Confined Space (Permit Required)

1.1 PURPOSE

1.1.1 The purpose of this policy is to establish procedures for TERRY R PITT CONSTRUCTION employees working in confined spaces, to eliminate and reduce the hazards associated with this type of work by addressing specific work practices, and to delegate individual responsibility for consistency in safe job performance.

1.2 RESPONSIBILITIES

1.2.1 Entrant

1.2.1.1 Authorized by TERRY R PITT CONSTRUCTION to enter a permit space

1.2.1.2 Know and understand the hazards of the jobsite

1.2.1.3 Recognize the signs and symptoms of exposure to a hazard

1.2.1.4 Maintain communication with the attendants outside the space, following warnings given by the attendants and exiting the space immediately when told to do so

1.2.1.5 Know and understand selection, use, and limitations of PPE required for safe entry

1.2.1.6 Be familiar with emergency procedures - know when and how to exit when instructed to do so by the attendant

1.2.1.7 Alert attendant whenever entrant recognizes any sign or symptom of exposure

1.2.1.8 Be thoroughly familiar with all conditions of the entry permit and strictly follow them

1.2.1.9 Stop the job, exit with other entrants, and immediately inform the entry supervisor if work is not being performed safely or if a potential hazard exists

1.2.2 Attendant (in addition to the responsibilities listed above)

1.2.2.1 Remain outside the permit space at the specific point of entry at all times while work is being performed inside the space until relieved by another attendant

1.2.2.2 Ensure accountability of all entrants by maintaining a *Confined Space Entrant Log*

1.2.2.3 Recognize potential hazards in the confined space and monitor activities inside and outside the permit space to determine if it is safe for entrants to remain inside

1.2.2.4 Maintain effective and continuous contact with entrants during entry

1.2.2.5 Have an understanding of atmospheric monitoring equipment and log readings in the confined space on the monitoring log at the prescribed intervals

1.2.2.6 Observe conditions outside the space which could endanger the entrants

1.2.2.7 Order the evacuation of authorized entrants immediately if unacceptable conditions in the confined space are observed

1.2.2.8 Observe behavioral actions and general demeanor of entrant(s) which could indicate possible exposure to the hazards in the confined space

1.2.2.9 Order entrants to evacuate the space immediately under any of the following:

1.2.2.9.1 Prohibited condition

1.2.2.9.2 Behavioral effects of hazard exposure

1.2.2.9.3 Situation outside the space that could endanger the entrant(s)

1.2.2.9.4 Cannot effectively and safely perform the duties required

1.2.2.10 Summon rescue and/or emergency services immediately if necessary

1.2.2.11 Do not allow unauthorized persons to enter a permit space or regulated area

1.2.2.12 Advise unauthorized workers to exit area and immediately inform entry supervisor

1.2.2.13 Never enter a confined space to perform a rescue

1.2.2.14 Wear the florescent orange vest that identifies them as the attendant while at post

1.2.2.15 Assist rescue and emergency personnel as needed

1.2.2.16 Monitor only one confined space at a time – if possible, do not monitor multiple entries

1.2.2.17 Stop the job, order evacuation, and immediately inform the entry supervisor if work is not being performed safely or if a potential hazard exists

1.2.3 Entry supervisor

1.2.3.1 Act as the qualified person responsible for work activities being performed in and near a confined space

1.2.3.2 Verify that the appropriate information has been entered on the permit and that all tests specified by the permit have been conducted by qualified persons

1.2.3.3 Verify that all procedures, specified PPE, and written emergency plan are in place and available at the site before endorsing the permit and allowing entry to begin

1.2.3.4 Responsible for the initiation of the confined space entry permit

1.2.3.5 Ensure that conditions are acceptable for entry

1.2.3.6 Authorize entry and oversee entry operations

1.2.3.7 In conjunction with management, contractors and other qualified personnel, determine appropriate PPE to be worn by entrants

1.2.3.8 Serve as an attendant if needed

1.2.3.9 Terminate entry procedures as required - Terminate a permit whenever there are dangers for the entrant(s)

1.2.3.10 Confirm measures are in place to keep unauthorized personnel clear of the area

1.2.3.11 Check the work at least twice a shift to verify and document permit requirements are being observed (more frequent checks should be made if operations or conditions are anticipated that could affect permit requirements)

1.2.3.12 Ensure necessary information on chemical hazards (ex. pertinent SDS and specific analytical information) is kept at the jobsite for the employees or rescue team

