Abrasive Blasting

1.1 PURPOSE

1.1.1 The purpose of this policy is to provide both requirements and guidelines for safe abrasive blasting operations. This policy covers written procedures, operator training and equipment standards required for safe, productive blasting operations.

1.2 RESPONSIBILITIES

1.2.1 Supervisor

1.2.1.1 Ensure that the initial determination for potential abrasive blasting or particulate exposure has been accomplished before work begins

1.2.1.2 Supervise safe performance of work in accordance with related work practices

1.2.1.3 Assign jobs only to qualified employees

1.2.2 Employee

1.2.2.1 Be familiar with the safe operating functions of blasting equipment

1.2.2.2 Comply with all company procedures

1.2.2.3 Have knowledge of hazards associated with respirable silica

1.3 GENERAL SAFETY

1.3.1 Before work begins a written safety plan must be developed to include all recognized hazards and assign a competent person trained to recognize hazards associated with the work and with the authority to quickly take corrective action to eliminate them.

1.3.2 All machinery, equipment, PPE or other resources will be inspected prior to use and as per manufacturer instructions.

1.3.3 Methods for effective communications will be established prior to work beginning.

1.3.4 Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced in the course of construction work, or affected employees are exposed via inhalation, ingestion, skin absorption, or have any contact with any substance or material, their concentrations will not exceed the limits specified in the "Threshold Limit Values of Airborne Contaminants - 1970" of the American Conference of Governmental Industrial Hygienists.

1.3.5 Abrasive blasting respirators will be worn by all abrasive blasters. TERRY R PITT CONSTRUCTION's *Respiratory Protection* policy will be followed when respiratory protective equipment, including blasting hoods/helmets, is required.

1.3.6 In addition to respiratory protection, adequate PPE and other resources will be provided to ensure personnel have required protection for the hearing, eyes, face and body of the operator.

1.3.7 Risk assessment for personnel working in the vicinity of abrasive blasting operations will be completed and any adequate PPE for the eyes, ears, face and body must be provided.

1.3.8 During post-abrasive blasting cleanup operation, compressed air will not be used unless verification has been made that the compressed air pressure has been reduced to less than 30 psi.

1.4 TOXIC DUSTS

1.4.1 Obtain positive documentation on materials/ingredients or remove sample(s) and conduct lab analysis of materials. This will be done before materials are shipped from a jobsite or before any onsite blasting is initiated. Identification should be coordinated with the client.

1.4.2 The composition and toxicity of the dust created during blasting operations will be considered in making an evaluation of the potential health hazards.

Potential Air Contaminants Associated with Abrasive Blasting	
Source	Potential Air Contaminants
Base Material - steel, aluminum, stainless steel, galvanized steel, copper-nickel and other copper alloys	Aluminum, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc
Surface Coatings - pre-construction primers, anticorrosive and antifouling paints	Copper, barium, cadmium, chromium, lead, tributyl tin compounds, zinc
Abrasive Blasting Media - coal slag, copper slag, nickel slag, glass, steel grit, garnet, silica sand, soda	Arsenic, beryllium, amorphous silica, cadmium, chromium, cobalt, crystalline silica, lead, manganese, nickel, silver, titanium and vanadium

1.4.3 Where there is potential for flammable or explosive dust mixtures, the blast nozzle will be bonded and grounded to prevent the buildup of static charges. Organic abrasives will be used only in automatic systems.

1.4.4 Dust will not be permitted to accumulate on the floor or on ledges outside the blast enclosure. Dust, shot, and other abrasives will be cleaned up promptly to prevent slipping hazards.

1.4.5 Review blasting methods and materials then select the proper respiratory protection for the anticipated hazards. Use a NIOSH approved type C or CE supplied air respirator for abrasive blasting. Follow TERRY R PITT CONSTRUCTION's *Respiratory Protection* policy for other tasks and for safe respirator use.

1.4.6 Grit materials to be used will be identified and the appropriate SDS of the grit reviewed. Elements in the SDS will be included in the activity plan and reviewed with all involved team members.

1.4.7 The concentration of respirable dust or fumes in the breathing zone of the abrasive-blasting operator or any other worker will be kept below the levels specified in 1910.1000.

