

*Safety*

**CONFINED SPACE PROGRAM**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This operating instruction (OI) establishes procedures and responsibilities for performing maintenance in and rescue from confined spaces. It is applicable to all personnel assigned or attached to the 649 Combat Logistics Support Squadron (CLSS) who enter confined spaces or are members of the emergency response team. This OI implements AFOSH Standard 91-25 *Confined Spaces*, OO-ALC Aircraft Directorate LAOI 91-25 *Confined Space Permit Required*, and Technical Order (T.O.) 1-1-3 *Inspection and Repair of Aircraft Integral Tanks and Fuel Cells*.

**SUMMARY OF REVISIONS**

This operating instruction (OI) has been completely revised and must be reviewed in its entirety.

**LOCATIONS:** Bldg 237, Bldg 5, Bldg 295, Base Operational Training Area (BORTA) and various temporary duty installations.

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## Chapter 1 DEFINITIONS

### 1.1. Confined Space: A space that:

1.1.1. Is large enough and so configured that an employee can bodily enter and perform assigned work.

1.1.1.1. Has limited means for entry or exit.

1.1.1.2. Is not designed for continuous human occupancy.

### 1.2. Permit-required Space: Is confined space that has one or more of the following characteristics:

1.2.1. Is classified on the basis of measurements of the oxygen content, flammability and toxicity by testing.

1.2.2. Is not designed for continuous employee occupancy.

1.2.3. Contains a material that has the potential for engulfing the entrant.

1.2.4. Is large enough and so configured that an employee can bodily enter and perform assigned work.

1.2.5. Contains any other recognized serious safety health hazard.

1.2.6. Permit-required spaces common to the 649 CLSS. The requirements for entry into these areas are covered in attachment 3 of this OI, *Confined Space Master Entry Plan (MEP) CLSS-001*. MEP must be reviewed and coordinated by Base Safety, Fire Department and Bioenvironmental Engineering.

1.2.6.1. F-16 F-1 fuel tank bladder cell. It is located inside the forward fuselage.

1.2.6.1.1. On the F-16C it is accessed through the upper left side of the aircraft, under panel 2413. On the F-16D it is accessed under panels 3432 and 3434 (aft of the cockpit). The dimensions of the access door is length = 19", width = 11".

1.2.6.2. A-10 confined spaces include the right main (fwd), left main (aft) fuel tank bladder cells, left and right wing tanks. The two bladder cells are located inside the fuselage. The left and right wing tanks are located in between the left and right wing Wing Station (WS) 90.0.

1.2.6.2.1. Access to right main (fwd) fuel cell is through the upper surface, under panel F-52. Access to the left main (aft) fuel cell is through the upper surface, under panels F-58 and F-62. The dimensions of all three access doors are length = 30", width = 24". Access to the wing tanks is through panels W-3 to W-10 in the bottom of the wing. The dimensions of the access doors are length = 16", width = 12".

### 1.3. Non-permit Confined Spaces: A space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. The space does not have a potential for engulfment and is not configured in a way that would cause entrapment or asphyxiation.

1.3.1. They are defined as confined due to design.

1.3.1.1. The entrants will not perform work that may cause a hazardous atmosphere.

1.3.1.2. If the conditions in paragraph 1.3 change then the spaces will have to be treated as permit required, requiring approval from 649 CLSS/CC, Ground Safety, Bioenvironmental Engineering and the Fire Department.

1.3.2. Non-Permit-required spaces common to the 649 CLSS:

1.3.2.1. F-16 engine inlet (when engine is installed). Access through inlet hampered by inlet strut heater.

1.3.2.2. A-10 wing dry bays located on the left and right wings between WS 90.0 and 110.0. Access to the dry bays is through the forward wing spar inside panels W-17, left hand wing; and W-18, right hand wing. The dimensions of the access doors are length =15", width = 11".

1.3.2.3. A-10 tail section (when accessed through panels F-51 and F-57).

## **Chapter 2 RESPONSIBILITIES**

### **2.1. Commander will:**

- 2.1.1. Appoint the Entry Authority via letter maintained in the Confined Space continuity book and as APPENDIX 4 of Confined Space Master Entry Plan CLSS-001.
- 2.1.2. Ensure a written confined space program is developed and maintained.
- 2.1.3. Sign this OI and attachment 3, *Confined Space Master Entry Plan CLSS-001*. This plan serves as the 649 CLSS Entry Permit Authorization Letter.
- 2.1.4. Ensure that personnel working in confined spaces are properly trained, equipped, qualified and the training is documented. Coordinate on material and equipment substitutions. Approves substitutions for non-2A6X4 personnel as attendants.
- 2.1.5. Coordinate with OO-ALC/SEC, 75CEG and 75 MDG/SGPB to classify confined spaces. The classification will be based on the characteristics of the space including oxygen levels, flammability and any other recognized safety and/or health hazard.
- 2.1.6. Coordinate with appropriate agencies to designate open fuel system repair areas as necessary. This letter will be maintained in the Confined Space Continuity Book.
- 2.1.7. Review all permit and non-permit-required confined spaces annually to assure no changes have occurred affecting the original classification.

### **2.2. Entry Authority will:**

- 2.2.1. Be designated via appointment letter and appendix 4 of 649 CLSS Master Entry Plan 91-301.
- 2.2.2. Can perform Entry Supervisor duties as required IAW T.O. 1-1-3, para. 1-6.2.2.1.
- 2.2.3. Maintain the organizational Master Entry Plan (MEP).
- 2.2.4. Keep records on training, safety drills and respirator fit test results.
- 2.2.5. Forward closed and canceled permits to Ground Safety where they will be retained for one year.
- 2.2.6. Designate alternate entry authority and Entry Supervisors (Entry Chief).

### **2.3. Entry Supervisors (Entry Chief) will:**

- 2.3.1. Be familiar with the organizational Master Entry Plan (MEP).
- 2.3.2. Plan each entry and describe the work to be done.
- 2.3.3. Identify the technicians who will be on the confined space entry team.
- 2.3.4. Identify all hazards within the space and any hazards that may be introduced by scheduled work.
- 2.3.5. Ensures that all necessary procedures, practices and equipment for safe entry are in use.
- 2.3.6. Verify confined space training dates for all members of the confined space work team.

2.3.7. Prepare entry permit and contact Wing Safety, Fire Department and Bioenvironmental Engineering for all entries not covered under a MEP.

2.3.8. Perform or arrange for atmospheric testing and monitoring. Prior to entry into the confined space, testing for potential hazards must be completed and the types of tests listed on the permit.

2.3.9. Complete, date, sign and post the permit prior to entry at the aircraft so that the entrant and attendants can confirm the pre-entry preparations have been completed prior to any entry.