1.2.3.13 Ensure that the attendant and entrants are aware of all hazards, existent and potential, in the confined space or hazardous area and that all mitigation measures are completed prior to entry to manage the hazards

1.2.3.14 Secure onsite rescue team or prearranged offsite rescue service to respond in a timely manner and ensure one member at minimum is first aid/CPR certified

1.2.3.15 Coordinate operations and procedures for multi-employer jobsites

1.2.3.16 Stop the job and immediately inform attendant to order evacuation if work is not being performed safely or if a potential hazard exists

1.2.3.17 Assure the proper closing of a confined space and cancel the permit once the work inside of the confined space has concluded

1.2.4 Safety department

1.2.4.1 Issue and administer the program and make sure that it satisfies the requirements of all applicable federal, state, and local confined space entry requirements

1.2.4.2 Evaluate and update the program

1.2.4.3 Train and retrain employees to their level of involvement

1.2.4.4 Verify the purpose for each entry into confined space

1.2.4.5 Inform contractors of the company's confined space entry program requirements and of the potential hazards of each space to be entered

1.2.4.6 Verify entry equipment is maintained and calibrated according to the manufacturer's specifications and the company's preventive maintenance procedures

1.2.4.7 Have rescue services provided by host facility or an outside service which is given an opportunity to examine the entry site, practice rescue, and decline as appropriate, or have rescue services provided by the employer by selecting a rescue team that is equipped and trained to perform the needed rescue services.

1.2.5 A competent person will identify confined spaces in which one or more of the employees may work and identify each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary before work begins.

1.2.6 Unauthorized employees must maintain safe distances from confined spaces.

1.3 HAZARD IDENTIFICATION

1.3.1 TERRY R PITT CONSTRUCTION will review information provided by client regarding product or content of confined space. Content may include anything that could aid in the identification of all possible hazards in the space and assist in preparing effective job procedures.

1.3.2 Entry supervisor will perform a physical assessment and evaluation of site prior to starting work.

1.3.3 Project management and entry supervisor will assess type and degree of PPE required for successful completion of tasks. Inclusive in this assessment is the probability or the creation of additional hazards resulting from work activities within the confined space.

1.3.4 Entry supervisor will evaluate the effectiveness of any equipment to be used and any additional hazards that would be created by the use of such equipment.

1.3.5 Any equipment with the potential to produce an ignition source will be bonded and grounded to eliminate all known related hazards and a hot work permit may be necessary.

1.3.6 All first-time entry into confined spaces or hazardous areas, where atmospheric monitoring has not been completed, will be made wearing either a SCBA or positive pressure air supplied respirator with a waist mounted 5-minute escape bottle.

1.3.7 All workers involved in the work being performed will participate in a pre-job safety meeting and complete a job safety analysis to identify all possible hazards prior to starting work. Entry supervisor will conduct pre-entry meeting with all affected personnel to discuss nature of hazards involved, necessary precautions to be taken, proper use of protective and emergency equipment, and to address any project related questions or concerns from work crews.

1.4 HAZARD CONTROL

1.4.1 When possible, control the hazards in a space to eliminate the need for a permit (after all other hazards within the space have been eliminated). No company personnel will enter the space unless:

1.4.1.1 Conditions making it unsafe to remove an entrance cover are eliminated before cover is removed.

1.4.1.1.1 Once the cover is removed, a 30-minute period, at minimum, is necessary to allow space to aerate before testing internal atmosphere.

1.4.1.2 Openings at entrance cover are guarded by a railing, temporary cover, or other temporary barrier that will prevent accidental falls and will protect entrants working in the space from foreign objects entering the space.

1.4.1.3 The internal atmosphere has been tested.

1.4.2 Onsite personnel will test the atmosphere inside the confined space or hazardous area prior to entry for the following and in the following sequence:

1.4.2.1 Oxygen content

1.4.2.2 LEL % of combustible gases

1.4.2.3 Toxic vapor concentrations as related to their individual permissible exposure levels

1.4.3 Perform atmospheric testing at a frequency of 30 minutes, at minimum, before entry to ensure appropriate atmosphere is maintained. Atmospheric testing must also be done at 30-minute intervals during entry, documented, and recorded on the *Confined Space Entry Permit*.

1.4.4 Perform atmospheric testing to confirm acceptable conditions, as per the entry permit, if the confined space has been unoccupied for a period in excess of 30 minutes.

1.4.5 Utilize mechanical ventilation to remove toxic and combustible vapors and gases for dissipation into the atmosphere if necessary. Ensure that vapors are not released to any point where they may travel to ignition sources or accumulate inside the firewall.

