Company, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee will be given a reasonable opportunity to select a different respirator facepiece and to be retested.

11.6. The fit test will be administered using an OSHA-accepted QLFT or QNFT protocol.

11.7. QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

11.8. If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

11.9. Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators will be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

11.10. Qualitative fit testing of these respirators will be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

11.11. Quantitative fit testing of these respirators will be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement will be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

11.12. Any modifications to the respirator facepiece for fit testing will be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

12. **Implementation**

12.1. Employees required to wear a respirator must be fitted properly and tested for a face seal prior to use of the respirator in a contaminated area. Manufacturers provide fitting instructions and use limitations on the product packaging.

12.2. Qualitative fit testing is acceptable for most hazards in the work place. (Refer to OSHA standards for specific direction.)

12.3. Fitting - For a respirator to work effectively, it must fit well and feel comfortable. All the care that went into proper respirator selection will not protect the worker if the face piece does not fit properly. Fitting is most critical for self-contained breathing apparatus and respirators used in IDLH atmospheres.

12.4. There are two categories of fitting tests -- qualitative and quantitative.

12.4.1. Qualitative tests include:

12.4.1.1. Negative Pressure Test - Close off air inlet of canister, cartridge, or filter with palms, inhale gently so that the face piece collapses. Hold breath for 10 seconds, if the face piece remains slightly collapsed and no inward leakage is detected, the respirator probably has an adequate fit.

12.4.1.2. Positive Pressure Test - Close off exhalation valve, exhale gently into the face piece. If a positive pressure can be built up inside the face piece without excess outward leakage, the fit is good. Take care not to disturb placement of the face piece by placing undue pressure on the mask with hand.

12.4.1.3. Banana Oil Testing - A worker is subjected to isoamyl acetate vapor (banana oil) adjacent to sealing surfaces of the respirator face piece. If there is a detectable odor inside the mask, then the face piece should be refitted in clean air; and the test repeated, switching respirators if necessary, until a fit is made.

12.4.1.4. Irritant Smoke Test - Stannic chloride is impregnated on pumice in glass tubes. When the tube ends are broken, irritant smoke is released. The tester puffs smoke towards the wearer from increasingly shorter distances until the tube is within about 6 inches of the respirator, where the smoke is then directed toward potential sources of leakage. At this point, if no leakage has been detected, the wearer may cautiously begin

various head movements to simulate use in particular job. This test has an advantage in that the wearer usually reacts involuntarily to leakage by coughing or sneezing. If there is a reaction, stop producing smoke immediately. The irritant smoke test is valid for testing both air-purifying and atmosphere-supplying respirators; but an air-purifying respirator must have high efficiency filters.

12.4.2. Quantitative test uses instruments to measure (quantify) the amount of test chemical outside vs. inside of the respirator. This type of test expresses the amount of leakage as a percentage of the challenge atmosphere outside of the mask. This test is excellent when face piece leakage must be minimized for work in IDLH atmospheres. A quantitative test may be required when employees are exposed to chemical agents like acrylonitrile, benzene, coal tar pitch volatiles or vinyl chloride.

12.5. When fitting any face piece the head straps must be comfortable. Tightening the straps will sometimes reduce leakage, but the wearer may be unable to tolerate the respirator for any length of time; thus invalidating the fitting test for a normal job routine.

13. Types of Respiratory Protective Equipment and Their Uses

13.1. There are three categories of respirators: air purifying, atmosphere supplying and combination respirators.

13.1.1. Air purifying

13.1.1.1. Single Use Disposal Dust Mask or Filter -- This mask protects against dusts and mists having a TLV not less than .05 mg/m3 or 2.0 mppcf. The respirator has a disposal filter and elastic straps for comfort and tight fit.

13.1.1.2. Half Mask Respirator for Dust, Mist Fumes -- The respirator covers the mouth and nose and is provided with flexible straps and is either totally disposal or has replaceable cartridges. Not for use in concentrations greater than 10 x TLV.

13.1.1.3. Half Mask Respirator for Gases and Vapors -- The half mask chemical cartridge respirator has a rubber facepiece flexible straps, exhalation port and element holders. Screw in cartridges is available for protection against most gases and vapors.