2.3.10. The permit will be cancelled and confined space maintenance terminated if the conditions are changed by any of the following: The original tasks change, the aircraft is moved, conditions not IAW T.O. 1-1-3, chemicals other than originally permitted are introduced into the tank, previously non-authorized personnel require entry into the tank and any condition outside the scope of the Master Entry Plan/Authorization Letter. Any conditions or changes not consistent with the Master Entry Plan/Authorization Letter require approval from the squadron commander, Bioenvironmental Services (BIO), Ground Safety, and Fire Department before entry.

2.3.11. Ensure proper classification of the confined space being entered.

2.3.12. Reclassify confined spaces from permit to non-permit, or non-permit to permit IAW appropriate guidelines contained in Chapter 9 of this operating instruction.

2.3.13. Determine if conditions are acceptable for entry into a confined space.

2.3.14. Watch for hazards outside of the confined space.

2.3.15. Notify the attendant and entrant to evacuate if conditions warrant.

2.3.16. Ensure workers are properly trained and qualified in safe operating procedures, emergency procedures, proper use of Personal Protective Equipment (PPE) and how to egress confined spaces.

2.3.17. Brief workers on the hazards of entry.

2.3.18. Inspect work areas, tools and equipment to identify and correct hazards.

2.3.19. Ensure all physical and atmospheric hazards are abated to the reasonable possible extent.

2.3.20. Select proper PPE and ensure that it is readily available and that it works properly.

2.3.21. Ensure that emergency procedures have been developed and that emergency services are readily available.

2.3.22. Be prepared to call for emergency help and assist in response/rescue procedures if needed.

#### **2.4. Entrants will:**

2.4.1. Fully understand all procedures, safeguards and emergency egress and/or rescue procedures associated with the entry.

2.4.2. Follow safe work practices and immediately notify the supervisor when an unsafe condition is identified.

2.4.3. Remain alert for early signs of asphyxiation, fire hazard, and other dangers within the space.

#### **2.5. Attendants will:**

2.5.1. Maintain an accurate count of all personnel entering and exiting the space.

- 2.5.2. Maintain constant communication (visual or voice) with the entrant during the entry.
- 2.5.3. Maintain clear access to and from the confined space.
- 2.5.4. Remain alert for early symptoms of danger, inside and outside the space and orders the evacuation of the space if there is any possible hazard to the entrants.
- 2.5.5. Monitor the atmospheric testing equipment.
- 2.5.6. Attend to the respirator air lines to prevent entanglement.
- 2.5.7. Ensure ventilation equipment is operational and ventilating air is not contaminated by outside sources.
- 2.5.8. Notify emergency services when required.
- 2.5.9. Prevent unauthorized persons from entering the space.
- 2.5.10. Remain outside the space until all entrants have exited the space or unless replaced by a qualified attendant.
- 2.5.11. Not perform any rescues that require confined space entry on ALC bases, unless said rescue can be accomplished from outside the confined space.
- 2.5.12. Not perform any rescues that require confined space entry until the fire department rescue team has been notified and properly trained assistance has arrived during non-ALC base entries.
- 2.5.13. Be responsible for maintaining control over the entry area inside and outside of the cell/cavity area.
- 2.5.14. Not normally monitor multiple spaces.
- 2.5.15. Remain alert for early signs of asphyxiation, fire hazard, and other dangers within the space.

**2.6. Runners will:**

- 2.6.1. Must meet the requirements of the Attendant if being utilized as rescue team member.
- 2.6.2. Alert fire department emergency rescue team by most direct means available upon notification by attendant.

### Chapter 3 TRAINING

**3.1. Training:** Training is a vital part of every confined space program. All personnel whose duties require them to enter and work in these spaces shall be trained on the criteria outlined in this Operating Instruction.

3.1.1. Initial confined space training conducted by Technology and Industrial University (TIU). Site specific confined space training will be taught annually to 2A6X4 (Fuels) and 2A7X3 (Structural Maintenance) personnel, using training lesson plan(Attachment 2), Confined Space Master Entry Plan CLSS-001 and the most current bioenvironmental survey. The training lesson plan will be approved by Ground Safety, Bioenvironmental Engineering, and Fire Department. Non-destructive Inspection (NDI) personnel will be trained on a case-by-case basis.

3.1.1.1. The entry authority or designated alternates will perform the site specific confined space training.

3.1.2. All personnel require Respiratory Protection and CPR/First Aid training annually.

3.1.3. Training will be tracked through Core Automated Maintenance System (CAMS) and documented in AF Form 55s.

**3.2. Entry Supervisors (Entry Chief) shall be trained on:**

3.2.1. Hazard recognition and hazard abatement.

3.2.2. Effects and signs of exposure to hazardous atmospheres.

3.2.3. Proper use of all related PPE.

3.2.4. CPR/First Aid.

3.2.5. Respiratory protection to include annual qualification.

3.2.6. Effective use of retrieval equipment.

3.2.7. Attendant and entrant training requirements.

3.2.8. Ventilating techniques.

3.2.9. Permit documentation.

3.2.10. Atmospheric monitoring equipment and protocols.

3.2.11. Self-rescue, emergency response/rescue procedures, and rescue communication techniques (i.e. who to call if a confined space emergency occurs and by what means).

**3.3. Attendants/Entrants shall be trained on:**

3.3.1. Responsibilities of both entrant and attendant IAW T.O. 1-1-3.

3.3.2. Hazard recognition and hazard abatement.

3.3.3. Proper use of all related PPE.

3.3.4. CPR/First Aid.

- 3.3.5. Effects and signs of exposure to hazardous atmospheres.
- 3.3.6. Effective use of retrieval equipment.
- 3.3.7. Respiratory protection to include annual qualification.
- 3.3.8. Ventilating techniques.
- 3.3.9. Atmospheric monitoring equipment and protocols.
- 3.3.10. Permit documentation.
- 3.3.11. Self-rescue, emergency response/rescue procedures, and rescue communication techniques (i.e. who to call if a confined space emergency occurs and by what means).

## Chapter 4 GENERAL REQUIREMENTS

**4.1. Entry Permit Requirements:** A Confined Space Entry Permit will be issued for any maintenance that is performed in the permit-required areas outlined in paragraph 1.2. Permits are valid for a period not to exceed a single shift and will be returned to the Entry Authority for cancellation at task completion. An entry permit is required for any fuel tank entry when the entrant's face will break the plane of the fuel tanks access panel.

4.1.1. Hill Visual Aid 127-3, *Confined Space Entry by Permit Only*, must be placed at the confined space entry point.

4.1.2. An AF Form 1024, **Air Force Confined Space Entry Permit**, shall be completed and placed at the confined space entry point whenever a permit-required confined space is to be entered.

4.1.3. The Fire Department will be notified of entry into a permit-required confined space. Notification of the Fire Department will be documented on a control log located in the Confined Space Continuity book. The log will list as a minimum the name of the individual notifying the Fire Department, date contacted, location of the work area and aircraft tail number. Entry into confined spaces will not be allowed if the Base Emergency Rescue Service is not available.