1.4.6 Continuous ventilation will begin at a minimum of 30 minutes before entry and will be maintained through the duration of any entrance into a confined space.

1.4.7 Use of respiratory protection will be mandatory when the confined space contains a toxic substance above the permissible exposure limit (PEL) as allowed by law of the occupational exposure limit (OEL) of TERRY R PITT CONSTRUCTION, whichever is less. The specific type of respiratory protection will be determined by the type and concentration of the contaminant found in the space.

1.4.8 Blind or block valve or otherwise restrict and isolate the flow of product to and from the confined space before employees are allowed to enter.

1.4.9 Maintain entry attendant at entry point to monitor entrants inside the space for full duration of entry.

1.4.10 Workers will ensure proper lockout/tagout of all switches, covers, control panels, and any other possible release of stored energy, etc. affecting the confined space to be entered.

1.4.11 Complete the entry permit to ensure hazards have been controlled.

1.5 PERSONAL PROTECTIVE EQUIPMENT

1.5.1 TERRY R PITT CONSTRUCTION may require entrants to use the following PPE and other safety equipment as needed:

1.5.1.1 Hard hat with face shield

1.5.1.2 Chemical splash goggles

1.5.1.3 Steel toe, rubber boots

1.5.1.4 Personal multi-gas monitor

1.5.1.5 Hearing protection

1.5.1.6 PVC rain suit and rubber gloves

1.5.1.7 Fall arrest equipment

1.5.1.8 Low voltage or pneumatic lighting

1.5.1.9 Non-spark tools, shovels, etc.

1.5.1.10 NIOSH approved respiratory protection equipment

1.5.2 Air purifying respirators

1.5.2.1 Oxygen level 19.5% - 23.5%

1.5.2.2 LEL < 10 %

1.5.2.3 H_2S < 10 ppm

1.5.2.4 Benzene < 1 ppm

1.5.3 Supplied air respirators

1.5.3.1 Oxygen level < 19.5%

1.5.3.2 H_2S > 10 ppm - < 100 ppm

1.5.3.3 Benzene > 1 ppm - < 5 ppm

1.5.3.4 First time entry into space to check atmosphere

1.5.3.5 Entry into space with unknown atmosphere

1.5.3.6 For confined space entries which require the use of supplied air for entrants, there will be a dedicated person, bottle watch/standby that is responsible for the operation of the

supplied air trailer and will serve as rescue standby to assist in the event of a confined space rescue. The standby is only to assist and is not to enter.

1.5.4 SCBA or a supplied air respirator (SAR) with 5-minute escape pack

1.5.4.1 First time entry into tank to check/assess atmosphere

1.5.4.2 Entry into space with unknown atmosphere

1.5.5 Air supply must be certified grade D quality breathing air. The bottles will be tested and tagged.

1.5.6 Technicians entering a confined space with an inert atmosphere must wear a helmet that is sufficiently secured to prevent inadvertent removal.

1.6 MONITORING AND TESTING

1.6.1 The entry supervisor will initially review and evaluate the atmospheric testing results gathered by the operator. This data will, at a minimum, define oxygen content, % LEL, and define the percentage of any toxics contained in the confined space in question.

1.6.2 Testing for hazards before entry into confined space:

1.6.2.1 All confined spaces will be tested before and during entry using properly calibrated and approved equipment.

1.6.2.2 The air in the confined space will be tested for oxygen levels, flammable gases, and vapors and toxic substances.

1.6.2.3 If there is the possibility that conditions could change during the entry, continuous air monitoring will take place.

1.6.2.4 If hazard level cannot be determined by testing, it will be assumed as an IDLH situation and appropriate protective measures will be used during entry.

1.6.3 In the absence of atmospheric hazard data generated by the operator as mentioned above, the entry supervisor is responsible for the gathering of such data. This process will include but not be limited to the following:

1.6.3.1 Use handheld meters to test for the oxygen level present in the confined space.

1.6.3.2 Use handheld meters to test for the explosive level (% LEL) of any flammable or volatile materials in the confined space.

1.6.3.3 Utilize an approved handheld pump to test for the presence and quantity of toxic contaminants in the confined space.

1.6.3.4 Use a lead-in-air test kit to detect lead content in gasoline and other metallic lined tanks or vessels when warranted.

1.6.3.5 If NORM is suspected in the confined space, test for the presence of gamma radiation on equipment and for contamination on entrants upon exiting the space.

