OFG CONFINED SPACE ENTRY PROGRAM
CONFINED SPACE ENTRY PROGRAM

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CONFINED SPACE ENTRY PROGRAM

1. PURPOSE

The purpose of this program is to establish a uniform procedure for the safe entry into confined spaces and to protect University OFG employees while working in confined spaces such as manholes, pipe tunnels, boilers, tanks, high voltage electrical enclosures, etc.

2. SCOPE AND APPLICATION

a) This program describes basic mandatory practices and procedures for employee entry into, and work within, “permit required confined spaces” and “non-permit confined spaces”. For the distinction(s) between permit required confined spaces and non-permit confined spaces in this program see Section 5 – Confined Space Identification and Classification, and Section 6 - Reclassification. Ref. HIOSH 1910.146

b) This program applies to all OFG employees of the University of Hawaii at Manoa as referenced by the Hawaii Occupational Safety and Health Standards for General Industry, except those OFG employees covered by the Telecommunications Standards found in HIOSH 1910.268(t).

3. RESPONSIBILITIES

a) Assistant Vice Chancellor for Campus Services - Shall ensure that the campus community is kept informed of confined space issues, and that appropriate emphasis is placed upon facility repair and construction projects.

b) Director of the OFG – Shall ensure this procedure, the various attachments to ensure compliance with HIOSH and OSHA standards, and all copies of the attachments are updated.

c) BGM, FMO and Admin. Services Directors, Managers and Supervisors - Shall ensure that adequate training (with written records documenting the latest training) and equipment are provided to support OFG employees and shall ensure that all OFG employees are familiar with the requirements of this procedure.

d) EHSO - Will assist OFG in compliance with safety and health requirements.

e) Maintenance Supervisors (those trained as Entry Supervisors.) shall:

   i) Maintain the written entry permit system to ensure that OFG employees comply with the relevant safety and health requirements during the
performance of their duties and that they are provided with the proper equipment.

ii) Ensure training of OFG employees. Such training shall be conducted for new OFG employees and annually for all OFG employees on the contents of this procedure and other related OFG procedures. Training shall be documented and maintained through the OFG Personnel Office.

iii) When confined spaces and the hazards in those spaces are identified on campus and within buildings, the information gathered shall be forwarded to the Director of the OFG for inclusion into Attachment A of this procedure.

f) OFG Personnel Office shall maintain all documented training records as related to this procedure.

g) The Entry Supervisor (see Definitions, Page 9) shall be responsible for the following:

i) Know the hazard(s) and potential hazards that may be encountered during entry. Information shall include:

   (1) The mode

   (2) Signs or symptoms

   (3) Consequences of the exposure

ii) Determine the availability of the Honolulu Fire Department (rescue team). Ensure that the means to summon the rescue team is operable (cell phones, etc. are available, on-site and working).

iii) List the names of all the entrants and attendants for each entry on the Entry Permit. If the Entry Supervisor will enter the confined space he/she must be listed as an entrant. Use the Entry Roster form (Attachment C) and attach it to the Entry Permit (Attachment B).

iv) Ensure that all entrants have been trained in Confined Space Entry procedures including self rescue techniques to exit from the confined space.

v) Ensure that all tests specified by the permit have been conducted and recorded.

vi) Ensure that the appropriate entries have been made on the permit.

vii) Ensure that the permit space is isolated to the extent possible. If isolation of the permit space is not feasible because the space is large or part of a
continuous system, entry conditions shall be continuously monitored in areas where authorized entrants are working.

viii) Ensure that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

ix) Sign the Entry Permit. Permits are not valid unless signed by the Entry Supervisor.

x) Terminate the entry and cancel the permit as required.

xi) Remove ALL unauthorized individuals who enter or attempt to enter the permit space during entry operations, regardless of their job classification or authority.

xii) Determine that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

xiii) Document on the Entry Permit or on a separate sheet, any incidents or circumstances requiring review of the confined space entry program. Sign the written documentation and if a separate sheet is used be sure that the permit number is written on the sheet and the sheet is attached to the Entry Permit. Such incidents include but are not limited to the following:

1) Unauthorized entry or entry attempt.

2) The detection of a condition/hazard not authorized by the permit.

3) The occurrence of an injury or near-miss during entry.

4) A change in use, configuration of the space or reclassification from a permit required confined space to a non-permit required confined space.

5) Entrant concerns about the entry (procedure, tools, etc.).

6) Determines procedures for coordination of entry when personnel from multiple employers will work simultaneously.

xiv) When work is completed sign, remove, and file the canceled entry permit and all attachments.

xv) If the permit space must be evacuated for any unacceptable condition, the entry supervisor shall:

1) Order the entrants to exit the confined space.
(2) Note the unacceptable condition on the entry permit.

(3) Cancel the entry permit.

(4) Retain the canceled Entry Permit with all attachments for annual review.

(5) Correct the unacceptable condition if re-entry is planned. Document the corrective action.

(6) Verify the conditions in the confined space are acceptable if re-entry is planned.

(7) Issue a new Entry Permit before allowing re-entry.

h) **The Attendant (see Definitions, Page 7) shall be responsible for the following:**

i) Prior to worker entry into the confined space, the attendant shall have determined the location of the nearest functional telephone, and verified the working condition of the two-way radio or other means of communications in case of an emergency.

ii) Know the hazard(s) that may be encountered during entry. Information shall include:

   (1) The mode

   (2) Signs or symptoms

   (3) Consequences of the exposure.

iii) Awareness of possible behavioral effects of hazard exposure in authorized entrants.

iv) Continuously maintains an accurate count of authorized entrants in the permit space and accurately identifies who is in the permit space. Records the names of any additional entrants on the Entrant Roster (Attachment C). Records all times of entry and exit of each entrant on the Entrant Roster.

v) Remains outside of the permit space during operations until relieved by another attendant.

vi) Communicates with entrants continuously to monitor status and to alert entrants of the need to evacuate the space.
vii) Monitors activities inside and outside the space and orders entrants to evacuate the space immediately under any of the following conditions:

(1) If the attendant detects a prohibited condition (e.g., safety equipment fails, lighting fails, ventilation fails, the portable air sampling equipment fails or enters alarm mode, the space becomes, or has the potential to become, immediately hazardous space, or become aware of a previously unrecognized hazard).

(2) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant.

(3) If the attendant detects a situation outside the space that could endanger the authorized entrants.

(4) If the attendant cannot effectively and safely perform his duties.

(5) An evacuation alarm is sounded (e.g., air sampling equipment alarm, civil defense/tsunami/hurricane alarm[s], etc).

viii) Notify the Entry Supervisor immediately after taking the emergency action required, of the emergency, unusual situations or conditions.

ix) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

x) Takes the following actions when unauthorized persons approach or enter a permit space while authorized entry is under way:

(1) Warn the unauthorized persons that they must stay away from the permit space.

(2) Advise the unauthorized persons that they must exit immediately if they have entered the permit space.

(3) Inform the authorized entrants and the Entry Supervisor if unauthorized persons have entered the permit space.

xi) Performs non-entry rescues.

xii) **Does Not Perform and May Not be** assigned any duties that will interfere with the attendant’s primary duty to monitor and protect the entrants.
i) **Entrants (see Definitions, Page 9) shall be responsible for the following:**

   i) Know the hazard(s) that may be encountered during entry. Information shall include:
      
      (1) The mode

      (2) Signs and symptoms

      (3) Consequences of the exposure.

   ii) Communicating with the attendant continuously to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.

   iii) Alert the attendant whenever:
      
      (1) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

      (2) The entrant detects a prohibited condition.

   iv) Exit from the permit space as soon as possible when:
      
      (1) An order to evacuate is given by the attendant or the entry supervisor.

      (2) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

      (3) The entrant detects a prohibited condition.

      (4) An evacuation alarm is activated.

   v) After the entry is completed, ensure that the confined space is clear and free of hazards. This includes but is not limited to the following:
      
      (1) Removal of tools, equipment and debris from the confined space at the completion of the job.

      (2) Confirm that all blinds (see definition, Page 7) are removed, all valves properly opened or closed, lines are properly reconnected, all locks and/or tags are removed and the space is completely ready to be returned to service.