4.1.4. Only 2A6X4 (Fuels) and 2A7X3 (Structural Maintenance) personnel will perform permit-required confined space maintenance.

4.1.5. The completed permit will show the exact location and conditions of the tasks being performed, the individuals performing the task, PPE being used and atmospheric test results.

4.1.6. Once all these conditions have been met the entry authority/designated alternate will sign the permit. No entry will be made until the above conditions are met.

4.1.7. Once the work is completed, permits will be cancelled and forwarded to Ground Safety and retained on file for one year.

**Chapter 5**  
**PRE-ENTRY CONFINED SPACE EVALUATION**

**5.1. Supervisor Evaluations:** Supervisors must consider the following before allowing personnel to enter confined spaces.

5.1.1. Determine if any solvents will be taken into the space.

5.1.1.1. Determine if any of the solvents have a low flash point.

5.1.1.2. Determine if the use of solvents necessitate the use of forced air ventilation in non-fuel tank entries. Ventilation is required at all times in fuel tank permit required spaces.

5.1.1.3. If forced air ventilation is used, the best placement of the unit and its ducting to provide adequate breathable air to entrants.

5.1.1.4. Review Material Safety Data Sheets (MSDS) on the chemicals that will be used in the space.

**NOTE:** MSDS's do not always adequately address the hazards of the product, especially when it is used in a confined space.

5.1.2 Determine if conditions outside of the space may affect entrants inside.

5.1.3. Determine if non-sparking tools will need to be taken into the space.

5.1.4. Determine the number of personnel that will be in the space at a time.

5.1.5. Only authorized personal protective equipment outlined in T.O. 1-1-3 and AFOSH 91-31, *Personal Protective Equipment*, will be used for confined space maintenance. Respirator protection will be approved by BIO.

## Chapter 6 ATMOSPHERIC MONITORING

**6.1. Monitoring Requirements:** Monitoring shall be done according to the permit or the MEP. Monitoring of the atmosphere in a permit-required confined space shall be done prior to each entry. OO-ALC Aircraft Directorate personnel from Bldg. 225 or 649 CLSS personnel trained in atmospheric testing will test each confined space prior to any entry and record the results on the permit.

**6.2. Types of monitoring tests:** Confined spaces must be monitored for oxygen level and flammability (LEL). These tests can be performed by the organization provided that they have the appropriate equipment and training. In addition, toxicity monitoring should be done annually or when a new chemical is introduced to the workcenter. This monitoring is conducted by the Bioenvironmental Engineering Flight.

6.2.1. Atmospheric testing frequency will be every 8 hours, after work interruptions occur and when operations and/or conditions change while confined space maintenance is in work.

6.2.1.1. If the atmosphere contains less than 19.5% oxygen, it is considered oxygen deficient and personnel are not allowed to enter the space. Personnel may only enter the space if the oxygen content is not less than 19.5% or greater than 23.5%.

6.2.1.2. Oxygen Enriched Atmospheres - If the atmosphere contains more than 23.5% oxygen, it is considered an oxygen enriched atmosphere. These atmospheres make the conditions right for flash fires and personnel are not allowed to enter the space.

6.2.2. Oxygen and LEL monitoring shall be conducted before entry into confined spaces.

6.2.2.1. Lower Explosive Limit (LEL) - Individuals should not enter the space if monitoring indicates levels at or greater than 10% of the LEL (20% for aircraft with foam). Atmospheres that are less than 10% of the LEL are too lean to burn. Nevertheless, when a space contains or produces measurable LEL readings below 10%, it might indicate that flammable vapors are being introduced or released in the space and could present a hazard in time. Therefore, the cause of the vapors must be investigated and, if possible, eliminated prior to entry.

6.2.2.2. Meters which measure LEL are calibrated using a specific gas. The LEL reading must be corrected for the hazard present in the confined space prior to interpreting the reading, unless the calibration gas is the same as the gas present. The operating manual of the instrument shall be consulted to determine how to perform this correction.

6.2.2.3. Toxicity Monitoring - There are many chemicals which may be present in confined spaces, either present prior to entry or brought in as a part of the job. Monitoring for toxicity is performed by the 75 AMDS/SGPB. In most cases, this type of monitoring is more complex than other confined space monitoring and requires specialized equipment. The 75 AMDS/SGPB Flight must be contacted for more details.

### 6.3. Monitoring Procedures.

6.3.1. General requirements:

6.3.1.1. The atmosphere of a confined space must be monitored according to strict procedures; if not, the readings may be inaccurate and the safety of entrants may be jeopardized.

6.3.1.2. Atmospheric readings are only valid for one 8-hour shift.

6.3.1.3. The atmosphere of the confined space will be retested after breaks in the work process. For example, shift change.

6.3.1.4. If hazardous atmospheric conditions exist when testing, or when re-testing for permit updating, or when detected by any other means, all work will stop immediately and the entrant will evacuate the space immediately.

6.3.1.5. Work will not be resumed until all unsafe conditions have been eliminated or controlled and the space has been re-tested and re-certified.

6.3.1.6. The person using the instrument must be trained and signed off on use of that equipment.

**6.4. Procedures:** The following procedure should be followed when monitoring confined spaces:

6.4.1. Open the entryway to the space. Test the air around the opening of the space. Then, insert the hose a few feet into the space and monitor the atmosphere again. If the levels are safe, open the space completely and then begin monitoring the inside of the space.

6.4.2. The space must be tested in the following sequence:

6.4.2.1. Test your oxygen levels first.

6.4.2.2. Test for the LEL.

6.4.2.3. If needed, toxicity monitoring will be conducted by the 75 AMDS/SGPB Flight.

6.4.2.4. The atmosphere must be tested in all areas inside the space where work will be performed.

**6.5. Atmospheric Monitoring And Ventilation:**

6.5.1. Test the space with and without ventilation equipment running. Test the dead air spaces around the ventilation stream.

**Chapter 7**  
**DEPLOYMENT AND READINESS PROCEDURES**

**7.1.** When deployed to another Air Force installation, all tank and cavity entries will comply with the requirements of the Master Entry Plan at the deployed location.

**7.2.** When deployed to non-Air Force military installations adhere to the requirements of this OI and MEP to the greatest extent possible.

**7.3.** When deployed to a bare base, or to a remote location, the unit will make provisions for at least two qualified fuel system repair specialists or one qualified fuel systems specialist and one person qualified to make confined space entries as outlined in this OI for each entry.

7.3.1. The runner/equipment monitor will be selected from available on-site personnel and will be briefed on duties, to include emergency response procedures. Tank entry will not be made until emergency medical response procedures appropriate to the location (BORTA, TDY Location, etc.) have been established. Entries on bases with established entry plans will be accomplished in accordance with local instruction.