1.6.4 Atmospheric testing for confined space entry is required for two distinct purposes: Evaluation of the hazards of the space and verification that acceptable entry conditions into that space exist.

1.6.5 Results of testing will be recorded on the *Confined Space Permit* in the space provided adjacent to the stipulated acceptable entry condition. Results will be revealed to requesting affected employees or their representatives.

1.6.6 All employees may request the space be re-evaluated.

1.7 ENTRY PERMIT

1.7.1 A site-specific *Confined Space Entry Permit* completed by the entry supervisor will verify completion of the items required for safe entry. This permit will be kept at the jobsite for the duration of the job. If circumstances dictate an interruption in the work, the permit required confined space must be re-evaluated and a new permit must be completed.

1.7.2 The duration of the *Confined Space Entry Permit* may not exceed the time required to complete the assigned job identified on the permit.

1.7.3 The entry supervisor will initiate and complete a confined space entry permit. A copy of the entry permit generated by the operator or the original of the permit will be attached to the JSA.

1.7.4 Every permit required confined space entry will require at minimum, one entry supervisor, one attendant, and one entrant.

1.7.5 A completed C*onfined Space Entrant Log* must accompany all confined space entry permits.

1.7.6 Each confined space should have a separate permit initiated and will be manned by a separate and dedicated attendant. Should the attendant be monitoring multiple permit spaces, the attendant must have the ability to respond to emergencies while still maintaining oversight of the other spaces, or be properly relieved by another trained attendant.

1.7.7 Monitoring the space includes informing the entrants of the potential hazards and results. The *Confined Space Entry Permit* will be reviewed with all onsite personnel prior to entry. They must participate in the permit review and signing.

1.7.8 Before entry begins, entry supervisor will sign *Confined Space Entry Permit* to authorize entry.

1.7.9 The completed *Confined Space Entry Permit* will be made available at the time of entry to all authorized entrants by posting it at the entry portal or by any other equally effective means so that the entrants can confirm that pre-entry preparations have been completed.

1.7.10 This permit will be kept for one year. A new permit must be issued before re-entry. The entry supervisor will be held accountable for the proper filing and execution of all prescribed permits and documentation associated with all confined space entries performed.

1.8 ACCEPTABLE ENTRY CONDITIONS

1.8.1 Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin unless isolation of the space is infeasible because the space is large or is part of a continuous system (such as pipelines). Pre-entry testing will be performed to the extent feasible before entry is authorized and if entry is authorized, entry conditions will be continuously monitored in the areas where authorized entrants are working.

1.8.2 Entry into a confined space or hazardous area has to be in accordance with the following table:

Parameter	Entry allowed with permit	Entry allowed with permit and rescue equipment ready	NO ENTRY ALLOWED
Type of Gas	Airborne Concentration	Airborne Concentration	Airborne Concentration
Oxygen	19.5% - 23.5%	19.5% - 23.5%	< 19.5% > 23.5%
Hydrocarbons	< 1% of LEL	1% - 10% of LEL	≥ 10% of LEL
Hydrogen Sulfide	< 10 ppm	10 ppm - 100 ppm	≥ 100 ppm
Sulfur Dioxide	< 2 ppm	2 ppm - 100 ppm	≥ 100 ppm
Carbon Dioxide	< 10,000 ppm	10,000 ppm - 50,000 ppm	≥ 50,000 ppm
Carbon Monoxide	< 35 ppm	35 ppm - 350 ppm	≥ 350 ppm

1.8.3 Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations. Results of testing will be recorded on the *Confined Space Entry Permit*.

1.9 PRE-ENTRY PROCEDURE

1.9.1 All spaces will be considered permit required confined space until the pre-entry procedure demonstrates otherwise.

1.9.2 Unless they already know, inform the appropriate personnel of the intent to enter the confined space. At this time a request will be made for a confined space entry permit from the designated personnel or hiring clients and/or as necessary. The confined space entry supervisor will initiate a confined space entry permit.

1.9.3 Documents will be completed before entry is authorized that include specifying acceptable entry conditions and isolating the permit space by purging, inerting, flushing, or ventilating the permit

space as necessary to eliminate or control atmospheric hazards and verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

1.9.4 Investigate and evaluate all potential atmospheric hazards, which may be encountered in the confined space based on the history of use and any other information provided by the operator.

1.9.5 Survey the outside perimeter of the space for the presence of flammables and/or toxics.

1.9.6 If perimeter of space is free of atmospheric hazards, set up ventilation equipment, making sure to bond and ground all sources of ignition.