1.5 CONTROLS

1.5.1 Use a less toxic abrasive blasting material.

1.5.2 Use abrasives that can be delivered with water (slurry) to reduce dust.

1.5.3 Use barriers and curtain walls to isolate the work area.

1.5.4 Use blast areas or blast cabinets for smaller operations.

1.5.5 Use restricted areas for non-enclosed blasting operations.

1.5.6 Keep coworkers away from blasting areas.

1.5.7 Use exhaust ventilation systems in containment structures to capture dust.

1.5.8 Use HEPA filters on vacuums or wet methods to minimize accumulation of toxic dust.

1.5.9 Compressed air is never to be used for cleaning.

1.5.10 Avoid blasting in windy conditions.

1.5.11 Air monitoring should be planned for and accomplished for those activities that involve known/ suspected hazards (ex. lead, silica, PCB, etc.), unless it can be substantiated with similar operations for which the company has monitoring results on file. Atmospheric testing for abrasive blasting hazard areas is required for two distinct purposes: Evaluation of the hazards of the work area and verification that acceptable particulate levels exist in that area.

1.5.12 Those work areas meeting the criteria for delineation as an abrasive blasting hazard work area will be restricted only to trained and authorized employees. Physical barriers, ropes, fencing or any other equally effective means of entry control may be used to control entry.

1.5.13 As much blasting as possible should be done in a specified location. A blasting zone (where dust is visible) should be established and marked off with signs around the perimeter of the area such as:

CAUTION
Abrasive Blasting Area
Eye, Ear and Respiratory Protection Must Be Worn

1.5.14 Blasting should not be done when wind direction and velocity carry visible dust to people unprotected by proper respirators.

1.5.15 Blasting of small objects should be done in an enclosure that is designed to specifically reduce the dust hazards.

1.5.16 Blast-cleaning enclosures will be exhaust ventilated in such a way that a continuous inward flow of air will be maintained at all openings in the enclosure during the blasting operation.

1.5.17 The construction, installation, inspection, and maintenance of exhaust systems will conform to the principles and requirements set forth in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, and ANSI Z33.1-1961, which are incorporated by reference as specified in 1910.6.

1.6 MECHANICAL PRECAUTIONS AND PROCEDURES

1.6.1 Machines and hoses should be inspected frequently and all parts showing excessive wear should be repaired or replaced.

1.6.2 Nozzles should be externally attached to the hose by a fitting, which will prevent accidental disengagement.

1.6.3 Blast cleaning nozzles will be equipped with an operating valve that must be held open manually. A support (or *deadman*) will be provided on which the nozzle may be mounted when it is not in use. An electric deadman will be low voltage (12-volt DC) and have continuous wire or plug connections.

1.6.4 Lengths of hose should be joined by external metallic connectors. The connectors will have pin-clips to prevent disengagement. Anti-whip arresters may be used between each connector.

1.6.5 All bull hoses, from the compressor to the abrasive blast pot, will have pin-clips and anti-whip arresters on each end.

1.6.6 In abrasive blasting situations where flammable or explosive dust mixtures may be present, construction of equipment and any exhaust system, including all electric wiring, will conform to American National Standard Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), as well as 1926 Subpart S.

1.6.7 Prior to operation where flammable or explosive dust mixtures may exist, confirm that the blast nozzle is bonded and grounded to prevent the buildup of static charges.

1.6.8 Where flammable or explosive dust mixtures may be present, confirm that the abrasive blasting enclosure, ducts and the dust collector are constructed with loose panels or explosion venting areas, located on sides away from any occupied area. These areas will provide pressure relief in the event of an explosion.

1.6.9 Compressed air can only be used for cleaning objects and materials when the pressure is reduced to less than 30 psi and effective chip guarding and PPE are utilized.

1.6.10 At no time will compressed air be used for cleaning clothes while being worn or directly applied to any part of the body.

1.6.11 Couplings will be secured per OSHA regulations. The blaster will be responsible to ensure that each coupling is correctly secured and whip checks will be installed, where possible.

1.7 PERSONAL PROTECTIVE EQUIPMENT

1.7.1 Personnel must be equipped with the appropriate protective safety equipment.

1.7.2 Operators should be equipped with heavy canvas or leather gloves and aprons.

1.7.3 Safety shoes must be worn.

1.7.4 Eye, face, hearing and respiratory protection will be supplied to all personnel working with or around abrasive blasting operations.

1.7.5 Precautions will be taken to protect personnel in the blasting zone including the blasting operator from excessive noise exposure by supplying and requiring the use of earplugs or muffs.

1.7.6 Vortex tubes that cool the air supply to the blaster hood will be considered depending on season and exposure of the employee to heat sources.