      (3) Clean the surrounding area.
4. DEFINITIONS

a) ATTENDANT - means an individual assigned to remain immediately outside the entrance to the confined space, to monitor authorized entrants, to perform all the attendant’s duties assigned by this procedure and who may render assistance as needed to entrants inside the space without entering the space.

b) BLIND, BLINDING or BLANKING - means the absolute closure of a pipe, line or duct, to prevent passage of any material by fastening a solid plate or “cap” across the bore and which is capable of withstanding the maximum potential upstream pressure and temperature.

c) CALIBRATION or RECALIBRATION - means a laboratory or bench-top resetting of alarm points, spans and zeros, if applicable, according to manufacturer specifications. Calibration or re-calibration shall be conducted by a factory authorized service center, a factory trained technician, or a trained University technician.

d) CONFINED SPACE - means any space:

i) That is large enough and so configured that an employee can bodily enter and perform assigned work.

ii) Not intended for continuous employee occupancy,

iii) Having a limited means for worker entry or exit due to the number, size or location of openings.

iv) That has doors and other portals through which a person could walk are not considered limited means for entry and exit. However, a space containing such a door or portal may still be deemed a confined space if an entrant’s ability to escape in an emergency would be hindered.

Note 1. Confined spaces generally include, but are not limited to: storage tanks, bins, boilers, ventilation or exhaust ducts, sewers, manholes, underground utility vaults, tunnels and pipelines. Open top spaces more than four feet in depth such as: pits, tubs, and vaults may also be confined spaces if the four above criteria are met. See: Permit Required Confined Space 4.cc.

Note 2. Service operations where OFG employees work in crawl spaces and tight rooms are generally not considered “confined spaces”. These types of spaces will need to be individually evaluated.

e) CPR - Cardio-Pulmonary Resuscitation
f) **DOUBLE BLOCK AND BLEED** - means the closure of a line, duct or pipe by locking and tagging a drain or vent to open to the atmosphere in the line between two locked-closed valves.

g) **ENGULFMENT** - means the surrounding and effective capture of a person by finely divided particulate matter or a liquid. There is potential for engulfment when such particulate matter or liquid exists in a sufficient quantity or at a sufficient pressure to surround a person before a normal exit can be affected.

h) **ENTRANT** - any associate who enters a confined space. A **QUALIFIED ENTRANT** is a person who:

i) Has a valid need to enter a confined space.

ii) Has been trained as required by this procedure.

iii) Has been briefed on the hazards of the confined space and is properly protected from all such hazards by use of appropriate engineering controls or personal protective equipment.

iv) Is listed on the Entry Permit.

i) **ENTRY** - means:

i) Any action resulting in any part of the employee’s body breaking the plane of any opening of the confined space,

ii) Includes any ensuing work activities inside the confined space,

iii) All periods of time that the confined space is occupied

j) **ENTRY PERMIT** - means the written or printed document provided by a qualified OFG Supervisor to allow and control entry into a permit space for a stated purpose during a specified time. The confined space entry permit must be properly completed prior to any confined space entry and must be posted at the portal of the confined space in use. See Attachment B.

k) **ENTRY PERMIT LOG** - OFG document which is used to assign numbers to Entry Permits. See Attachment D.

l) **ENTRY SUPERVISOR (QUALIFIED PERSON)** - means:

i) A person who is trained on all aspects of this procedure and on how to recognize the hazards of the confined space, how to evaluate those anticipated hazards, and shall be capable of specifying necessary control measures to ensure worker safety.
ii) The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry, overseeing entry operations and for terminating entry.

iii) The entry supervisor may or may not actually participate throughout the entry, but shall be on the scene during the issuance of any confined space entry permit and be readily available in person, via phone, or through the internet for consultation during the course of the entry.

m) EMERGENCY - means any occurrence, internal or external to the permit space, of an event including the failure of hazard control or monitoring equipment that could endanger entrants.

n) FIELD CHECKED - means the checking of the accuracy of an instrument’s response to a known concentration of a gas: a method of checking an instrument for a proper response in the field. It is a check of the instrument’s functionality and is a pass/fail or go/no-go check. When an adequate response is not obtained, the equipment shall be removed from service and adjusted or repaired by a factory authorized service center, a factory trained technician, or a trained University technician.

o) GROUND FAULT CIRCUIT INTERRUPTER (GFCI) - means a device whose function is to interrupt the electric circuit to the load when a fault current to ground exceeds a predetermined value that is less than that required to operate the over-current protective device of the supply circuit.

p) HAZARDOUS ATMOSPHERE - means an atmosphere presenting a potential for death, disablement, injury, acute illness, or the inability to escape unaided from a permit space, from one or more of the following causes:

i) A flammable gas, vapor, or mist in excess of 10% of it’s Lower Flammable Limit (LFL).

ii) An oxygen- deficient atmosphere containing less than 19.5% oxygen by volume or an oxygen enriched atmosphere containing more than 23.0% oxygen by volume.

iii) An atmospheric concentration of any substance listed in Subpart Z of Part 1910 Standards above the listed numerical value of the Permissible Exposure Limit (PEL). In the case of substances for which no PEL has been established, the EHSO Safety Specialist must be contacted to establish a safe atmospheric concentration prior to entry.

iv) An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
v) A concentration of an air contaminant that is considered Immediately Dangerous to Life or Health (IDLH) by any published source, including the manufacturer’s Material Safety Data Sheet (MSDS).

vi) A condition Immediately Dangerous to Life or Health (IDLH) as defined in this procedure.

q) HOT WORK - Work that produces arcs, sparks, flames, heat, or other sources of ignition. This includes but is not limited to burning, welding, grinding, riveting and space heating.

r) HOT WORK PERMIT LOG - OFG document which is used to assign numbers to Hot Work Permits. Attachment E.

s) INTRINSICALLY SAFE - Equipment that is explosion proof and will not produce sparks or other ignition sources.

t) IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH) - means any condition that poses an immediate or delayed threat to life, or which is likely to result in acute or immediately severe health effects or that would interfere with an individual’s ability to escape unaided from a confined space.

**NOTE:** Only qualified personnel with proper protective equipment may be permitted to enter IDHL confined space.

u) IMMEDIATE SEVERE HEALTH EFFECTS - means that an acute clinical sign of serious, exposure-related reaction is manifested within 72 hours of exposure.

v) INERTING - displacement of the atmosphere by a nonreactive gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

**NOTE:** This procedure (INERTING) produces an IDHL oxygen deficient atmosphere.

w) LFL - Lower Flammable Limit - the minimum concentration of a flammable gas or vapor in air (usually expressed in percent by volume at sea level), that will ignite if an ignition source is present.

x) LINE BREAKING - the intentional opening of a pipe, line or duct that is/or has been carrying flammable, corrosive or toxic material, an inert gas and/or fluid at a volume, pressure, or temperature capable of causing injury.

y) LOCKOUT OR TAGOUT - means placing locks or tags on the energy isolating device(s) in accordance with OFG procedure, Lockout/Tagout. The key for any lock used for Lockout shall remain with the person working within the confined space.
z) OXYGEN DEFICIENT ATMOSPHERE - an atmosphere containing less than 19.5 percent oxygen by volume.

aa) OXYGEN ENRICHED ATMOSPHERE - an atmosphere containing more than 23.0 percent oxygen by volume.

bb) PEL - Permissible Exposure Limit

cc) Permit Required Confined Space or Permit Space - those spaces which meet the requirement of Confined space and which also pose health or safety hazards such as:

i) A current or potentially hazardous atmosphere,

ii) Potential worker entrapment (from inwardly converging walls or downward sloping floor),

iii) A potential for engulfment,

iv) Contains any other serious safety or health hazard.

dd) PPE - Personal Protective Equipment

ee) PURGING - the method by which gases, vapors or other airborne contaminants are displaced.

ff) RESCUE TEAM - means those OFG employees whom management has designated and provided training to perform rescues from confined spaces PRIOR to any confined space entries. A rescue team from the Honolulu Fire/Rescue emergency services will normally be the rescuers of choice providing that the training and notification requirements of this procedure have been met.

gg) RETRIEVAL LINE - means a line or rope secured at one end to a worker's safety belt, chest or body harness, or wristlets with the other end secured to an anchor point or lifting device located outside the entry portal. The anchor point shall not be a motor vehicle. Retrieval lines shall be of sufficient strength to remove an entrant when necessary.

hh) SCBA - Self Contained Breathing Apparatus

ii) ZERO MECHANICAL STATE - means that the mechanical potential energy of all portions of the machine or equipment is at its lowest practical value, set so that the opening of the pipe(s), tube(s), hose(s), or actuation of any valve, lever or button will not produce a movement which could cause injury.
5. CONFINED SPACE IDENTIFICATION AND CLASSIFICATION

a) Entry Supervisors are responsible for:

i) Identifying and classifying all confined spaces into which OFG employees will enter. Entry is considered to have taken place as soon as any part of the entrant’s body breaks the plane of an opening into the space.

ii) Identifying and providing written information as to the contents of the space, atmospheric conditions and rescue procedures. This information is to be forwarded to the OFG Director for inclusion into Attachment A.

b) A permit required confined space is:

i) A confined space that meets the stated definition.

ii) Contains or could contain a hazardous atmosphere.

iii) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.

iv) Contains any other recognized serious safety or health hazard.

c) If a space is not considered “permit required” but meets the criteria in this procedure, it must be considered permit required for entry.