1.9.7 If dangerous air contamination or oxygen deficiency does not exist within the space, as demonstrated by tests performed in accordance with the pre-entry procedures, entry into and work within the space may proceed subject to the following provisions:

1.9.7.1 Air testing, in accordance with the pre-entry procedures, will be conducted with sufficient frequency to ensure that the development of dangerous air contamination and/or oxygen deficiency does not occur during the performance of any operation.

1.9.7.2 Work stops, employees exit, and additional precautions are taken if dangerous air contamination and/or oxygen deficiency does develop.

1.9.8 Depending on the initial monitoring, it can be determined what PPE will be needed to enter the confined space. This information will also be committed to the *Confined Space Entry Permit*.

1.9.9 Where existence of a dangerous air contamination or oxygen deficiency is verified by tests performed in accordance with pre-entry procedures or if development of dangerous air contamination or an oxygen deficiency is imminent, the following requirements will also apply:

1.9.9.1 Existing ventilation will be augmented by appropriate means.

1.9.9.2 When additional ventilation has removed dangerous air contamination and/or oxygen deficiency as demonstrated by additional testing conducted (and recorded), entry into and work within the space may proceed.

1.9.9.3 A source of ignition should not be introduced until appropriate provisions are implemented and dangerous air contamination due to flammable or explosive substances does not exist.

1.9.9.4 Whenever oxygen-consuming equipment such as welding torches or furnaces are used, measures should be taken to ensure adequate combustion air and exhaust gas venting.

1.9.9.5 To the extent feasible, make provisions to permit ready entry and exit.

1.9.9.6 If It is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems employing harmful design concentrations of toxic or oxygen displacing gases or total foam flooding, such systems will be deactivated. Where it is not

practical or safe to deactivate such systems, the use of respiratory protective equipment, such as SCBA, will apply during entry into and work within such spaces.

1.9.10 TERRY R PITT CONSTRUCTION employees will only work in a confined space if it is determined safe as listed above. Workers will not enter in confined spaces where there is an ongoing hazard of air contamination or oxygen deficiency.

1.9.11 Complete the *Confined Space Entry Permit*. Confined space entry should be indicated on the JSA. Associated forms such as the *Confined Space Entrant Log* should be prepared as well.

1.9.12 All lockout/tagout procedures will be followed in securing electrical, mechanical, and pressure systems and/or rotating machinery, and other hazardous energy sources.

1.9.13 If welding or cutting is to be performed in a confined space, local exhaust ventilation must be used. A *Hot Work Permit* will be completed and attached to the *Confined Space Entry Permit*.

1.9.14 Hazardous chemicals being used will be listed on the *Confined Space Entry Permit*.

1.9.15 The entry supervisor should conduct a pre-entry meeting. At minimum, this should include:

1.9.15.1 Initiate entry crew assignments: attendant, bottle watch/standby person (if using air supplied respiratory protection), and entrants

1.9.15.2 Discuss hazards and controls, such as PPE and respiratory protection and make certain that entrants understand purpose and conditions of the entry

1.9.15.3 Communication signals

1.9.15.4 Evacuation and rescue procedures

1.9.15.5 Monitoring for oxygen, LEL, and toxic levels

1.9.15.6 After entry requirements have been met, required PPE has been determined and supplied to the entrants, then entrants are allowed access to the space

1.9.16 The entry supervisor must ensure adherence of elements on the *Confined Space Entry Permit*.

1.9.17 When employees of more than one employer are working in or near the same confined space, entry operations will be coordinated through the entry supervisor so employees of one employer do not endanger employees of another employer.

1.10 INERT ATMOSPHERES

1.10.1 A space having an atmosphere containing less than 19.5% oxygen due to the presence of an inert gas is considered an atmosphere insufficient to support life, or IDLH. To prevent ignition, the atmosphere must be less than 5% oxygen. A worker entering into a confined space that has been filled or is filled with an inert gas such as nitrogen constitutes an IDLH environment where proper set up and execution of work and safety systems is critical.

1.10.2 Asphyxiation is the greatest hazard when working in or near an inert atmosphere. Asphyxiation can be sudden or may occur slowly without the worker knowing they are in trouble.

1.10.3 Fire is possible if the inert atmosphere is not maintained.

1.10.4 High temperatures may exist due to chemical reactions of pyrophoric materials if inert atmosphere is not maintained. Control of heat stress, such as work/rest regimens, monitoring workers, and use of auxiliary cooling must be addressed.