**7.4.** The team will deploy, when possible, with one combustible gas and oxygen analyzer, sufficient air-supplied respirators, support equipment and PPE to ensure a safe entry.

**Chapter 8**  
**ENTRY INTO PERMIT-REQUIRED CONFINED SPACES:**

**8.1.** These spaces contain atmospheres or conditions which are hazardous but not Immediately Dangerous To Life and Health (IDLH). For information concerning hazards associated with chemicals and fuel that may be encountered see the MSDS Web Site located in the Workers Right To Know book located in the 649 CLSS support section.

8.1.1. Bldg 237 Fuel System Maintenance: Aircraft will be fluid purged prior to aircraft entering Bldg 237, and hangar entry checklists will be completed prior to aircraft maintenance.

<u>HAZARD</u>	<u>SYMPTOMS/COMMENTS</u>
Vapor:	Benzene content of 0.5 to 1 %. ( <i>known carcinogen</i> )
Fire Hazard:	Combustible atmosphere above 20% LEL.
Health, Ingestion:	Nausea, vomiting, loss of appetite, headaches, dizziness, euphoria, muscular twitching followed by loss of consciousness, convulsions and death.
IDLH atmosphere:	Any condition which poses immediate threat to life or may result in acute severe health effects. Oxygen less than 19.5% or greater than 23.5 %.
Prolonged contact:	Dryness, irritation of the skin and possibly severe dermatitis.
Eye:	Immediate irritation and possibly loss of sight.

8.1.2. An entry permit approved by OO-ALC/SEC, 75CEG/CEFT and 75 AMDS/SGPB or an entry permit issued by an entry authority in accordance with the organizational MEP is required for entry.

8.1.3. All of the following equipment is located at Bldg 237/225. Aerospace Ground Equipment (AGE) will be requested as needed through the AGE dispatch contractor (e.g. maintenance stands, manually operated crane, etc.):

- \*Respirators (3M 7800 series)
- \*Personnel Protective Equipment (coveralls, footwear, head coverings)
- \*Atmospheric Tester
- \*Universal Body Harness with Lanyard

8.1.4. Oxygen level content will be tested first, followed by atmosphere combustibility (LEL).

8.1.4.1. Oxygen levels will be not less than 19.5% or greater than 23.5% prior to tank entry. Atmospheric testing equipment that meets or exceeds various standards outlined in AFOSH 91-25 par. 3-6 and T.O. 1-1-3 par 2.6.3.1 will be used to test oxygen content and LEL (combustibility) level.

8.1.4.2. Combustibility levels will be 10% LEL (20% for aircraft with foam) or lower for depuddling operations on aircraft not fluid purged.

8.1.4.3. The entry permit will be completed and signed by the entry authority/designated alternate.

8.1.4.4. Entrant will perform a fit test of respirator prior to entry, ensuring serviceability of breathing equipment.

**8.2.** Operations creating hazards will be covered by the permit, and actions will be taken to minimize and control the hazards.

**8.3.** Where toxic materials are or may be introduced into the space, the entry supervisor will provide personnel entering the space with NIOSH-approved respiratory protective equipment suitable for the exposure. The entry supervisor will contact the local BE staff for assistance in selecting the appropriate respiratory protective equipment and other PPE as determined necessary to protect against skin contact.

**8.4.** Only explosion-proof or intrinsically safe equipment will be used when flammable or explosive atmospheres are present.

**8.5.** Entrants will wear approved harnesses that permit extraction when utilizing manually operated utility crane for emergency actions.

**8.6.** Entry supervisors will notify the base fire department before a permit-required confined space entry begins. Entries on ALC bases will be terminated if base fire department rescue personnel are not available due to response to another emergency.

**8.7.** An attendant shall be present for all permit entries.

**8.8.** An atmospheric hazard is oxygen content less than 19.5% or greater than 23.5% or Lower Explosive Limit (LEL) of greater than 20%.

**8.9.** If atmospheric conditions require, ventilation will be utilized to remove contaminants and provide fresh air. Ventilation ducts will be directed to ventilate the immediate areas where the entrant is or will be present within the space. Constant ventilation is required for all permit required entries.

**8.10.** Individuals from the OO-ALC Aircraft Directorate or 649 CLSS personnel trained in atmospheric testing will accomplish all atmosphere testing. Documentation of readings will be annotated on AF Form 1024, **Confined Space Entry Permit**.

**8.11.** Verbal communication and physical observation will be maintained between entrant and attendant at all times while entrant is in the permit-required confined space.

**8.12.** When the task is completed, the entry permit will be closed by completing the "Date and Time of Expiration" block. The entry permit will be forwarded to Ground Safety and maintained for 1 year.

**Chapter 9**  
**RECLASSIFICATION OF CONFINED SPACES**

**9.1.** An entry authority may reclassify a permit-required space as non-permit if:

9.1.1. Personnel performing atmospheric testing must remain outside the confined space while testing the space to ensure the space is free of hazards. If entry is required to eliminate the hazards in the space, the entry must be made with an entry permit

9.1.1.1. Actual or potential hazards are eliminated and continuous monitoring is used to ensure that the atmosphere remains free of hazards.

9.1.2. During routine work, the entrant does not take tools or material into the space that could introduce a hazard.

9.1.3. The entrant does not perform any work that would cause a hazardous condition.

**9.2.** Entry into a non-permit confined space is allowed after attaching a signed reclassification cover letter to the permit, however if you introduce any hazardous materials, perform any operation, or change any condition, the space must be reevaluated by the entry authority or alternate entry authority. Entry is only authorized if absolutely nothing has changed from the time it was evaluated by the entry authority or alternate entry authority and reclassified by cover letter.

## **Chapter 10 COMMUNICATION**

**10.1.** There are two lines of communication required for confined space entry. One line of communication will be between the confined space entrant(s) and attendant. The other line of communication must be between the attendant and rescue personnel.

10.1.1. Entrant and Attendant Communication:

10.1.1.1. The attendant will maintain visual contact with the entrant and will communicate with the entrant by voice.

### **10.2. Rescue Communication:**

10.2.1. Attendants are responsible for having runner immediately activate emergency rescue procedures, notifying the fire department by the most direct means.

10.2.2. The fire department must contact the attendant to order the entrant out of the permit-required confined space in the event the fire department must respond to an emergency on or off base. If the senior fire official on duty determines they cannot provide rescue services at that time, the attendant must order the entrant out of the permit-required space.

**Chapter 11**  
**RESCUES AND EMERGENCIES IN CONFINED SPACES**

**11.1. 649 CLSS Confined Space Rescue Team Requirements:**

11.1.1. All rescue providers shall be First Aid and CPR trained.

11.1.1.1. Rescue providers will receive training in rescue team member's duties and responsibilities, and the use of retrieval and rescue equipment.