6. RECLASSIFICATION

a) Although ALL confined spaces are initially considered “permit required confined spaces”, certain spaces can be reclassified as an “alternative procedure” entry or a “non-permit required” confined space (see Attachment B), provided the following apply:

i) Site specific approval of a qualified professional. (i.e.: Entry Supervisor, EHSO Safety Specialist, etc.)

ii) All contaminants, vessels containing contaminants, and contaminated material have been removed.

iii) All actual or potential atmospheric hazards have been eliminated and verified by testing.

iv) Ventilation is not required to maintain control of atmospheric hazards (exception per “alternative procedure” entry outlined in Attachment B).
v) All recognized hazards have been eliminated.

b) The Entry Supervisor (or EHSO Safety Specialist, qualified professional, etc.) shall document in writing on Attachment B (Entry Permit), the basis for reclassifying a permit required confined space to an “alternative procedure” or a “non-permit required” confined space entry, and sign and date the Entry Permit.

c) The space shall be re-evaluated whenever the use or configuration of the space changes in any way that might increase the hazard to entrants. If necessary the space shall be reclassified to permit required confined space.

d) All entrants shall exit the space immediately when hazards are noted.

e) The Entry Permit and all attachments shall be posted at the portal to the confined space.

7. ENTRY PROCEDURE

a) Entering permit spaces is potentially one of the most dangerous jobs in industry. Entry into a confined space shall be conducted only if necessary to do assigned work. Whenever possible assigned work shall be done from outside the space.

b) This Confined Space Entry Procedure shall be followed for entry into any defined confined space.

c) This procedure is to be used only by trained entry supervisors, entrants and attendants.

d) Hazards of entering confined spaces can be managed safely if the following principles and procedures are followed:

i) Identify the confined space and develop a written work plan for isolating, clearing and entering the space.

ii) Identify known and potential hazards or contaminants that may be found in the space.

iii) Any deficient areas shall be corrected before entry proceeds.

iv) Isolate the space from all hazardous energy sources, production streams and/or energized equipment and stored pressure.

v) Prohibit entry into the space until atmospheric testing is conducted and the applicable entry permit is completed, signed and posted at the portal to the space.
vi) When removing the space from service, the space shall be opened up as much as possible to allow for good ventilation. Empty, flush, purge, ventilate and clear the confined space (from the outside if possible).

vii) After the space has been removed from service and prior to entry, initial testing of the atmosphere shall be conducted.

viii) Ventilate the space to remove any residual hazardous gases, vapors, dusts and fumes. Then test the atmosphere with the ventilation system turned off.

ix) After the initial applicable entry procedures have been conducted, the entry supervisor, an entrant, attendant or other trained person shall verify that all actions and conditions necessary for safe entry have been performed.

x) Once the verification is completed, the entry supervisor shall sign the entry permit.

xi) Entry is prohibited until the permit has been completed satisfactorily and signed.

xii) Prepare the entry permit, specifying the hazards that may be found, acceptable entry conditions, and required level of PPE to be used.

xiii) Prepare the Hot Work Permit (as applicable) (see Attachment E) if hot work is to be conducted in a confined space.

xiv) Review the hazards, safety requirements and PPE requirements with all entry personnel during the pre-entry meeting before entering the space.

8. GENERAL REQUIREMENTS

a) Each confined space being entered shall have a minimum of one dedicated attendant and one other support person (who may have other duties) within sight or call. The support person does not have to be a qualified entrant, but may not enter the space unless they have been properly trained.

b) All Entry Supervisors must be thoroughly familiar with the confined space entry procedures and shall be responsible for ensuring that all entries are conducted according to this procedure.

c) The use of the space, internal configuration, size of the openings, contents, construction materials, internal mechanical devices, unique characteristics and hazards are all factors that should be known by all entrants before entering.

d) No confined space entry is permitted without a properly executed Confined Space Entry Permit.
e) No confined space will be entered until it has been thoroughly tested for hazardous conditions and all of those conditions have been properly eliminated or overcome.

f) Unauthorized entry shall be prevented through measures such as training, posting of signs and barriers.

g) All required PPE must be sanitary and in proper working condition prior to use.

h) All members of the entry team must be properly trained, including the entry supervisor, entrants, attendants, OFG rescue personnel and Honolulu Fire/Rescue emergency personnel.

i) Contingencies/Emergencies specific to each entry must be anticipated and planned for such as:

   i) Worker asphyxiation, engulfment or injury

   ii) Fire and explosion

   iii) Fluid or gas leaks

j) All support equipment such as breathing apparatus, fire extinguishers, rescue ropes and harnesses, atmospheric monitors and required electrical devices (Ground Fault Circuit Interrupters [GFCI], explosion proof or intrinsically safe equipment, etc.) shall be utilized during entry and readily available as needed.

k) Rescue procedures and related equipment must be anticipated beforehand and be readily available during entry.

l) Any deviation from this procedure must be approved in writing and attached to the Entry Permit by the Supervisor responsible for the Confined Space Entry.

9. CONFINED SPACE ISOLATION PROCEDURE

Before persons are permitted to enter a confined space the following isolation procedures shall be conducted where applicable:

a) Depressurize the confined space if necessary.

b) The confined space must be isolated by Lockout/Tagout to preclude the entry of hazardous materials. Prevent the introduction into the confined space of hazardous materials from interconnecting equipment such as piping, ducts, vents, drains or other means. This will include not only inlet and outlet piping but all potential sources (electrical, thermal, hydraulic, mechanical, pneumatic, etc.).
c) Lockout/Tagout any hazardous energy sources within or attached to the confined space to prevent accidental movement or energizing of such sources. Where applicable, one or more of the following methods shall be used:

i) Remove a valve, spool piece, or expansion joint in piping to, and as close as possible to, the confined space, and blank or blind a pipe or duct at the nearest accessible point to the confined space.

ii) Employ the “double block and bleed” technique (a method used to isolate a confined space from line, duct or pipe by locking closed and tagging in-line valves on a piping system, and opening a valve between them that is vented to the atmosphere) at the nearest accessible point to the space.

iii) In cases where lines have contained hazardous liquids or gases, inert gases, or gases or liquids at high temperature or pressure, all lines entering the space (process, steam, pneumatic or hydraulic lines, vents, drains, etc.) shall be physically disconnected as close to the tank or vessel as possible and practical.

iv) Lines shall also be physically disconnected if they could introduce non-hazardous substances into the space in quantities that could engulf the entrants. If possible the open ends of disconnected lines must be blanked or capped to prevent any liquids or gases from entering the space. All blind flanges must be of sufficient thickness and tensile strength to withstand maximum pressures and corrosion by chemicals to which they may be exposed.

v) Pressure in the lines must be bled down to atmospheric levels. Where lines cannot be physically disconnected due to space limitations, they may be blinded and tagged or a double block and bleed arrangement may be used.

d) To avoid the buildup of static electricity, all lines and other equipment used during the entry shall be electrically bonded and grounded to the space.