1.10.5 TERRY R PITT CONSTRUCTION employees are not permitted to enter inert spaces. Because of the critical nature of inert entry, it is important for TERRY R PITT CONSTRUCTION and clients to work together to provide facility knowledge, job expectations, and accountability to complete the job safely. Pre-planning every aspect of the job is required.

1.10.6 The entry supervisor must prepare a JSA, specific to the space being entered and the work being undertaken. The JSA needs to address all the risks associated with the work such as:

1.10.6.1 Setting up the inert entry and catalyst handling equipment at the worksite

1.10.6.2 Access and egress to the equipment

1.10.6.3 Provision for adequate lighting

1.10.6.4 Control of access around the worksite and around any open manways where nitrogen is being vented

1.10.6.5 Manual handling activities including lifting and rigging activities

1.10.6.6 Catalyst handling and loading

1.10.6.7 Removal of vessel internals (if required)

1.10.6.8 Installation of warning signs utilizing international caution/danger symbols

1.10.6.9 Emergency procedures specifically for the site:

1.10.6.9.1 Loss of N_2 supply and breathing air supply

1.10.6.9.2 High N_2 pressure

1.10.6.9.3 High O_2 levels

1.10.6.9.4 High equipment temperature

1.10.6.9.5 Emergency inside the space/Emergency outside of the space

1.10.7 The presence of an inert atmosphere must be stated on the permit. Operations personnel preparing the job will perform atmospheric testing to determine a safe zone. This regulated area around entry operations will be barricaded to limit personnel in the area. All entry points and

points of access to an inert confined space will have a warning sign stating, *Danger – Inert Atmosphere – Do Not Enter.*

1.10.8 Any deviations from the permit must be documented and signed off by appropriate personnel.

1.10.9 Each manway or opening will be covered, unless in use, to prevent unauthorized entry.

1.10.10 Before entry is allowed the confined space must be purged with inert gas, the oxygen content less than 5%, and the LEL reading at the entry point must be less than 10%.

1.10.11 Purging is the intended displacement of the contents of equipment or systems with an inert gas to eliminate the dangers of a reaction. Except for the purge line, the vessel will be blinded according to the client's blinding procedure.

1.10.12 Inert entry requires specialized equipment that must be inspected and in good working order. Subcontractors used by TERRY R PITT CONSTRUCTION must supply the equipment necessary for completing the job.

1.10.12.1 Subcontractors must maintain a communication system for employees working inside the inert atmosphere and those monitoring work from the outside must be maintained. This system must be capable of simultaneous communication with all connected personnel and must include a redundant system in the event the primary system fails.

1.10.12.2 Entrants can be lowered into the vessel using a winch/hoist specifically designed for carrying people. A ladder can be used for access.

1.10.12.3 All hand tools contractors bring onsite will be in good workable order. All designed safeguards will remain in place and not tampered with or bypassed.

1.10.12.4 Inherent safe connections will only be used.

1.10.12.5 Labeling of all air and communication lines will be required.

1.10.12.6 Pneumatic equipment used inside the space will use nitrogen as the energy source.

1.10.13 Inert entry requires specialized respiratory equipment that must be inspected and in good working order. Entry into inert confined spaces must only be made using air supplied positive pressure breathing apparatus, together with a self-contained cylinder (escape set) or other independent backup supply. Entry using conventional self-contained breathing apparatus must be limited to emergency lifesaving interval.

1.10.13.1 Two independent sources of air must be provided to a helmet. The secondary air supply should cut-in automatically whenever the primary source is overextended or over breathing occurs.

1.10.13.2 The entrant must wear an auxiliary escape air bottle.

1.10.13.3 An emergency egress line will be supplied for each entrant for emergency egress. Air for these emergency egress lines will be supplied from an independent source.

1.10.13.4 The helmet must be sufficiently secured to prevent inadvertent removal. The helmet must be in clean, workable order with all inspections complete and documented.

1.10.13.5 The umbilical cord containing the air hoses must be adequately sheathed to protect the hoses and be designed such that the hoses cannot be detached should the umbilical cord be pulled or snagged.

1.10.13.6 A trained worker outside the space will continuously monitor the air supply. An alarm will warn of low air pressure and/or if secondary air is activated.