13.1.1.4. Emergency Escape Respirator -- This mouthpiece-type respirator offers protection against low concentrations of gases or vapors or may be used for escape from hazardous

atmosphere if the chemical cartridge will absorb the contaminant.

13.1.2. Atmosphere supplying

13.1.2.1. Escape Air Supplied Respirator -- This device is used for escape only from hazardous atmospheres. The respirator's plastic hood is for fresh air from a pack placed behind the neck.

13.1.2.2. Airline Respirator -- Air under pressure is fed to either a larger more flexible hose or regulator where the pressure reduced and the breathing air delivered to a flexible face piece. Types: demand and continuous flow pressure demand.

13.1.2.3. Airline Respirator with Self-contained Escape Cylinder -- This unit is similar to the airline respirator and includes a small compressed air bottle with regulator to provide breathable air for work in, and escape from, IDLH atmosphere.\

13.1.2.4. Self-Contained Breathing Apparatus (SCBA) -- Demand and pressure demand SCBA units are used in operations for hazardous work or rescue. The SCBA equipment includes a compressed air cylinder, regulator, flexible hose to a full face piece, and shoulder harness.

13.1.2.5. Abrasive Blasting Hood -- A helmet and protection apron fed by air from a compressor or cascade of cylinders that is used for protection in sandblasting and may be fitted with a vortex tube to assist in cooling worker.

13.1.3. Airline respirator with escape bottle -- The airline respirator with full face piece in the pressure- demand mode is designed for use in atmospheres immediately dangerous to life or health when used with an approved emergency escape system. With the potential hazards involved when using this respirator, it is imperative that this type of equipment be inspected before and after each use.

13.1.3.1. Before entry into a hazardous area, check the following:

13.1.3.1.1. Hose length to the escape unit from a compressor or bottle cascade system should be adequate to perform all types of work, but not greater than 300 feet.

13.1.3.1.2. All connections should be tight and free of leaks. Rubber hose from the face piece to the regulator and hand disconnect union should be hand tight only.

13.1.3.1.3. The face piece and all hoses should be free of cracks and the regulators functioning normally at recommended pressures.

13.1.3.1.4. The air pressure in the emergency escape bottle should be approximately 2100 pounds per square inch (PSI).

13.1.3.1.5. Face seal on respirator should be good by using negative pressure test.

13.1.3.1.6. Make sure the respirator works properly before entering a contaminated area.

13.1.3.2. When using an airline respirator with an emergency escape bottle:

13.1.3.2.1. Never over-pressure the regulator.

13.1.3.2.2. The bottle should be used for escape from a hazardous atmosphere. Do not breathe from the bottle during normal work. Do not turn on the air supply from the bottle except to escape from a hazardous area, if the main air supply has been cut off.

13.1.3.2.3. After the escape cylinder has been used or the air pressure is below the recommended level (2100 PSI), the foreman at the job site should be notified and the foreman should then see that this equipment is refilled with certified breathing air.

13.1.3.2.4. Exposure to high levels of contaminants requires that all exposed skin be properly protected.

13.1.4. Self contained breathing apparatus -- Self contained breathing apparatus (SCBA) should be used for emergencies like clean-up of a large spill, fire fighting, or rescue from a hazardous area. The equipment must be checked before and after each use and at least monthly. Routine inspection of this equipment assures that it will be ready for use in an emergency.

13.1.4.1. Thirty (30) minute SCBA units provide protection against most air-borne agents and are an excellent back-up system when tank cleaning, vessel entry or breaking into lines is done with airline-SCBA equipment.

13.1.4.2. Before Using Any SCBA Equipment:

13.1.4.2.1. Inspect the connections for tight fit and possible leaks.

13.1.4.2.2. Inspect all parts of the respirator for damage or excessive wear. Check low air pressure alarm.

13.1.4.2.3. Check the air pressure in the cylinder, it should read approximately 2100 PSI, and check the air flow to the face piece.

13.1.4.2.4. Make sure you can get a good face seal. Use the negative pressure fitting test to check the fit. Do not wear this apparatus if you have a beard, long side burns or wear glasses.

13.1.4.2.5. Be sure you have been properly instructed before using this equipment.

13.1.4.3. When Using SCBA Equipment:

13.1.4.3.1. Do not attach the hose from the respirator face piece until you are ready to enter the contaminated area. This will conserve the air supply in the cylinder.