e) All sources of ignition within the space, and those nearby which are close enough to pose a hazard, shall be turned off and locked out.
10. VENTILATION

a) Continuous ventilation of the space shall be performed under the following cases:

   i) Initial air monitoring was not acceptable.

   ii) Natural ventilation is not adequate (example, space has only one entrance).

   iii) Chemicals are to be introduced into the space for cleaning or other purposes.

   iv) Welding or other “hot work” is to be conducted inside the space.

b) Only intrinsically safe air movers shall be used to ventilate confined spaces. Such air movers must be electrically bonded and grounded to prevent any buildup of static charge during operation.

c) Oxygen or power air-driven ventilators shall not be used to ventilate space.

d) Air movers used for ventilation shall be operated in the supply mode. The ventilation rate shall be high enough to achieve 20 air changes per hour based upon the total cubic feet of the space.

e) Blowers shall be placed at least 5 feet away and upwind of the entry to the space to prevent re-entry of contaminated air.

f) Whenever possible, air movers shall be used with ducting to increase the efficiency of ventilation in the space and to prevent re-entry of contaminated air. For maximum efficiency, the end of the ducting must be placed within 2 feet of the bottom of the space.

g) To prevent re-entrainment of contaminated air, ensure the ducting is placed out of the path of the purged air that is escaping from the space.

h) If the ventilation stops, all entrants shall evacuate the space immediately.

i) The space must be thoroughly ventilated using atmospheric air only (never compressed air or oxygen). The equipment providing the ventilation outside the confined space must be situated to ensure that it does not introduce exhaust fumes or other toxic gases into the space.

j) Continuous ventilation shall be used while welding in a confined space or working in tank/vessel(s) that contain sludge, scale or other flammable materials.
11. POTENTIAL HAZARDS OF CONFINED SPACE ENTRY

a) Asphyxiation may occur because:

i) Certain chemicals can absorb or replace oxygen in the space (inert gases).

ii) Welding processes can deplete oxygen in the confined space and elevate the carbon monoxide levels.

iii) Metal oxidation (rusting) inside a closed vessel may deplete oxygen from the atmosphere.

iv) Improper or inadequate ventilation can allow toxic or asphyxiation gases to accumulate within the space.

b) Gases or dusts present a fire and/or explosion hazard and:

i) May come from residues in the confined space.

ii) May enter from upstream or downstream components.

iii) May be introduced by compressed welding gases (acetylene, oxygen, etc.).

iv) May be introduced by liquid or gaseous releases from outside the confined space.

c) Toxic substances or atmospheres:

i) May be introduced from inside or outside the space.

ii) May cause damage through inhalation, ingestion or direct skin contact.

iii) Exposure effects may vary from mild to fatal.

iv) May be generated from procedures or materials used during the entry.

d) Electric shock can occur if electrical energy to the space is not properly disconnected and locked out or tagged out, or if equipment used in the space is improperly grounded or insulated.

e) Physical injuries can occur because of:

i) Slippery conditions within the space.

ii) Falling objects.
iii) Contact with hot metal or corrosive chemicals.

iv) Failure to disconnect and lock out all energy supplies to moving equipment inside the confined space.

v) Poor lighting.

vi) Cave-in when working in a trench or excavation.

f) Note existing or potential hazards such as:

i) Oxygen deficiency or enrichment

ii) Flammability

iii) Toxicity

iv) Mechanical hazards

v) Heat hazards

vi) Engulfment

12. CONFINED SPACE ATMOSPHERIC MONITORING PROCEDURES

a) A written record of the pre-entry atmospheric monitoring results shall be documented and kept at the work site for the duration of the entry. This record is part of the entry permit and is to be kept on file for 1 year.

b) The entry supervisor shall certify in writing, based upon the results of the pre-entry atmospheric monitoring, that all hazards have been eliminated.

c) All affected persons must be able to review the test results.

d) The most hazardous conditions will govern when work is being performed in two adjoining, connecting spaces.

e) After the space has been removed from service and prior to entry, a trained entrant or attendant shall conduct initial testing of the atmosphere inside the space. The testing shall be performed in the following sequence:

i) Oxygen,

ii) Flammable atmosphere (%LFL), and

iii) Toxic gases or vapors. Record the readings on the entry permit.
f) Atmospheric testing shall be conducted using only properly calibrated air monitoring equipment. Properly calibrated equipment is equipment that has been calibrated using the manufacturer’s recommended specifications within the past 30 days. The most recent calibration date shall be marked on the equipment and in the log book for testing and maintenance of such equipment.

g) After appropriate ventilation, a check of the atmosphere inside the confined space shall be conducted prior to entry, as determined by the potential hazard and immediately prior to any hot work. If IDLH conditions are suspected, an air supplied respirator must be used while conducting initial testing. Record the readings.

i) Ventilating equipment shall be turned off at least fifteen minutes prior to performing any atmospheric monitoring to ensure that the values shown are representative of the raw atmosphere within the space.

ii) Tests shall be conducted with a properly calibrated detector(s) in the following order:

   (1) Oxygen
   (2) Flammable vapors (%LEL)
   (3) Suspected airborne contaminants

iii) The person conducting the atmospheric monitoring shall initial and list on the permit the date/time the testing was conducted and the results of the test.

h) Atmospheric monitoring shall be conducted at a minimum of 3 locations within the space (i.e., bottom, middle, and top of space) for a minimum of 1 minute in each location. Record the readings on the entry permit.

i) If entry is to be through a manhole, initial air monitoring shall be conducted through the manhole cover without removing the cover whenever possible. This is to prevent sparking in case of a flammable atmosphere in the space.

ii) If entry is to be through the side of a space, testing immediately inside the space shall be conducted prior to entry. After entry, atmospheric monitoring of the space 5 feet in front of the entrant shall be conducted using a 3 foot probe.

i) All atmospheric monitoring results shall be legibly recorded on the entry permit documenting the range of results obtained from the different sampling locations within the space.
j) Entry into a confined space is prohibited when one or more of the following conditions are present:

i) Atmospheric oxygen concentration below 19.5 or above 23.0 percent.

ii) Flammable atmosphere in excess of 10 percent of it’s LEL.

iii) Airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less, or combustible dust concentration is more than LEL.

iv) Any air contaminant at a concentration in excess of it’s allowable concentration.

v) If the oxygen concentration is not within the range of 19.5 to 23.0 percent, the reason for the abnormal reading shall be investigated. Such a reading may indicate the presence of another toxin, such as carbon monoxide, that displaces oxygen. This toxin shall also be monitored for.

vi) If any or more of the above conditions exist, the space shall be ventilated for a minimum of 10 minutes prior to re-testing.

(1) With the ventilation still on, retest the space.

(2) If conditions are still not acceptable, contact a qualified professional.

k) All atmospheric monitoring shall be performed by a trained qualified person, such as an Entry Supervisor, EHSO Safety Specialist, etc., and all readings are to be recorded on the Confined Space Entry Permit.

l) Continuous atmospheric monitoring may be needed based upon the potential for changing atmospheric conditions. Readings are to be recorded every fifteen minutes.

13. CONFINED SPACE ENTRY PERMIT (Attachment B)

a) The entry permit serves several essential functions:

i) It restricts entry so that only authorized personnel may enter a confined space.

ii) It ensures that communication takes place and hazards are controlled.

iii) It minimizes safety precautions to be taken.

iv) Serves as an official written record of existing conditions, requirements and safeguards.
v) Serves as a tool for reviewing this procedure.

b) Entry into a confined space shall be documented in writing using an ENTRY PERMIT.

   i) The permit is a written authorization and approval that specify the job to be done and certify that all hazards have been evaluated and protected against.

   ii) It also serves as a record of all entrants.

   iii) All required signatures must be present and the permit must be filled out completely.

c) Entry permits are only valid for a specified time period (e.g., one task or one shift).

d) Prior to entry, a copy of the entry permit shall be made available to all entrants by posting it at the portal. All entrants shall examine it to determine if entry conditions have been met.

e) The original permit and any subsequent permits shall be retained for a minimum of one year.

f) All permit required confined space entries shall have the following minimum equipment at the entry site prior to initiating the entry:

   i) Communication equipment

   ii) Full body harness

   iii) Appropriate PPE

   iv) For top entry: rescue line & tripod retrieval winch

   v) For bottom entry: rescue line, wristlets.