1.10.13.7 Entrant working inside the vessel must be in visual contact of attendant.

1.10.14 A periodic log of continuous monitoring (minimum frequency of 15 minutes) during entry should be maintained. The checklist or log must include:

1.10.14.1 Vessel temperature

1.10.14.2 LEL

1.10.14.3 Oxygen concentration

1.10.14.4 Air supply (primary and secondary) checks

1.10.14.5 Communication checks

1.10.15 An evacuation of an inert atmosphere must occur under the following circumstances:

1.10.15.1 Loss of primary communication systems

1.10.15.2 Vessel temperature rise greater than 15°F

1.10.15.3 Loss or problems with primary air, nitrogen purge, or loss of power or lighting

1.10.15.4 O_2 concentration greater than 4%

1.10.15.5 An alarm is set off at the facility

1.10.15.6 Use of emergency egress bottle

1.10.16 Anytime a vessel is evacuated, a thorough investigation must be performed to identify the cause that led to the condition requiring evacuation. Entry will not be permitted back into the space until corrective actions have been implemented to address the cause.

1.10.16.1 Inert entry permitting process should be repeated and a new entry permit issued.

1.10.17 Employees working within an inert space must have knowledge of the duties they are to perform as well as a thorough understanding of the potential hazards. Personnel must be trained on inert space entry, respiratory equipment, standby requirements, and communication equipment. The company entering into the inert space has the responsibility to train the personnel entering, attendant, or breathing air supply monitor in correct procedures.

1.10.18 Entry into inert atmospheres is only permitted where specific written procedures have been prepared and authorized by safety department. Only employees or subcontractors trained for inert atmosphere work may perform this job for TERRY R PITT CONSTRUCTION.

1.11 VACUUM OPERATIONS

1.11.1 The nature of vacuum operations can affect the atmosphere in the vessel and present new physical hazards in and outside the space. These risks must be addressed from the approval process through execution. The following additional precautions need to be taken:

1.11.1.1 Components including ducting, the cyclone, and vacuum equipment must be properly bonded together and must be grounded to prevent buildup of an electrostatic charge.

1.11.1.2 Hoses can be eroded by catalysts and must be visually examined prior to each use.

1.11.1.3 Vacuum operations must be stopped if the vessel O_2 level rises above 4%.

1.11.1.4 Consider location of the vacuum hose during emergency evacuation planning so it does not impede emergency egress from the vessel.

1.11.1.5 Spent catalyst containers must be inerted before being loaded.

1.11.2 At the end of vacuuming operations, filters and internal components of vacuum system should be thoroughly washed to remove pyrophoric residue and prevent build-up of pyrophoric waste.

1.12 COMMUNICATION

1.12.1 Entrants must maintain a communication system with personnel inside the confined space and those monitoring the work from the outside.

1.12.2 TERRY R PITT CONSTRUCTION attendants and entrants will use one or more of the following methods to communicate:

1.12.2.1 Tugging signals

1.12.2.2 Audible alarm operated by the attendant to signal immediate evacuation

1.12.2.3 Radio – set to specific emergency channel

1.12.2.4 Hand signals for basic communication

1.12.3 Entrant inside the space must be evacuated if primary communication link fails.

1.13 TERMINATING/CANCELING A PERMIT

1.13.1 The *Confined Space Entry Permit* is good for the duration of the time to perform the work specified or until the time limit on the permit expires.

1.13.2 Continuation of work beyond the time specified requires the issuance of a new permit.

1.13.3 The entry supervisor will terminate entry and cancel the entry permit when:

1.13.3.1 The entry operations covered by the entry permit have been completed

1.13.3.2 A condition that is not allowed under the entry permit arises in or near the confined space or when permit conditions change (ex. hazardous air monitoring results are noted, unsafe behaviors are observed, etc.).

1.13.4 Under these circumstances, the space will be closed and permit canceled. The entry supervisor will enter the date, time, and signature at the bottom of the *Confined Space Entry Permit*.

1.13.5 A *Confined Space Entry Permit* can only be terminated with a signature from an entry supervisor.

1.13.6 Upon termination of the *Confined Space Entry Permit*, the entry supervisor will confirm that:

1.13.6.1 Personnel are out of the confined space and accounted for

1.13.6.2 Equipment has been removed from the space

1.13.6.3 Entry portals, inlet and outlet piping are restored to operating conditions

1.13.6.4 Safety and automation systems are restored to normal service

1.13.6.5 The *Confined Space Entry Permit* is removed from the work area

1.13.6.6 Affected personnel are debriefed to identify deficiencies or hazards encountered during the entry. The debriefing will be documented on the canceled permit.

1.13.7 Canceled permits will be retained for at least one year to facilitate the review of the confined space program. If no entry is performed during a 12-month period, a review is not necessary.