11.1.1.2. At no time will a mechanically powered retrieval system (i.e. vehicle, winch) be used to retrieve entrants.

11.1.1.3. On a yearly basis, the 649 CLSS will simulate a confined space rescue with live personnel or mannequins, to keep confined space rescue training current. This training will be tracked in CAMS under course code 15 and in individuals Form 55.

**11.2. Confined Space Rescues - General Requirements.**

11.2.2. Rescue providers shall be readily available for all permit-required entries.

11.2.3. Before entering permit-required confined spaces; entry supervisors and/or attendants will notify the fire department of the following, which they will document in their log:

11.2.3.1. Location of space being entered.

11.2.3.2. Type of space being entered.

11.2.3.3. Type of work being performed in the space.

11.2.3.4. Time contacted.

11.2.3.5. Expected amount of time the permit entry will take.

**11.3. Confined Space Emergencies:**

11.3.1. Attachment 3, Confined Space Master Entry Plan, paragraph 12, Emergency Response Plan is intended to provide rescue procedures for an individual incapable of self-rescue from a confined space.

11.3.2. The rescue team will consist of the attendant and personnel in the immediate area that have received required training (initial & site specific confined space training, and emergency rescue procedures).

11.3.3. All entrants will wear a universal/adjustable full body harness with a 6' nylon lanyard attached to the D-ring to aid in rescue procedures if utilizing a manually operated utility crane during the rescue process.

11.3.3.1. The manually operated utility crane hook will be positioned so the attendant can reach the hook and attach it to the entrant's lanyard while standing on the maintenance stand and outside of the confined space.

11.3.4. The attendant will initiate the rescue/removal. Team members in the immediate area (personnel in Bldg. 237 or the BORTA area) will notify base fire department and assist the attendant with initial rescue. The attendant will ensure the forced air duct is properly ventilating the confined space.

11.3.5. The attendant will alert the runner or dock chief that an emergency exists and to call 911. The caller will provide the following information:

Name and phone number of caller  
Building number or location  
Nature of emergency

11.3.6. The fire department will notify medical personnel of the emergency and respond to the scene to take charge of the rescue operation.

11.3.7. After the fire department arrives; the attendant will be responsible for keeping unauthorized personnel away from the confined space.

11.3.8. The attendant will direct trained personnel in the immediate area to aid in the rescue procedures and assist in the operation of a manually operated utility crane during the removal of a tank entrant from the confined space.

11.3.9. The full-body harness and manually operated utility crane will not be used if the retrieval system would create a greater hazard for the entrant.

11.3.10. The attendant will hook the lanyard end to the manually operated utility crane hook and instruct the crane operator to slowly crank crane handle to the up position while the rescue team guides tank entrant through the access opening. Special care will be given in guiding the tank entrant's head, shoulders and arms through the access opening as not to inflict injuries upon them during the rescue process.

11.3.11. If removal of the entrant fails or is not possible for any reason, the attendant will continue to ventilate the confined space until the fire department arrives and assumes responsibility for the rescue procedures.

11.3.12. After the entrant is removed from the confined space, administer CPR, rescue breathing and/or self-aid and buddy care as required until fire department or emergency medical personnel arrive and assume responsibility of the scene.

#### **11.4. Non-entry (self) rescue:**

11.4.1. All entrants will be trained to perform self-rescue.

11.4.1.1. Entrant will remain aware of conditions within the space and their physical reactions to those conditions.

11.4.1.2. If at any time the entrant feels discomfort, has concerns, or determines that conditions have changed and present a danger to safety and well being, the entrant will notify the attendant and immediately exit the space.

11.4.1.3. The entrant will exit the space immediately upon the command of the attendant or at the alarm signal of monitoring equipment.

**NOTE:** The effects of electric shock and some chemical exposures are not immediately apparent. A competent medical authority must examine the individual after electric shock, severe falls, chemical overexposure, welding fume overexposure and any other serious injury.

## Chapter 12

### WELDING, CUTTING, AND BRAZING IN CONFINED SPACES AND ENCLOSED AREAS

**12.1.** All confined space entries that require welding, cutting, riveting and/or brazing will be permit-required confined space entries. Bioenvironmental Engineering must be contacted to evaluate potential hazards and recommend ventilation procedures. (Refer to AFOSH Standard 91-5, *Welding, Cutting, and Brazing*.)

12.1.1. AF Form 592, **USAF Welding, Cutting and Brazing Permit** is required whenever workers perform hot riveting, welding, cutting, burning, or heating operations within a confined space, and must be obtained from the base fire department.

**12.2.** The AF Form 592 will be maintained with its corresponding entry permit and placed outside the space next to the confined space entry permit.

**12.3.** Continuous forced air ventilation will be used while welding, cutting, riveting, and/or brazing in confined spaces.

**12.4.** If ventilation proves not to be feasible, an air line respirator will be used.

**12.5.** The attendant will ensure proper airflow and proper function of air line units.

**12.6.** All electrical leads on welding equipment will be inspected for nicks and cuts prior to entry. Any electrical leads that have substantial nicks and cuts will not be used inside the space.

**12.7.** Gas cylinders or manifolds will not be taken into any confined spaces.

**12.8.** All hoses used for transferring gas and oxygen for welding, cutting and burning purposes will be inspected before entering confined spaces and after welding is stopped for any substantial period of time (e.g. lunch, overnight).

**12.9.** All welding hoses and torches will be removed from the confined space when welding is stopped for a substantial period of time (e.g. lunch, overnight).

**12.10.** Welding equipment that is mounted on wheels will be chocked to prevent it from rolling.

**12.11.** Torch valves and fuel-gas and oxygen supply tank shut off valves must be closed whenever the torch is not in use for a substantial period of time (e.g. lunch, overnight).

**12.12.** Inspect, test, operate, and maintain welding and cutting equipment such as hoses, connections, torches, etc., according to the provisions of AFOSH Standard 91-5 and applicable T.O.s.

### Chapter 13 VENTILATION

**13.1.** The positioning of ventilating equipment is crucial to ensure the confined space is being ventilated properly. The supervisor must truly understand the nature of the confined space in order to properly ventilate it. This can be accomplished by analyzing the following:

13.1.1. Determine if you need to ground and/or bond the air blower unit. Blower units will generate static electricity. An arc from static electricity could cause an explosion in and around explosive atmospheres.

13.1.2. Determine how large the space is in terms of volume.

13.1.3. Determine the type of atmosphere you are trying to ventilate. For instance, the way you position your ductwork depends on whether the contaminates are lighter or heavier than air.

13.1.4. Determine if there is more than one opening into the space.

13.1.5. Determine where the contaminated exhausted air will leave the space. At times, people have placed the intake for their air blower next to the exhaust portal for the confined space. In essence, contaminated air is recirculated back into the confined space.

13.1.6. Determine the shape of the space. This influences the type of directional device and the amount of air pressure needed to ensure that the space can be adequately ventilated.