g) A separate Hot Work Permit (Attachment E) shall be obtained for any welding, burning, drilling or other hot work that will take place within the space and attached to the entry permit.

h) The Entry Permit shall outline the elements of a rescue plan for the rescue of entrants in case of an emergency. It will outline at least the following elements:

   i) Designated rescuers

   ii) Equipment
iii) Methods of summoning the rescue team.

i) Prior to any confined space entry, a pre-entry safety meeting shall be held that involves all participants (including contractors) and covers at least the following points:

   i) Review all existing or potential hazards that may exist in the space.

   ii) Review the required levels of PPE. The Entry Supervisor shall ensure that each participant has the proper PPE and knows how to use it.

   iii) Discuss the work to be performed, who will do it and how it will be done safely.

   iv) Review the rescue plan that will be activated in case of emergency.

   v) Anyone not attending the pre-entry safety meeting will not be allowed to enter the permit space until they have been briefed on all the information presented at that meeting.

j) Preparation of the Entry Permit

Entry into a permit-required confined space shall not be made unless an Entry Supervisor has assured that the following procedures have first been completed:

i) An entry permit is initiated by signing the Confined Space Permit Log (Attachment D), obtain a blank Entry Permit (Attachment B) and fill it out. The permit will indicate:

   (1) The specific confined space to be entered.

   (2) What work is to be performed.

   (3) The length of time estimated to complete the work. Permits are only valid for 8 hours. A permit may be extended for another 8 hours provided that acceptable conditions are re-certified and test results entered on the permit.

   (4) What date and time the work will be started.

   (5) Personnel names and who will perform the work.

   (6) Name and title of Entry Supervisor.

   (7) Name of person acting as the “Attendant”.
(8) All pumps or lines which may convey flammable, injurious, or incapacitating substances into the confined space shall be disconnected, blinded, (double blocked or bled), or effectively isolated by other means to prevent the development of dangerous levels of air contamination or oxygen deficiency within the space. The closing of valves alone, or the closing of valves and locking or tagging of them, is not considered effective protection. The disconnection or blind shall be so located or done in such a manner that inadvertent reconnection of the line or removal of the blind are effectively prevented.

NOTE: This does not require the blocking of all laterals to sewers or storm drains unless experience or knowledge of industrial use indicates materials resulting in dangerous air contamination may be dumped into an occupied sewer.

(9) The atmospheric testing equipment must be “field checked” prior to testing the atmosphere in the confined space.

(10) Atmospheric testing must be conducted for oxygen levels between 19.5% and 23.0% by volume and the percentage found is to be entered on the permit. The last calibration date of the oxygen detector must be entered on the permit.

(11) Atmospheric testing must be conducted for flammable gas, vapors or mists in excess of 10% of its LEL and results noted on the permit. The last calibration date of the combustible gas indicator must be entered on the permit.

(12) The confined space must be flushed or emptied of all dangerous substances and then tested for known toxic substances for the Permissible Exposure Limit (PEL) per Attachment A.

(a) Enter the value of the PEL on the permit.

(b) If a hazardous atmosphere is present ventilation and respirators must be provided.

(13) Electrical and mechanical hazards must be removed or prevented from causing a hazardous situation.

(14) OFG employees entering a permit-required confined space with a hazardous atmosphere must be provided with an appropriate retrieval device, retrieval line and an appropriate respirator. The associate must have received and have documented training on the use of a respirator.
ii) If a hazardous atmosphere is present atmosphere testing shall be conducted every hour that the confined space is occupied and results noted on the permit.

iii) If there is a problem, necessary action shall be taken to ensure the safety of those involved. The attendant is to contact the applicable rescue team and inform them of the conditions when they arrive on the scene. The University EHSO must be notified immediately of all problems.

   NOTE: Under NO circumstances is the attendant to enter the confined space.

iv) When the work has been completed the Entry Supervisor shall sign the permit as being completed and all conditions in the confined space have been returned to normal, the space is closed and properly marked.

14. CONFINED SPACE ILLUMINATION

   a) All confined spaces shall be properly illuminated.

   b) When temporary lighting is used in confined spaces containing combustible or flammable dusts, residues or contaminates, the following requirements shall be met:

   i) All temporary lighting and powered equipment shall be protected by the use of a Ground Fault Circuit Interrupter (GFCI) or be the low voltage type (12 volts).

   ii) All lighting shall be Factory Mutual (FM) or Underwriters Laboratories (UL) approved. Equipment used in hazardous areas shall match the classification of the area (i.e., Class 1 or 2, Division 1 or 2, etc.).

   iii) Extension cords used for temporary lighting shall be equipped with connectors or switches approved for hazardous locations.

15. PROTECTIVE EQUIPMENT

   a) Appropriate protective equipment (selection based on exposure) shall be worn during entry. This may include but is not limited to the following:

   i) Protective clothing

   ii) Hard hat

   iii) Gloves

   iv) Safety-toed footwear
v) Safety glasses with side shields, or face shields

vi) Respiratory protection

b) No one will use respiratory protection unless they have been properly trained and qualified in its use according to 1910.134.

c) A rescue line shall be worn by all entrants unless it would increase the overall risk of entry.

i) The rescue line shall be attached to a mechanical device or fixed point outside the space. Under NO circumstances is the line to be fastened to a vehicle.

ii) A mechanical device must be available to retrieve personnel from vertical type spaces more than 4’ deep.

iii) A full body harness shall be worn for all top entry confined spaces.

d) Personal Protective Equipment (PPE) is necessary for entry into a confined space if the space contains a corrosive hazard or if chemicals that are brought into the space require such clothing.

i) The proper type of PPE must be assigned for use in confined spaces based on the types and amounts of hazardous substances present in the confined space.

ii) The Entry Supervisor is to contact the EHSO Safety Specialist if there is any question about what is proper PPE for a particular entry.

iii) Additional information may be obtained from the applicable MSDS.

e) Where required, PPE shall be used in accordance with 1910.134, and shall be NIOSH approved.

i) Respiratory protection is required in situations where hazardous dusts are present and when atmospheric monitoring results dictate.

ii) The EHSO Safety Specialist shall determine the proper type of respiratory equipment required.

iii) OFG employees MUST be trained in the proper selection and use of PPE.
f) Retrieval equipment is required for all permit required confined spaces such as entries that:

i) Present an engulfment hazard from the presence of a material inside the space during entry.

ii) Involve hot work or the presence of chemicals inside the space.

iii) Require the use of air supplying respirators.

g) Retrieval equipment shall include:

i) A retrieval line that shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve OFG employees from vertical type permit spaces more than 4 feet deep.

A chest or full body harness, with a retrieval line attached at the center of the entrants back near shoulder level, or above the entrants head. Wristlets may be used in place of the chest or full body harness if the Entry Supervisor can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

ii) Fall protection for spaces greater than 4 feet in depth and requiring entry through the top.

h) As a minimum, safety glasses and safety shoes or boots shall be worn while in a confined space.

16. MISCELLANEOUS TOOLS AND EQUIPMENT

Many types of tools and equipment may be utilized to conduct a confined space entry. The tools and equipment shall meet the following minimum criteria:

a) Electrical tools using nominal 120 volt alternating current shall be grounded and connected only to a GFCI circuit. (Low voltage systems (12 volts) are preferred.)

b) Within spaces where a flammable atmosphere may exist, all electrical equipment shall be explosion proof or intrinsically safe.

c) All electrical lighting systems shall be connected to a GFCI circuit or provided by a 12 volt electrical system.
d) Where ladder or scaffolding use is required, all equipment shall be non-slip/skid and shall be secured (tied off) as necessary to ensure against falling.

e) Arc welding equipment shall be properly grounded, taken into space only when needed and removed as soon as possible. A Hot Work Permit is required.

f) Compressed gas cylinders (except breathing air and portable fire extinguishers) ARE NOT to be taken into any confined space. Oxyacetylene hoses and arc welding equipment may be taken into the space but must be checked for leaks and/or cracks prior to use. If leaks or cracks are found the hose or cable shall be replaced immediately.