1.13.8 Any problems encountered during an entry operation will be noted so appropriate revisions to the permit space program can be made, such as:

1.13.8.1 Any space is compromised by the entry of unauthorized personnel

1.13.8.2 A hazard not covered by the permit is determined or found to exist

1.13.8.3 Any injury or illness arises from the entry into a confined space

1.13.8.4 If employee feels the program does not provide adequate procedures or protection

1.14 RESCUE AND EVACUATION PROCEDURE

1.14.1 The emergency plan developed during the planning phase must be available onsite and verified. It is important that entrants, attendants, entry supervisor, and rescue team involved understand their roles and know what to do in the event of an emergency.

1.14.2 Pre-arrange emergency response and rescue from the onsite team or offsite sources (contract or local fire dept.) Offsite emergency services and rescue can be summoned by calling 9-1-1 or by pre-arranged methods of communicating with emergency response team onsite.

1.14.3 Establish primary evacuation route and *grouping area* and a secondary evacuation route and *grouping area* where employees assemble in the event of an emergency.

1.14.4 Entrants will immediately vacate the confined space and immediately proceed to designated *grouping area* upon being notified by attendant of an emergency that warrants evacuation.

1.14.5 Ensure that each member of the response team is provided with and is trained to use PPE and necessary rescue equipment. Each member must be trained to perform the assigned rescue duties including first aid and CPR. Response team must also receive entrant training.

1.14.6 Each member of the response team will practice making permit space rescues at least once every 12 months, by means of simulated rescue operations. Representative permit spaces will simulate the types of spaces from which any anticipated rescue is to be performed.

1.14.7 When non-company rescue personnel are designated to perform permit space rescue, TERRY R PITT CONSTRUCTION will inform rescue service of the hazards that may be encountered and provide the rescue service with access to all permit spaces from which rescue may be necessary so the response team can develop appropriate rescue plans.

1.14.8 Issues to consider when determining which rescue approach to take (either onsite or offsite):

1.14.8.1 Determine how quickly a rescue team can respond, the time it takes for the team to receive notification, arrive on scene, set up equipment, and be ready for entry

1.14.8.2 Availability of the rescue team and adequate communication

1.14.8.3 Willingness to rescue on company premises

1.14.8.4 Necessary skills and rescue equipment

1.14.9 Entry required rescue

1.14.9.1 Entry required rescue is to be executed by trained and certified individuals of the rescue team provided onsite by the hiring clients, TERRY R PITT

CONSTRUCTION, or by those individuals who have been contracted for rescue services prior to confined space entry.

1.14.10 Non-entry Rescue

1.14.10.1 For non-entry rescue, a lifeline attached to entrant is attached to a retrieval device or will be pulled by hand to extricate the injured party from the space.

1.14.11 TERRY R PITT CONSTRUCTION will provide protection of entrants from external hazards including pedestrians and vehicles and ensure no unauthorized entry into the work area by:

1.14.11.1 Barricading the area around the space to limit personnel in the area. The perimeter of this regulated area will be a minimum of 4 feet from the opening.

1.14.11.2 Placing DANGER TAPE across all confined space openings or entrances with a sign attached stating: *Permit Required*.

1.14.11.3 Posting warning signs: *Confined Space - Authorized Entrants Only* at the entry to the area which explains the hazards which may be encountered and the need to remain out of the work area unless authorized and qualified to enter.

1.14.12 Rescue service must be onsite for IDLH conditions while work is being performed, trained and equipped to provide prompt and effective rescue.

1.14.13 TERRY R PITT CONSTRUCTION will train affected employees to perform assigned rescue duties, as needed.

1.15 TRAINING

1.15.1 Each affected employee must be trained prior to initial assignment, prior to a change in assigned duties, if a new hazard has been created, or special deviations have occurred.

1.15.2 Entrants, attendants, entry supervisors, and rescue personnel will be trained on their respective responsibilities listed in this policy.

1.15.3 Confined space training will include understanding the duties and requirements of safe entry, the hazards they may encounter and the necessary precautions to eliminate or control those hazards, permit requirements, and rescue equipment.

1.15.4 TERRY R PITT CONSTRUCTION will certify employees assigned to confined space work are properly trained and that training is documented and maintained in employee's training file.

1.15.4.1 Certification will include employee name, date of training, nature of training, and instructor name and signature.

1.15.4.2 Certification will be provided to operator on an individual job basis, since crew members are subject to vary from project to project.

1.15.4.3 Copies of the employee's certification will also be made available to the employee or their designated representative upon notification.