13.1.7. Determine the clean air source. Do not place the intake in an area that contains contaminated air.

13.1.8. Determine the length of time ventilation is needed. Ventilation may only be needed to purge the space or to provide continuous ventilation.

13.1.9. Determine the type of work that will be performed in the space. If the work produces dust or fumes, local exhaust ventilation is better than general ventilation. If work will be done throughout the space, then continuous general ventilation in combination with local exhaust ventilation may be needed to control the atmosphere. Bioenvironmental Engineering must be consulted for all non-routine tasks to evaluate respiratory and ventilation requirements.

CRAIG W. HALL, Lt Col, USAF  
Commander

**Attachment 1****REFERENCES, ABBREVIATIONS, AND ACRONYMS*****References***

AFOSH Standard 91-25, *Confined Spaces*

AFOSH 91-31, *Personal Protective Equipment*

29 CFR 1910.146, *Permit-required Confined Spaces*

T.O. 1-1-3, *Inspection and Repair of Aircraft Integral Tanks and Fuel Cells*

LAOI 91-25, *Confined Space Permit Required*

***Abbreviations and Acronyms***

**CSPT**—Confined Space Program Team

**MEP**—Master Entry Plan

**PPE**—Personal Protective Equipment

**LEL**—Lower Explosive Limit

**IDLH**—Immediately Dangerous to Life and Health

**Attachment 2****Confined Space Site Specific Training Plan CLSS OI 91-301****649 CLSS Confined Spaces Training Outline****A. Permit required confined spaces**

1. F-16 F-1 Cell
2. A-10 Main and Wing fuel tanks

**B. Non-permit required confined spaces (permit required if chemical/toxic hazards are introduced)**

1. F-16 Intake (engine installed)
2. A-10 Wing Dry bays (L/R W.S. 90-110)
3. A-10 Tail Section (when accessed through panels F-51 & F-57)

Locations of these spaces include but not limited to Building. 237, Bldg. 5, the Base Operational Training Area (BORTA), and various temporary duty installations.

**PURPOSE:** This training gives personnel working in or around a confined space the general understanding of the hazards of and the safeguards required when an entry is performed. As well as any rescue procedures should an emergency occur.

**General Conditions**

- Oxygen content of 19.5% - 23.5% is sustained.
- Test cavity prior to any entry/re-entry, every eight hours, and at any time the personnel question the integrity of the cell/tank/cavity. -LEL and oxygen content percentage will be annotated on AF Form 1024 Confined space permit or continuation checklist.
- All entries will be ventilated with an HDU-13 heater, MA-1A blower, or Rhine air blower.
- Constant communication (visual or voice) will be maintained.
- All hot work, I.E. grinding, welding, and brazing, on aircraft shall be approved by Fire Department. AF Form 592, USAF Welding, Cutting and Brazing Permit shall be completed. When using NDI equipment the LEL will be maintained at 1.5%.

**Prevention of Unauthorized Entry**

- Only permit required confined spaces are required to have a confined space entry sign, OO-ALC Form 127-3 posted at the entrance of the space.
- It is the responsibility of the attendant to keep unauthorized individuals out of these areas when they are open and to ensure they are closed when not monitored.
- During fuel system maintenance AF Form 1492 WARNING TAGS will be placed on the fuel management panel, external power receptacle and the aircraft battery. When these items are present on the aircraft only authorized individuals will remove them.
- Area must be roped off and restricted entry signs must be posted

**Potential Hazards**

- Many of these hazards are not readily apparent, detectable by odor, or visible
- Consider all permit required confined spaces contain the most unfavorable/unsafe conditions until tests, evaluations, and prescribed requirements outlined in AFOSH STD 91-25, LAOI 91-25, and 649 CLSS OI 91-301 have been performed to ensure safe conditions exist prior to entry and are maintained during the entire work period.
- Include atmospheric hazards such as lack of sufficient oxygen to support life,
- Excessive oxygen levels that increase the danger of fire or explosion,
- Presence of flammable or explosive atmospheres and materials
- Presence of toxic gases or materials
- Workspace may include electrical or mechanical hazards that must be locked out
- Engulfment and entrapment hazards

-- For information concerning hazards associated with chemicals and fuel that may be encountered see the Material Safety Data Sheets (MSDS) Web Site, located in the Workers Right To Know book located in the 649 CLSS Support Section

### **Control of Hazards**

- Aircraft will be fluid purged prior to entry.
- Forced air ventilation will be used while personnel are in the permit required confined space.
- Verbal communication and physical observation will be maintained between entrant and attendant at all times while entrant is in the permit required confined space.
- Individuals from the OO-ALC Aircraft Directorate or 649 CLSS personnel trained in atmospheric testing will accomplish sampling. -Documentation of readings will be annotated on AF Form 1024, Confined Space Entry Permit or LEL checklist.

### **Entry Permit**

The individuals of the 649 CLSS Fuels Section are authorized by the entry supervisor to issue confined space permits for entry into the F-1 fuel cell/cavity on F-16 aircraft and the main/wing fuel cells/tanks on A-10 aircraft.

### **Permit Requirements**

- A field permit is required for any fuel tank entry when the entrant's face will break the plane of the fuel tanks access panel.
- All personnel assigned to 649th CLSS Fuels and Structural Element will read and adhere to the current bioenvironmental survey.
- These procedures apply when deployed to an Air Force or non-Air Force installation that does not have fuel tank entry procedures established. Otherwise, follow the fuel tank entry procedures at the deployed location.
- When deployed to a bare base or remote location the unit will make provisions for at least two qualified fuel systems repair specialists or one qualified fuel systems specialist and one qualified confined space person for each entry. The attendant/runner will be selected from available on-site personnel and will be briefed on their duties including emergency response procedures. Confined space entries will not be made until emergency medical response procedures appropriate to the location have been identified. The team will deploy with one combustible gas and oxygen analyzer, sufficient airline respirators, and support equipment to ensure a safe entry.

### **Confined Space Reclassification**

The entry supervisor may reclassify a permit required confined space to a non-permit confined space provided the following has been done:

- Testing of the confined space has been accomplished prior to entry with the results showing the space to be free of all hazards. **NOTE:** If entry is required to eliminate the hazards in the permitted space, the entry must be made according to the Master Entry Plan.
- All actual or potential atmospheric hazards or hazardous conditions are eliminated, and continuous monitoring is used to ensure the atmosphere remains free of hazards.C. The entrant does not take tools or introduce any material into the space that could themselves cause a hazard.
- The entrant does not perform any work that would cause a hazardous condition.
- The entry permit is revoked whenever any test, monitoring instrument, or observation shows hazardous conditions are developing in confined space.
- The entry supervisor has signed and dated a reclassification letter (see C.S.M.E.P.) and attached it to the permit.