17. MEDICAL CONSIDERATIONS

a) Individuals who are claustrophobic should be made aware of the conditions involved in a confined space and should notify their Supervisor if they feel unable to function in such an environment. The Supervisor should excuse such individuals.

b) Other Precautions

i) The number of confined space entrants should always be kept to a minimum, especially during “hot work” (welding or burning).

ii) Entry will not be permitted until entrants have a minimum visual distance of 5 feet within the confined space.

18. ADDITIONAL PROCEDURES

a) Rescue Service Personnel

i) Rescue teams shall be from the Honolulu Fire Department as well as in-house personnel trained to effect rescues.

ii) All rescuers entering the space shall be trained and equipped to perform rescues. They shall also be trained as entrants.

iii) A rescue entry is to be considered as IDHL until proven otherwise.

iv) Rescuers shall use a separate air supply from those being rescued.

v) Rescue teams shall:

   (1) Be provided with, and trained to use properly, all necessary equipment to make rescue from a confined space.
(2) Practice making confined space rescues at least once every twelve months, extracting dummies, mannequins or personnel from confined space that closely approximate those for whom rescue may be required.

(3) Have each member of the rescue service trained in basic first-aid and CPR. At least one of the rescuers holding current certification in CPR and basic first-aid shall be available.

b) Emergency Preparation and Procedures

i) Appropriate fire protection and/or water supply should be readily available and operable if needed.

ii) For emergencies:

(1) At least one reserve air line cart and two air lines must be readily available.

(2) A rescue harness and line(s) must be available.

(3) If necessary, a SCBA may be used in lieu of an airline respirator when used in conjunction with a five-minute escape bottle.

iii) Attendants will not enter a confined space to make a rescue unless ALL the following conditions are met:

(1) They are relieved by another attendant.

(2) They are also trained as entrants.

(3) They are equipped with the proper PPE clothing and equipment.

19. TRAINING

a) OFG Supervisors shall inform their employees of the hazards of working in confined spaces and permit-required confined spaces by providing specific training to OFG employees before they may be authorized to enter a confined space.

b) New OFG employees shall receive an introduction to confined space entry procedures from their OFG Supervisor, or the EHSO Safety Specialist. It will include a briefing on and a copy of, the confined space entry procedure with Attachments B, C, D and E. Attachment A will be reviewed by OFG employees and be available to them when requested. Attachment A is available in each Supervisors office. Supervisors must ensure that untrained OFG employees DO NOT participate in confined space entries.
c) All Entry Supervisors, entrants and attendants shall attend an annual training course to keep aware of changing requirements and to maintain skills. Supervisors shall document through the OFG Personnel Office that the required training has been received and that the OFG employee is proficient in the duties required of him/her. Documentation shall contain each trained employee’s name, the signature of the trainer and the date of training.

d) Training shall include but is not limited to the following;

i) All Entry Supervisors, entrants and attendants of a confined space shall have completed training on the related OFG Policies and Procedures that meet applicable OSHA and HIOSH regulations, including 1910.146 (Permit Required Confined Space), 1910.134 Respiratory Protection), 1910.1200 (Hazard Communication) and 1910.147 (Hazardous Energy Control [Lockout/Tagout]).

ii) Use of atmospheric testing devices, for those OFG employees required to perform atmospheric tests, including field checks as specified by the manufacturer, normal use and specific limitations of the equipment.

iii) Use of special equipment and tools, including rescue equipment.

iv) Emergency and rescue methods and procedures.

v) Duties of the “Entry Supervisor” during permit-required confined space operations.

vi) Duties of the “attendant” during permit required confined spaces.

vii) Duties of the “entrant” during permit required confined spaces.

viii) The entry permit system.

ix) A “hands on” practice session.

e) Training shall be given to affected OFG employees at the following times:

i) Before the employee is first assigned duties relating to confined space.

ii) Before there is a change in his/her assigned duties related to confined space.

iii) Whenever there is a change in permit space operations that presents a hazard about which the employee has not been trained.
iv) Whenever the Supervisor has reason to believe that the employee’s knowledge or use of procedures are inadequate or there have been deviations from those procedures.

v) A written test will be required to be completed by all trainees. The test shall be written by the trainer and is to be sufficient in nature to determine that the trainee has learned the necessary safety requirements of a confined space entry.

vi) Failure to pass the written test with a score of at least 70% correct shall result in re-training.

f) Rescue Teams shall be trained to use the equipment they may need to perform rescue functions.

i) Rescue teams, including those from emergency community service organizations, shall practice annually removing victims from representative confined spaces of the same configurations and accessibility from which an actual rescue could be required.

ii) The attendant and/or at least one member of each rescue team shall hold a current certification in basic first aid and CPR (Cardio-Pulmonary Resuscitation).

g) Training records shall be kept on file by the OFG Personnel Office and shall include the following information:

i) Date of the training program.

ii) The instructor(s) name and title.

iii) Names of OFG employees and titles.

iv) Outline of topics covered.

v) Copies of tests and test scores.
20. REVIEW

This procedure will be reviewed:

a) Whenever any deficiencies are found, this procedure shall be revised to correct those deficiencies before any subsequent entries are authorized.

b) This procedure shall be reviewed and revised as necessary at least every 12 months using the canceled/completed permits from entries performed during that period.
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ATTACHMENT B

Entering a Permit-Required Confined Space

1. The Entry Supervisor physically inspects the space to determine potential hazards and if the entry is a “Permit-Required,” “Alternate Procedure,” or “Non-Permit” entry. Entry Supervisor then completes all items on this Confined Space Entry Permit.

2. At least one Attendant externally monitors the Permit Space being entered for the duration of the entry operation.

3. Maintain retrieval equipment and use all safety equipment as specified on the permit.

4. Attendant verifies acceptable entry conditions by identifying, and controlling or eliminating, any hazards; by testing the atmosphere with an oxygen / gas detector at 4’ intervals, and a PID if organic vapors are detected or expected, and other appropriate testing equipment for other known or expected contaminants (see page 36 – Hazardous Atmosphere); and by complying with all entry permit conditions.

5. Attendant directs the Entrant(s) to enter and exit the space, and conducts periodic checks of hazard controls.

6. Attendant orders immediate evacuation of the space if safety equipment fails or if the space becomes, or has the potential to become, immediately hazardous. If necessary, Attendant summons emergency responders, but NEVER ENTERS space.

7. When confined space operation is complete, Entry Supervisor accounts for all Entrants, & terminates entry by signing the last page of the Entry Permit.

Entering a Permit Confined Space using “Alternate Procedure”

1. This Alternate Entry Procedure may be used if the only hazard present in the confined space (as determined by Entry Supervisor) is: 1) atmospheric in nature, and 2) the atmospheric hazard can be controlled by mechanical ventilation alone, and if 3) the Permit Space atmosphere will not become immediately dangerous to life and health (IDLH) if the mechanical ventilation fails.

2. After evaluating the “Permit Required Confined Space,” and establishing appropriate atmospheric controls, the Entry Supervisor may classify the Permit Space as an Alternate Entry Space by checking the appropriate box on Page 1 of the Confined Space Entry Permit, and completing applicable parts of the Entry Permit.
3. The Entrant (see note below) may enter the confined space without the assistance or use of an Attendant, following the below procedure.

4. When entering the Alternate Entry Confined Space, the Entrant will:

a. Establish and ensure that the mechanical ventilation system is operational and providing clean, fresh air to the Entrants work location within the space during the entire entry;

b. Test the atmosphere of the Permit Space prior to entry into the space;

c. Use and continually operate a personal gas detector during the entire confined space operation;

d. Immediately evacuate the space if ventilation fails, or if the portable air sampling equipment fails or enters alarm mode; and

e. Immediately evacuate the space if you discover, or become aware of a previously unrecognized hazard. If this occurs, immediately notify the Entry Supervisor (or Entrant’s line supervisor, if Entrant is also Entry Supervisor). The Entry Supervisor re-evaluates the Permit Space and implements appropriate safety precautions prior to resuming the confined space operation.

Note: Entry Supervisor may act as Entrant during Alternate Entry Confined Space operations. No Attendant is necessary for Alternate Procedure entries, unless assistance is needed to accomplish safe entry and exit by the Entrants (i.e., a tripod to enter a tank, etc.).

5. All steps taken to reclassify the Permit Space to an Alternate Entry Space must be written on the entry permit. All confined spaces shall be considered Permit-Required until the pre-entry procedures demonstrate otherwise.