13.1.4.3.2. If the alarm bell rings, signaling a lowered air supply, LEAVE THIS CONTAMINATED AREA AT ONCE!

13.1.4.3.3. If air flow is insufficient for any reason, turn on the bypass valve to increase air flow to the face piece and leave the area immediately. Do not return to the hazardous area until the equipment is repaired or a new SCBA unit is issued.

13.1.4.4. After Using SCBA Equipment:

13.1.4.4.1. Close all valves and then de-pressure the hose through the by-pass valve.

13.1.4.4.2. Tell the foreman that the cylinder has been discharged. The foreman should then see that the cylinder is properly charged with certified breathing air.

13.1.4.4.3. This equipment should be inspected, tagged and properly stored to protect against damage and to insure ready use.

14. Emergencies And Special Operations

14.1. Self-contained breathing apparatus may be required in specific areas for emergency use. This equipment will be used only by trained personnel when it is necessary to enter hazardous atmospheres. The following points should be considered:

14.1.1. All potential users will be fully trained in the use of this equipment.

14.1.2. When the equipment is used, it will be tested in an uncontaminated atmosphere prior to entering the hazardous area if possible.

14.1.3. An employee will not work with this apparatus in a hazardous atmosphere on an individual basis. At least one additional employee suitably equipped with a similar breathing apparatus must be in contact with the first employee and must be available to render assistance if necessary.

14.1.4. This equipment will be inspected monthly by trained department or group personnel.

14.2. There are certain situations where only one type of respiratory protection should be considered. For fire fighting and rescue from a hazardous atmosphere only self-contained breathing apparatus is acceptable. In confined spaces with IDLH atmospheres only SCBA, airline with escape bottle or other approved equipment should be used.

14.3. Emergencies, such as explosion and fire, release of high concentrations of toxic gas or vapor, and rescue will be discussed at those locations where incidents occur.

14.4. Special operations like tank cleaning, tower maintenance, turnarounds, clean up of large spills, etc., and the use of appropriate respirators, will be covered by safety personnel, superintendents or foremen.

14.5. Before entering areas that could be oxygen deficient or have chemical contaminants of unknown concentration, the work environment should be monitored with available equipment to determine exposure levels. If the proper equipment is not on hand or special monitoring is required, contact the Site Supervisor or the Company Safety Coordinator; if unavailable and on a client's work location, contact the client's safety personnel.

15. Additional Respirator Information

15.1. Canister Gas Masks

15.1.1. Some operations require the use of canister masks to protect against chemical contaminants. This equipment is designed to filter harmful chemical agents from the air; however, this is not multi-purpose equipment and will not afford protection for all exposures.

15.1.2. Each gas mask canister is made for protection from a certain agent or group of agents with similar properties. The manufacturer's instructions for proper use should be followed carefully.

15.1.3. Gas masks should not be used if any of the following conditions exists:

15.1.3.1. Oxygen content in work area is below 19.5%.

15.1.3.2. If contaminant concentrations are unknown or are likely to be very high.

15.1.3.3. If the atmosphere has been determined to be immediately dangerous to life or health (IDLH).

15.1.3.4. If any chemical agent in the work area has poor odor warning properties or is odorless like carbon monoxide.

15.1.3.5. If the gas mask is not effective in filtering the chemical agent, i.e. H2S - hydrogen sulfide.

15.1.4. If gas masks are used, then canisters must be used prior to the expiration date.

15.1.5. Wearer must leave the contaminated area if:

15.1.5.1. Any odor is detected within mask, or

15.1.5.2. The canister is noticeably causing an increase in breathing resistance.

15.1.6. Gas mask canisters should be changed after each use.

15.1.7. All instructions for proper use should be followed.

16. **Maintenance & Care Of Respirators**

16.1. The following points should be considered for respirator inspection and maintenance:

16.1.1. The wearer of a respirator will inspect it daily whenever it is in use.

16.1.2. Supervisor, foreman, or group leader will periodically spot check respirators for fit, usage, and condition.

16.1.3. Respirators not discarded after one shift use will be cleaned on a daily basis, according to the manufacturer's instructions, by the assigned employee or other person designated by the respirator program coordinator.