1.7.7 Eye and face protection will be supplied to any other personnel working in the vicinity of abrasive blasting operations.

1.7.8 PPE will be provided to and worn by the employee that covers the eyes and face when the design of the respirator does not provide such protection.

1.8 RESPIRATORY PROTECTION

1.8.1 All use of respirators or other respiratory protective equipment will be in accordance with the company's *Respiratory Protection Policy* and 29 CFR 1910.134.

1.8.2 Employees required to don or attempt to use a respirator must undergo proper medical evaluation, fit test, and training in the proper selection, use, maintenance, and storage of the specific respirator. Each employee is individually authorized by TERRY R PITT CONSTRUCTION for wearing a respirator in the scope and course of work.

1.8.3 During construction and pipeline maintenance operations and abrasive blasting specifically as per this program, special safety and health considerations will be given whenever hazardous dusts, fumes, mists, vapors, gases or other substances either exist or are produced in the course of work. Concentrations of any such exposure will not exceed the limits specified in 1926.55(a).

1.8.4 All abrasive blasting respirators must cover the wearer's head, neck and shoulders to protect the wearer from rebounding abrasive. Workers must use only Type CE NIOSH certified blasting airline respirators with positive pressure blasting helmets. Air for abrasive blasting respirators must be free of harmful quantities of dusts, mists or noxious gases.

1.8.5 An apron and dust collar, properly fitted and properly worn, will be used by all persons blasting. In addition to the hood, blasters should also wear a disposable respirator when working in a high dust concentration. This would provide protection when the blasting operation has ceased and the blaster is removing the air supplied equipment or when merely taking a break.

1.8.6 Abrasive blasting hoods will be worn by all abrasive blasting operators:

1.8.6.1 When working inside of blast clean rooms

1.8.6.2 When using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure

1.8.6.3 Where concentrations of toxic dust dispersed by the abrasive blasting may exceed the limits set in 1926.55 or other pertinent sections of this part and the nozzle and blast are not physically separated from the operator in an exhaust-ventilated enclosure

1.8.7 In situations where the abrasives and the surface coatings on the materials blasted become shattered and pulverized during blasting operations, the dust formed by this work will contain particles of a size that can be breathed (respirable size). TERRY R PITT CONSTRUCTION will consider this in the evaluation of the health hazards posted to affected company employees.

1.8.8 Concentration of respirable dust or fume in the abrasive blasting operator's breathing zone will be kept below Permissible Exposure Limits as required by OSHA. The same consideration will be given regarding exposure of any other worker in the area to this respirable dust.

1.8.9 Particulate filter respirators, commonly referred to as dust-filter respirators, properly fitted, may be used for short, intermittent or occasional dust exposure during cleanup, dumping of dust collectors, or unloading shipments of sand at a receiving point, when it is not feasible to control the dust by enclosure, exhaust ventilation, or other means. Respirators used will be certified for protection against the specific type of dust.

1.8.9.1 Dust filter respirators may be used to protect the operator from outside abrasive blasting operations where non-silica abrasives are used on materials having low toxicities.

1.8.9.2 Dust filter respirators will not be used for continuous protection where silica sand is used as the blasting abrasive or where toxic materials are blasted.

1.8.10 Support personnel involved with cleanup and other related activities may also need respiratory protection.

1.9 HOUSEKEEPING

1.9.1 Personnel must use proper hygiene practices while in hazardous areas and remain fully protected at all times in the work area. Before leaving work areas, ensure protective clothing is removed, properly stored in a controlled area and wash facilities used to remove any contaminants from exposed skin. Specific procedures and facilities established for personal hygiene will be covered in the activity plan and covered with all team members.

1.9.2 A facility should be available for blasters to wash hands routinely and before eating, drinking or smoking and after blasting operations.

1.9.3 Eating, drinking or the use of tobacco products is prohibited in the blasting area.

1.9.4 Vacuum or remove contaminated work clothes before eating, drinking or smoking.

1.9.5 Provide accommodations with separate storage facilities for street cloths, protective clothing, and equipment. Keep contaminated clothing and equipment out of clean changing areas.

1.9.6 Do not allow dust to accumulate on the floor or ledges outside of an abrasive blasting enclosure. Clean up dust spills in a prompt and consistent manner.

1.9.7 Keep walkways and aisles clear of abrasive blasting products such as steel shot or any other material that could cause a slipping hazard.