**Entering a Non-Permit Confined Space**

1. If no inherent hazard is associated with the space, or if all inherent hazards have been “ELIMINATED” (not just controlled, but eliminated), the space may be entered using the following guidelines.

2. When entering the Non-Permit Confined Space, the Entrant(s) will:

a. Survey the surrounding area for potential hazards and sources of drifting vapors and gases before entry;

b. Always test a Non-Permit Confined Space with an oxygen/explosive gas detector before and during entry; document pre-entry tests;
c. Follow OFG safety rules and use generally acceptable safe work practices when entering and working in the space;

d. Never use paints, thinners, chemicals, or weld or create any other atmospheric hazard while working in the space;

e. Never introduce any other atmospheric, mechanical, engulfing, or electrical hazard into the space.

**Note:** introduction of a hazard (e.g., paint thinner) into a confined space requires that the full permit process be followed.

3. No attendant or arrangement for rescue service is necessary when workers enter Non-Permit Spaces.

4. All steps taken to reclassify a Permit-Required Space to a Non-Permit-Required Space must be written on the entry permit.

### HAZARDOUS ATMOSPHERE

An atmosphere presenting a potential for death, disablement, injury, acute illness, or the inability to escape unaided from a permit space, from one or more of the following causes:

1. A flammable gas, vapor, or mist in excess of 10% of its Lower Flammable Limit (LFL).

2. An oxygen-deficient atmosphere containing less than 19.5% oxygen by volume or an oxygen enriched atmosphere containing more than 23.0% oxygen by volume.

3. An atmospheric concentration of any substance listed in Subpart Z of Part 1910 Standards above the listed numerical value of the Permissible Exposure Limit (PEL). In the case of substances for which no PEL has been established, the EHSO Safety Specialist must be contacted to establish a safe atmospheric concentration prior to entry.

4. An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.

5. A concentration of an air contaminant that is considered Immediately Dangerous to Life or Health (IDLH) by any published source, including the manufacturer's Material Safety Data Sheet (MSDS).

6. A condition Immediately Dangerous to Life or Health (IDLH) as defined in this procedure.
CONFINED SPACE ENTRY PERMIT

This permit must be completed prior to entry into the confined space. Unless marked as N/A (not applicable), entry cannot be performed if any boxes are marked “No.” This permit is valid for only 8 hours only.

☐ This is a “Permit-Required” confined space entry.

☐ This is a CERTIFICATE for an “Alternate Procedure” confined space entry. (per Page’s 34 and 35)

☐ This is a CERTIFICATE for a “Non-Permit-Required” confined space entry (per Page’s 35 and 36)

Entry Permit #:____________________

Date of entry: __________________ Time of Entry: __________________

Location: ______________________________________________________________

Type of space:__________________________________________________________

Equipment to be worked on: ________________________________

______________________________________________________________________

Work to be performed: _________________________________________________

Anticipated time needed to complete work: _____________________________

Anticipated Hazards:___________________________________________________

Entry personnel: ______________________________________________________________________________________

Attendants:______________________________________________________________________________________________
Acceptable conditions

1. Atmospheric checks:

- Oxygen: _____% O₂ (between 19.5% to 23.5%)
- Explosive: _____% L.F.L. (less than [≤]10% of the L.E.L./L.F.L)
- Toxic: _____ppm (between 0-35 ppm Carbon Monoxide, or 0-10 ppm Hydrogen Sulfide)

Atmospheric Tester’s Initials: ________________________ Time: ________________________

2. Isolation of pumps/lines:

Pumps or lines blocked, blanked, or disconnected

N/A  Yes  No

(   ) (   ) (   )

3. Ventilation:

N/A  Yes  No

- Mechanical: (   ) (   ) (   )
- Natural ventilation only: (   ) (   ) (   )

4. Hot work permit required

(   ) (   ) (   )

5. Atmospheric checks after isolation and ventilation, if applicable:

- Oxygen: __________% O₂
- Explosive: __________% L.E.L
- Toxic: __________PPM

6. Communication procedures:

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
7. Lockout procedures, if applicable:  

8. Entrant(s), attendant(s), and rescue personnel (if applicable) have successfully completed required training.

9. Equipment:

   - Direct reading sampling device which is properly calibrated
   - Safety harnesses and lifelines for entrants and attendants
   - Mechanical retrieval/hosting equipment
   - Communication equipment
   - SCBA or Type C air line respirator
   - Personal protective equipment and clothing
   - Electrical equipment/Lighting/Non sparking Tools
   - Traffic barriers/entrance covers

I have reviewed the work authorized by this permit and the information pertaining to each item. Safety procedures have been received and are understood by all personnel.

Entry Supervisor: __________________________________________________________
Date: ________________
Entry Supervisor Title: ____________________________________________________

The work authorized by this permit has been completed and all attendants and entrants have been accounted for. This entry permit is terminated upon time and date below:

Entry Supervisor Signature: _______________________________________________
Time: ________________  Date: ________________
ATTACHMENT C
CONFINED SPACE ENTRANT ROSTER

MUST BE ATTACHED TO THE CONFINED SPACE ENTRY PERMIT

PERMIT NUMBER ______________

SPACE/AREA ______________________________________________

DATE ____________

ENTRY SUPERVISOR _______________________________________________

<table>
<thead>
<tr>
<th>ENTRANT NAME (PRINTED)</th>
<th>EMPLOYEE ID NUMBER</th>
<th>REASON FOR ENTRY</th>
<th>ENTRY TIME</th>
<th>EXIT TIME</th>
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Record all "BREAK" times and "LUNCH" times. In addition, record other times when entrants exit, and times when entrants and attendants change places.
## ATTACHMENT D

### CONFINED SPACE PERMIT LOG

<table>
<thead>
<tr>
<th>PERMIT #</th>
<th>LOCATION</th>
<th>DATE ISSUED</th>
<th>ENTRY SUPERVISOR</th>
<th>SIGNATURE</th>
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OFG - Confined Space Entry Program
July 2011
ATTACHMENT E
PRECAUTIONS & RECOMMENDATIONS FOR HOT WORK IN CONFINED SPACES

GENERAL

Special care is necessary when Hot Work is undertaken in or on a confined space. Hot work is defined in 29 CFR 1910.146 as welding, thermal or oxygen cutting, heating and other fire-producing or spark-producing operations.

PERMITS

Hot work in or on the exterior surfaces of an occupied confined space shall not be commenced until a hot work permit has been issued. The hot work permit shall certify that appropriate precautions have been carried out and shall list any tests necessary to ensure that safe conditions are maintained.

Aspects to be taken into account when considering the issue of a permit include the following:

1. When a confined space or a space adjacent thereto has contained a flammable or combustible substance, the permit shall be issued only after inspection and testing have ensured that the following requirements have been achieved.
   a) The concentration of flammable vapors or gases in the atmosphere is below 5% of the LEL
   b) The liquid and solid residues have been removed as necessary to prevent the release of flammable vapors or gases that will raise the concentration above 5% of the LEL
   c) All piping within the confined space has been found by testing, not to contain concentrations of flammable vapor or gas above 5% of the LEL

2. In a confined space having last contained dry material that creates an explosive atmosphere when dispersed in air, the permit shall be issued only after inspection has ensured that loose dust has been removed from the confined space and all appropriate surfaces have been cleaned.

3. Where fixed fire extinguishing equipment, having either manual or automatic activation controls, protects the confined space such equipment shall be positively isolated when the confined space is occupied. In such cases alternative fire protection shall be provided in the confined space by adequate numbers of the appropriate size and type of portable fire extinguishers.
FIRE PREVENTION

The following fire preventative measures shall be taken:

1. All combustibles, including any dry residues, in the vicinity of the hot work shall be removed to a safe place. If they cannot be moved, such items shall be covered by a non-combustible blanket, flame-resistant tarpaulin, or other means to prevent ignition from heat, sparks and slag.

2. When hot work is involved, consideration shall be given to the assignment of a fire watch while the hot work is being performed and for a period of at least 30 minutes after completion of such hot work.