16.1.4. Respirators not discarded after one shift use, will be stored in a suitable container away from areas of contamination.

16.1.5. Whenever feasible, respirators not discarded after one shift use, will be marked or stored in such a manner to assure that they are worn only by the assigned employee. If used by more than one employee is required, the respirator will be cleaned between uses.

16.2. Maintenance of respiratory protective equipment is essential to the overall effectiveness of the program. Wearing a poorly maintained or malfunctioning respirator could be more hazardous than not having any respirators available. A worker wearing a defective respirator thinks he is fully protected when, in reality, he may not be.

16.3. Emergency equipment must be maintained routinely. Self-contained breathing apparatus is generally used in the most hazardous and demanding circumstances; wearing a defective unit could have lethal results.

16.4. Equipment should be repaired by trained personnel or the manufacturer. Only designated replacement parts should be used when assembling respirators. Substitution of parts from a different brand or type of respirator invalidates approval of the device. All respiratory protective equipment should be cleaned and disinfected. For most respirators, hot soap and water and a hot rinse is adequate. Manufactured disinfectant solutions aid in sterilization. Respirators used in atmospheres immediately dangerous to life or health or for emergencies or rescue should be cleaned after each use.

16.5. Respirators should be stored to protect against dust, sunlight, heat, extreme cold, high humidity, corrosive conditions and contamination. Respirators should be protected and stored in a sealed plastic bag in a metal cabinet. If equipment is issued to an employee, it is his/her responsibility to keep it clean and store it in the proper manner.

16.6. Emergency equipment should be readily available for use, not under lock and key, and strategically placed for ready access in an emergency.

16.7. All respirators should be inspected to check for tightness of the connections, fit of component parts and adjustment of straps on the face piece as follows:

16.7.1. Air purifying - when inspecting this type of respirator, be sure to check the head straps for wear and cracks; face piece for broken element holders or split lens, sealing of exhalation valve, and air purifying elements for correct type, expiration date, gasket seal, and previous use. Reusable air purifying respirators should be inspected before and after each use.

16.7.2. Atmosphere supplying - although units differ in construction, examination should include: a check of head straps and face piece, condition of lines or hoses and connections, and inspection of regulators, valve, cylinders and

warning alarms. Most important- respirators for emergency use should be inspected monthly; and the person initializing the record tag should make certain that the SCBA equipment is in good working order. Atmosphere supplying equipment not used routinely should be inspected after use before it is put back into service.

17. **Breathing Air Quality And Use**

17.1. This section will assure that breathing air for atmosphere supplied-air respirators is of high quality. When supplied-air is used the following will be required:

17.1.1. Compressed breathing will be Type 1 - Grade D as described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989.

17.1.2. Compressors used to supply breathing air will be constructed and situated to prevent entry of contaminated air into the air-supply system, minimize moisture, have suitable in-line air filters, will have a tag on the filter showing last date changed and signature of person changing filter.

17.1.3. Oil lubricated compressors will have a high temperature alarm or CO alarm, or both; if only a high temperature alarm is used the air supply will be monitored at intervals sufficient to prevent CO in the breathing air from exceeding 10 PPM.

17.1.4. Breathing air line couplings will be incompatible with non-respirable worksite air or gas systems. No asphyxiating substances will be introduced into the breathing air system.

17.1.5. Pure oxygen will not be used in breathing air cylinders or systems.

18. **Identification of Filters, Cartridges, and Canisters**

18.1. All filters, cartridges and canisters used in the workplace will be labeled and color coded with the NIOSH approved label and that label will not be removed and will remain legible.

19. **Employee Training and Information**

19.1. The Company will provide effective training to employees who are required to use respirators. The training must be comprehensive and understandable. This includes providing basic information on respirators to employees who wear respirators when not required by OSHA or the Company to do so.

19.2. Additionally, employees who use respirators will be retrained annually, and also in the event of any of the following:

19.2.1. There are changes in the workplace or the type of respirator being used that contradict or make obsolete previous training;

19.2.2. Observation or evaluation is made that indicate an employee's knowledge or use of a respirator is not in accordance with program requirements, or the individual has not retained the required training information, knowledge or skills; or

19.2.3. Some other situation arises that indicates the need for retraining to ensure that employees are using respiratory equipment safely and in accordance with program requirements.