1.10 EMERGENCY FIRST AID PROCEDURES

1.10.1 In the event of an emergency, institute first aid procedures and send for first aid or medical assistance in accordance with local procedures.

1.10.2 Eye exposure - Wash immediately with large amount of water, lifting the lower and upper lids occasionally. Get medical attention as soon as possible.

1.10.3 Skin exposure (embedded particulates) - Immediately flush with copious amounts of water. Remove clothing blocking exposed areas and flush exposed areas. Get medical attention as soon as possible.

1.10.4 Respiratory exposure - Get the victim to open, fresh air immediately. If breathing has stopped, perform CPR. Keep the victim warm and at rest. Get medical attention as soon as possible.

1.10.5 Move the affected person from the hazardous area. If the exposed person has been overcome, initiate local emergency notification procedures. Understand the facility's emergency rescue procedures and know locations of rescue equipment before the need arises.

1.11 MEDICAL SURVEILLANCE

1.11.1 The medical surveillance provisions are intended to provide employees with a comprehensive approach to prevent silicosis.

1.11.2 All medical examinations and procedures will be performed by or under the supervision of a licensed physician and are provided without cost to employees at a reasonable time and place.

1.11.3 TERRY R PITT CONSTRUCTION will remove an employee from work having an exposure to abrasive blasting materials or particulates under the following conditions: exposure limit exceedance, evidence of silicosis, or medical determination.

1.11.4 Any employee removed from exposure to abrasive blasting materials or particulates may return to former job status when approved by their healthcare provider. A written recommendation that the

employee no longer has a detected medical condition which places the employee at increased risk of impairment of health will be required by TERRY R PITT CONSTRUCTION before return to work is authorized.

1.12 DISPOSAL

1.12.1 Waste materials are properly disposed of in accordance with state, federal, and company requirements.

1.12.2 Identify contractually, before shipping, who is responsible for waste to be generated and plan accordingly for disposal.

1.12.3 Before shipping, a sample should be analyzed for positive identification and proper manifesting.

1.12.4 Whenever a manifest is generated, prior to shipment, the safety department will be notified.

1.12.5 When contractual agreements dictate, manifests should show the client as generator and show responsibility for proper manifesting, shipping and disposal.

1.12.6 If segregation of waste generated by job is necessary, proper controls must be in place to collect and contain waste in approved storage/shipping containers properly marked and labeled (Contractual agreements should dictate).

1.12.7 Waste materials must be disposed of through one of TERRY R PITT CONSTRUCTION's approved hazardous materials and waste disposal companies.

1.13 TRAINING

1.13.1 TERRY R PITT CONSTRUCTION will determine whether training required for specific jobs will be conducted in a classroom or on-the-job or a combination of both. The degree of training provided will be determined by job complexity and the abrasive blasting exposure hazards associated with the individual job.

1.13.2 Initial training will be provided prior to job assignment and include training to ensure that the hazards associated with abrasive blasting are understood by workers and that the knowledge, skills, and personal protective equipment required are acquired by workers.

1.13.3 Each authorized worker will receive training in the following:

1.13.3.1 Recognition of applicable hazards involved with the particular job and jobsite, as well as the methods and means necessary for safe work

1.13.3.2 Specific nature of operation, which may result in exposure to abrasive blasting materials

1.13.3.3 Purpose, proper selection, fitting, use and limitation of PPE

1.13.3.4 Adverse health effects associated with overexposure to abrasive blasting materials

1.13.3.5 Controls and work practices associated with the job assignment, including training of employees to follow relevant good work practices

1.13.3.6 Manufacturer's health and hazard information included on the SDSs required under OSHA's hazard communication standard

1.13.3.7 Worker right of access to records under 29 CFR 1910.20

1.13.4 Refresher training will be conducted on an annual basis.

1.13.5 Retraining will be provided for all affected workers as a minimum under the following conditions:

1.13.5.1 Whenever there is a change in job assignments, PPE, change in equipment, or processes that present a new hazard

1.13.5.2 Whenever their work takes them into hazardous areas

1.13.5.3 Whenever there is a change in abrasive blasting safety procedures

1.13.5.4 Whenever safety procedures fail resulting in a near miss, illness, or injury

1.13.6 TERRY R PITT CONSTRUCTION will certify that worker training is accomplished and is being kept up to date. The certification will contain a synopsis of the training conducted, worker's name, and date of training.