3. When welding or cutting will be performed on a tank shell or a conductive boundary of a confined space, the same precautions shall be exercised inside and outside the space where the hot work is being performed.
   NOTE: Sparks from direct penetration or heat transfer may also create an explosion or fire hazard in the adjacent spaces outside the confined space.

4. Before hot work is started on a surface covered with a preservative or other protective coating, the flammability and thermal decomposition products of the coating shall be considered. Where such a coating is flammable, it shall be stripped from the area of hot work to prevent ignition. A pressurized fire hose and a suitable nozzle or other extinguishing equipment, or both, shall be available.

5. When arc welding is suspended for a substantial period of time, such as during lunch periods or overnight, the power source to the equipment shall be de-energized, all electrodes removed from holders, and the holders placed so that accidental contact or arcing cannot occur.

6. When gas welding or cutting is suspended for a substantial period of time, such as during lunch periods or overnight, the torch and cylinder valves shall be closed. Where practicable, the torch and hose shall be removed from the area and depressurized outside the confined space.

7. Where practicable, no compressed gas cylinders or associated manifold, other than those used for self-contained breathing apparatus, shall be located inside the confined space.
CONTROL OF FUMES

Fumes shall be controlled as follows:

1. Before hot work is started on a metal surface which is coated, the atmosphere in the confined space shall be tested to ensure that flammable vapors or gas from coatings with flashpoints below the ambient temperature do not exceed 5% of the LEL.

2. During such hot work, periodic tests shall be conducted to ensure that these limits are not exceeded. In a confined space, all surfaces covered with coatings that would decompose or volatiles under hot work into toxic, corrosive or irritant components shall be stripped from the area of heat application. Coatings shall also be removed for a sufficient distance from the area to be heated in order to minimize the temperature increase of the un-stripped metal. Additionally, artificial cooling of the metal surrounding the hot-work area may be necessary to limit the size of the area required to be cleaned. Where such stripping is not practicable, all persons in the confined space shall wear suitable respiratory protective devices and other personal protective equipment, as appropriate. Means shall be provided to exhaust contaminated air from the confined space. Such exhaust shall be directed to a location where it presents no hazard to any persons or equipment and will not accidentally be re-circulated into the confined space.
ATTACHMENT E
HOT WORK PERMIT FOR CONFINED SPACE

Department:_________________ Equipment:________________ Date:_______

This permit is IN ADDITION to the Permit-Required Confined Space Permit

The precautions listed below must be fully observed.

[ ] The area is clean and free of all readily combustible materials within 45 feet.
[ ] All drains within 25 feet are covered with a wet fireproof blanket.
[ ] Appropriate fire extinguishers are on site and near the source of ignition.
[ ] A water hose is run to the job site, tested/left running.
[ ] All sparks from work conducted more than 6 feet above ground, must be contained completely by the use of a suitable enclosure that shall be inspected before commencing work.
[ ] Welding machine/gas cylinders are located (they must not be within 24 feet of any drain).
[ ] Welding machine must be earthed directly to the equipment that is being welded as close to the welding point as practical.
[ ] Power leads are not draped across pipelines or access ways.
[ ] Electrical traces on pipes are isolated.

Any special conditions? ___________________________________________________________

_____________________________________________________________________________

_____________________________________________________________________________

_____________________________________________________________________________

I have read and fully understand the precautions listed on the attachment to this permit

Signature: _______________________________ Date: __/__/__ Time: ____ am/pm

Authorized Person(s) entering Confined Space
AUTHORIZATION

The hot work in or on the occupied confined space described above and on the associated Confined Space Entry Permit, is in my opinion, safe for the work to be carried out, provided that the precautions listed are adhered to.

Signature: ___________________________ Date: __/__/___ Time: ____ am/pm

Designated Employee

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<th>PERMIT VALID from</th>
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TASK COMPLETED: This sign-off must be completed with the associated Confined Space Entry Permit

Signature: ___________________________ Date: __/__/___ Time: ____ am/pm

Designated Employee

THIS DOCUMENT MUST BE RETAINED FOR NO LESS THAN ONE (1) YEAR
ATTACHMENT F – EXCERPTS FROM THE OSHA GENERAL INDUSTRY STANDARDS

1910.146(c)(1)
The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

NOTE: Proper application of the decision flow chart in Appendix A to section 1910.146 would facilitate compliance with this requirement.

1910.146(c)(2)
If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

NOTE: A sign reading DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER or using other similar language would satisfy the requirement for a sign.

1910.146(c)(3)
If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with paragraphs (c)(1), (c)(2), (c)(6), and (c)(8) of this section.

1910.146(c)(4)
If the employer decides that its employees will enter permit spaces, the employer shall develop and implement a written permit space program that complies with this section. The written program shall be available for inspection by employees and their authorized representatives.

ALTERNATE PROCEDURES

1910.146(c)(5)
An employer may use the alternate procedures specified in paragraph (c)(5)(ii) of this section for entering a permit space under the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(i)
An employer whose employees enter a permit space need not comply with paragraphs (d) through (f) and (h) through (k) of this section, provided that:

1910.146(c)(5)(i)(A)
The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;
1910.146(c)(5)(i)(B)
The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

1910.146(c)(5)(i)(C)
The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs (c)(5)(i)(A) and (c)(5)(i)(B) of this section;

1910.146(c)(5)(i)(D)
If an initial entry of the permit space is necessary to obtain the data required by paragraph (c)(5)(i)(C) of this section, the entry is performed in compliance with paragraphs (d) through (k) of this section;

1910.146(c)(5)(i)(E)
The determinations and supporting data required by paragraphs (c)(5)(i)(A), (c)(5)(i)(B), and (c)(5)(i)(C) of this section are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph (c)(5) of this section or to that employee's authorized representative; and

1910.146(c)(5)(i)(F)
Entry into the permit space under the terms of paragraph (c)(5)(i) of this section is performed in accordance with the requirements of paragraph (c)(5)(ii) of this section.

NOTE: See paragraph (c)(7) of this section for reclassification of a permit space after all hazards within the space have been eliminated.

1910.146(c)(5)(ii)
The following requirements apply to entry into permit spaces that meet the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(ii)(A)
Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

1910.146(c)(5)(ii)(B)
When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

1910.146(c)(5)(ii)(C)
Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any
employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph.

1910.146(c)(5)(ii)(C)(1) Oxygen content,

1910.146(c)(5)(ii)(C)(2) Flammable gases and vapors, and


1910.146(c)(5)(ii)(D) There may be no hazardous atmosphere within the space whenever any employee is inside the space.

1910.146(c)(5)(ii)(E) Continuous forced air ventilation shall be used, as follows:

1910.146(c)(5)(ii)(E)(1) An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

1910.146(c)(5)(ii)(E)(2) The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;

1910.146(c)(5)(ii)(E)(3) The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

1910.146(c)(5)(ii)(F) The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space, or that employee's authorized representative, shall be provided with an opportunity to observe the periodic testing required by this paragraph.

1910.146(c)(5)(ii)(G) If a hazardous atmosphere is detected during entry:

1910.146(c)(5)(ii)(G)(1) Each employee shall leave the space immediately;
1910.146(c)(5)(ii)(G)(2)
The space shall be evaluated to determine how the hazardous atmosphere developed; and

1910.146(c)(5)(ii)(G)(3)
Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

1910.146(c)(5)(ii)(H)
The employer shall verify that the space is safe for entry and that the pre-entry measures required by paragraph (c)(5)(ii) of this section have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space or to that employee's authorized representative.

TRAINING

1910.146(g)(1)
The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

1910.146(g)(2)
Training shall be provided to each affected employee:

1910.146(g)(2)(i)
Before the employee is first assigned duties under this section;

1910.146(g)(2)(ii)
Before there is a change in assigned duties;

1910.146(g)(2)(iii)
Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

1910.146(g)(2)(iv)
Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of this section or that there are inadequacies in the employee's knowledge or use of these procedures.
1910.146(g)(3)
The training shall establish employee proficiency in the duties required by this section
and shall introduce new or revised procedures, as necessary, for compliance with this
section.

1910.146(g)(4)
The employer shall certify that the training required by paragraphs (g)(1) through (g)(3)
of this section has been accomplished. The certification shall contain each employee's
name, the signatures or initials of the trainers, and the dates of training. The certification
shall be available for inspection by employees and their authorized representatives.