19.3. Regarding training objectives and requirements, each employee must demonstrate knowledge of at least the following:

19.3.1. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

19.3.2. What the limitations and capabilities of the respirator are;

19.3.3. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

19.3.4. How to inspect, put on and remove, use, and check the seals of the respirator;

19.3.5. What the procedures are for maintenance and storage of the respirator;

19.3.6. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

19.3.7. The general requirements of OSHA and the Company's safety program regarding safe use of respirators.

19.4. Each employee, upon assignment to an area requiring respirators, must be instructed by his superintendent, supervisor, foreman, or group leader relative to their responsibilities in the respiratory program. They will be instructed in need, use, limitations, and care of their respirator(s).

19.5. There are basic components of training that are common to both workers and supervisors. Each person must have an opportunity to handle the respirator, check different fitting techniques, test face piece-to-face seal, and to wear the respirator in normal air prior to starting a job. In addition there should be a discussion of engineering and administrative controls in use, and why respirators also are needed. The nature of the respiratory hazard and what happens if the respirator is not worn, or used improperly should be explained.

19.6. The employees should be informed why a particular type of respirator has been selected and how to use respirators in emergencies and special operations.

19.7. Supervisors who oversee the daily activities of workers who wear respirators should be familiar with the following:

19.7.1. Work requirements and conditions necessitating the use of respirator protective equipment. These may include:

19.7.1.1. Time of exposure to a contaminant

19.7.1.2. The activity and mobility of the worker

19.7.1.3. Eye protection needed

19.7.1.4. Temperature extremes

19.7.1.5. Face piece-to-face seal of various types of equipment

19.7.2. Nature and extent of hazards to which a worker may be exposed.

19.7.2.1. Type of contaminant and its concentration

19.7.2.2. Acute (short term) or chronic (long term) exposure potential

19.7.3. The general operation of the program; maintenance and inspection of equipment, issuance of respirators, and control of their use.

19.7.4. Legal requirements pertinent to the use of respirators in a capacity as supervisor.

19.8. A Supervisor can get help and information from the Respirator Training Guide, Material Safety Data Sheets, or the Safety Director.

19.9. Since the worker will be directly exposed to contaminants, he/she must know:

19.9.1. The nature of the hazard and what might happen if a selected respirator is not worn.

19.9.2. What control measures are being considered in addition to wearing personal protective equipment?

19.9.3. Why a particular respirator was selected for that job.

19.9.4. The limitations of a specific respirator.

19.9.5. How to use any respirator assigned to him/her and to adjust the unit for a proper fit.

19.9.6. Maintenance, storage and cleaning of respirators.

19.9.7. How to recognize an emergency and use the proper equipment.

19.10. The supervisor will provide training with help from the Safety Coordinator.

19.11. The most effective respiratory protective equipment is that equipment which is worn. The best way to insure that the respirators will be worn is to handle objections to wearing the equipment. The worker must be motivated to wear the respirator by instilling in him the desire and need to wear the proper equipment. If objections to fit, size, type, etc., are handled, then there will be a greater likelihood that the worker will wear the respirator provided.

20. Program evaluation

20.1. The Company will conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

20.2. The Company will conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

20.3. The Company will regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment will be corrected. Factors to be assessed include, but are not limited to:

20.3.1. Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

20.3.2. Appropriate respirator selection for the hazards to which the employee is exposed;

20.3.3. Proper respirator use under the workplace conditions the employee encounters; and

20.3.4. Proper respirator maintenance.

21. Recordkeeping

21.1. The Company will establish and retain written information regarding medical evaluations, fit testing, employee training and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

21.2. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

21.3. The employer will establish a record of the qualitative and quantitative fit tests administered to an employee including:

21.3.1. The name or identification of the employee tested;

21.3.2. Type of fit test performed;

21.3.3. Specific make, model, style, and size of respirator tested;

21.3.4. Date of test; and

21.3.5. The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

21.4. Fit test records will be retained for respirator users until the next fit test is administered.

21.5. A written copy of the current respirator program will be retained by the Safety Coordinator.

21.6. Written materials required to be retained under this program will be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.