Once the above items have been completed the space can be reclassified as a non-permit required space. Such reclassification allows entry without a permit, without personnel being suited with a harness, without respirators, and without an attendant. Ref. AFOSH STD 91-25, para. 6.4.11.

**Acceptable Entry Conditions**

Using atmospheric testing equipment that meets or exceeds OSHA standards test oxygen and LEL (combustibility) level.

- Oxygen level content will be tested first, followed by atmospheric combustibility.
- Oxygen levels will be between 19.5-23.5% prior to tank entry.
- Combustibility levels will be 10% LEL (20% for aircraft with foam) or lower for depuddling operations when fuel or chemicals are present.
- The entry permit has been completed and signed by the entry authority/designated alternate.

Entrant has performed a fit test of respirator prior to entry, ensuring serviceability of breathing equipment.

-- Field permits for cell/cavity entries not consistent with the conditions of T.O. 1-1-3 and the Fuel Tank Master Entry Plan/Authorization Letter will not be issued without prior approval from the LG/CC, Base Safety, Bioenvironmental Engineering, and the Fire Department. After receiving approval, routine and reoccurring tasks may be added to this authorization letter on attached sheets with references to the appropriate paragraph.

**Entry Supervisor**

- Plans each entry and describes the work to be done.
- Identifies the workers who will be on the confined space entry team.- Identifies all hazards within the space and any hazards that may be introduced into the space by scheduled work.
- Performs or arranges for atmospheric testing and monitoring.
- Prior to entry into the confined space, testing for potential hazards must be completed and the types of tests listed on the permit.
- Ensures that all necessary procedures, practices, and equipment for safe entry are in effect.
- Completes, dates, signs, and posts the permit prior to entry. The permit will be controlled at the dock chief's desk or by any other means equally effective, so that the entrant and attendants can confirm the pre-entry preparations have been completed prior to any entry.
- The permit will be cancelled and confined space maintenance terminated if the conditions are changed by any of the following: The original tasks change, the aircraft is moved, conditions not in adherence to T.O. 1-1-3, chemicals other than originally permitted are introduced into the tank, previously non-authorized personnel require entry into the tank, and any condition outside the scope of the Master Entry Plan/Authorization Letter. Any conditions or changes not consistent with the Master Entry Plan/Authorization Letter require approval from the CC or LG, Bioenvironmental, Ground Safety, and the Fire Department before entry.- Verify and record confined space training dates for all members of the confined space work team.- Keep records on training, safety drills, and respirator test results.-Reviews the duties of the entrant and attendant to ensure they are familiar with rescue/response procedures in case of emergency.- Ensures the ventilation equipment is serviceable.- Remains alert for early symptoms of danger within the confined space.- Watches for hazards outside of the confined space.- Notifies the attendant and entrant to evacuate if conditions warrant.- Is prepared to call for emergency help and assist in response/rescue procedures if needed.

**Attendant**

A trained and qualified individual outside the cell/cavity/tank confined space who acts as the observer of the cell/cavity/tank entrant. All attendants will read and abide by the requirements of the 649th CLSS Fuel Tank Master Entry Plan/Authorization Letter.

- Maintains an accurate accounting of entrants in the permit space.
- Keeps unauthorized personnel out of the area.
- Maintains clear access to and from the confined space.
- Remains alert for early symptoms of danger, inside and outside the space and orders the evacuation of the space if there is any possible hazard to the entrants.
- Maintains constant communication (visual and voice) with the entrant during the entry.
- Ensures ventilation equipment is operating & supplied air is not contaminated by outside sources.
- Monitors the atmospheric testing equipment.
- Attends to lifeline, when worn, and the respirator air line to prevent entanglement.
- Implements the Emergency Response Plan if needed.
- The attendant will not enter a space that is Immediate Danger to Life and Health (IDLH).
- Attendant will be CPR and self-aid/buddy care trained or equivalent.

- Attendant will be aware of Confine Space Hazards- chemical, fuel and solvent expose, noise level, limited movement due to size of confined space
- Attendant will be medically qualified IAW AFOSH 161-17
- Attendant will be trained in hazardous communication IAW AFOSH 161-21
- Attendant will be briefed on protective clothing and equipment
- Attendant will be respirator qualified IAW AFOSH 48-137 and Squadron OI 48-137
- Attendant will understand how to use atmospheric testing equipment and validate current PMEL calibration requirements.

Attendant or entrant will test the cell/cavity/tank area with approved atmospheric equipment and documents readings on AF Form 1024.

- Attendant or entrant will test the cell/cavity/tank prior to any entry/re-entry, every eight hours, continuously for foamed filled aircraft and at any time the attendant questions the integrity of the cell/cavity/tank.
- Attendant will understand how to document and fill out AF for 1024 confine space field entry permit with entrant, and entry authority or designated alternate entry authority.
- Attendant will understand the early warning signs of exposure to chemicals, fuels, and solvents.
  - Examples are but are not limited to: Headache, dizziness, lightheaded, euphoria, nausea, drowsiness, disorientated, muscle twitching, weakness/cramps in extremities.
- order the evacuation/exiting of entrant immediately if any of these signs are present.
- Attendant will order the evacuation/self-rescue of entrant in the event of any hazardous situations or any reason which would cause the attendant's focus away from the entrant.
- Attendant will ask entrant if he/she is feeling physically and mentally fit and is not taking any medication that will impair their functions or abilities to perform their assigned tasks
- Attendant will have knowledge of the area set up and use of rescue equipment
- Attendant will know how to implement procedures for emergency response/rescue plan
- Attendant will understand responsibility for maintaining control over entry area inside and outside of cell/cavity/tank area, accurate accounting of entrants and prevent unauthorized personnel from entering confined space AA.
- Attendant installs and secures cell/cavity access door when maintenance tasks are complete or at any time that confined space maintenance is not in work

### **Entrant**

A trained and qualified individual that enters the cell/cavity/tank confined space to perform maintenance. All entrants will read and abide by the requirements of the 649th CLSS Fuel Tank Master Entry Plan/Authorization Letter.

- Entrant will be CPR and self-aid/buddy care trained or equivalent
- Entrant will be medically qualified IAW AFOSH 161-17
- Entrant will be trained in hazardous communication IAW AFOSH 161-21
- Entrant will be briefed on protective clothing and equipment
- Entrant will be respirator qualified IAW AFOSH 48-137 and Squadron OI 48-137
- Entrant maintains continual verbal communication with attendant while inside the confined space.
- Entrant will understand how to use atmospheric testing equipment and validate current PMEL Calibration requirements
- Attendant or entrant will test the cell/cavity/tank area with approved atmospheric equipment and documents readings on AF Form 1024.
- Attendant or entrant will test the cell/cavity/tank prior to any entry/re-entry, every eight hours, continuously for foamed filled aircraft and at any time the attendant or entrant questions the integrity of the cell/cavity/tank.
- Entrant will understand how to document and fill out AF form 1024 confine space field entry permit with attendant, and entry authority or designated alternate entry authority.
- Entrant will understand the early warning signs of exposure to chemicals, fuels, and solvents.
  - Examples are but are not limited to: headache, dizziness, lightheaded, euphoria, nausea, drowsiness, disorientated, muscle twitching, weakness/cramps in extremities. Evacuate/exit the tank immediately if any of these signs are present.
- Entrant will exit the confined space as rapidly as they can whenever an order to evacuate is given by the attendant or in the event of any hazardous situations.

- Entrant will notify the attendant, entry authority or their alternate if not feeling physically and mentally fit or if he/she taking medication that could impair their functions or abilities to perform their assigned duties.
- Entrant will have knowledge of area set up and use of rescue equipment
- Entrant will know how to implement procedures for emergency response/rescue plan
- Entrant will notify the Fuel Systems entry authority or designated entry authority when hazards exists that have not been corrected

### **Runner**

Must be trained on proper use of AGE equipment, and procedures for initiating emergency response plan. Must meet the requirements of the Attendant if being utilized as rescue team member.

### **Entry Equipment**

All of the following equipment is located at Bldg. 237, 225, and local Aerospace Ground Equipment (AGE) dispatch contractor:

- Respirators
- Maintenance Stands
- Personnel Protective Equipment
- Atmospheric Tester
- Universal Body Harness with Lanyard
- Portable Utility Crane

### **Testing**

OO-ALC Aircraft Directorate personnel from Bldg. 225 or 649 CLSS personnel trained in atmospheric testing will test each confined space prior to any entry and record the results on AF Form 1024, Confined Space Entry Permit or LEL checklist. Oxygen/LEL levels will be checked prior to the first entry of every shift and every eight hours thereafter or more often as deemed necessary IAW T.O. 1-1-3.

#### **Atmospheric Monitoring Equipment: LEL/Oxygen tester**

- Photoionization Detector (PID)
- Verify that these testers are in operational condition and have current certification tags from PMEL (ALC-TI/TIPL). This equipment will be used to test and verify safe working atmosphere for confined space of the cell/ cavity and integral tanks on fluid purged aircraft.

***Remember cell phone 911 calls go off base. For base rescue services call 777-1911 when using a cell phone. Base Phones: Call 911 to notify base rescue service.***

### **Self-Rescue**

An entrant who is in the confined space and is ordered by the attendant to evacuate and exit the confined space for any reason or whenever entrant/attendant recognizes the early warning signs of substances that would hinder self evacuation/exiting of the cell/cavity entrant.

Entrant will exit the confined space as rapidly as they can whenever an order to evacuate is given by the attendant or in the event of any hazardous situations (Ref AFOSH 91-25)

### **Rescue**

Emergency Response Plan: All rescues within the ALC (Bldgs. 237, 5, and Fuel Pad) will be accomplished by the fire department. The emergency response plan is intended to provide rescue procedures for an individual incapable of self-rescue and evacuation of the fuel cell/tank/cavity area. The aircraft area will be set up, atmosphere testing accomplished and documented on AF 1024 confined space entry permit and the permit signed by the entry authority/designated alternate prior to any confined space entries. All support equipment associated with ventilation and rescue attempts will be in place. The fire department will be notified of a confined space entry being accomplished in Bldgs. 237 and 5 or at the BORTA. If portable crane is utilized all entrants will wear a universal/adjustable full body harness with a 6' nylon lanyard attached to the D-ring to aid in rescue procedures if required.

**Rescue team will consist of the following:** One Attendant- 2A6X4 (Fuels) or 2A7X3 (Structural); Two (2) required if portable crane is not used or unavailable, functioning as spotter/runner.

- Trained person assigned as entry monitor (Attendant )- initiate initial rescue/removal attempts from outside area.
- Personnel in the vicinity of hangar 237 or BORTA – used to notify emergency agencies and assist the attendant with initial rescue attempts.
- Fire Department – alerts medical personnel of emergency, responds to scene and takes charge of rescue situation.
- Medical personnel – Responds to emergency and provide medical attention.

**NON ALC Primary Rescue Method:**

Prior to any tank entry for removal of an incapacitated entrant the attendant will;

- alert the runner, ensure that the tank is being properly ventilated, Determine, through contact with the entrant if possible, the nature of the emergency. Assess the conditions of the tank, and make any rescue attempts possible from outside the tank.

The runner will

- alert the dock chief or any individual in the immediate area that an emergency is in progress and to dial 911 from a base phone or 777-1911 from any cell phone. The caller will provide the following information to the fire department. Name and phone number of caller, building number, and nature of emergency.

The attendant will

- Don respiratory protection, but will not enter the tank until the runner assumes the duties of the attendant. The runner will direct immediate area personnel to aid in the rescue procedures and assist the attendant in the removal of a tank entrant from the outside area of the confined space. Special care will be given in guiding the tank entrants head, shoulders, and arms through the access opening as not to inflict injuries upon them during rescue process. If removal of entrant fails or is not possible for any reason, the runner will continue to ventilate the confined space until the fire department arrives and assumes responsibility for rescue procedures.

After entrant is removed from a confined space locate them to a fresh air environment and administer cardiopulmonary resuscitation(CPR), rescue breathing, and self-aid and buddy care as required until fire department or emergency medical personnel arrives and assumes responsibility at the scene.

**NON ALC Alternate Rescue Method**

All entry persons will wear a universal/adjustable full body harness with a 6 foot nylon lanyard attached to the D-ring to aid in rescue procedures.

The attendant will alert the dock chief or any individual in the immediate area that an emergency is in progress and to dial 911 from a base phone or 777-1911 from any cell phone. The caller will provide the following information to the fire department; Name and phone number of caller, building number, and nature of emergency.

The attendant will direct immediate area personnel to aid in the rescue procedures such as utilization of a portable utility crane and assisting the attendant in the removal of a tank entrant from the outside area of the confined space.

The attendant will hook the lanyard end to the cable crane hook and instruct the crane operator to slowly crank crane handle to the up position while attendant and immediate area personnel guide tank entrant through access opening. Special care will be given in guiding the tank entrants head, shoulders, and arms through the access opening as not to inflict injuries upon them during rescue process. If removal of entrant fails or is not possible for any reason, the attendant will continue to ventilate the confined space until the fire department arrives and assumes responsibility for rescue procedures.

After entrant is removed from a confined space locate them to a fresh air environment and administer CPR, rescue breathing, and self-aid and buddy care as required until fire department or emergency medical personnel arrives and assumes responsibility at the scene.

**Confined Space Chemical, PPE and Support Equipment Listing**

The following is a list of chemicals/equipment is authorized for use during confined space entry.

**HAZARDOUS CHEMICALS:**

Adhesion promoter

Electron dielectric cleaner – used for non-destructive inspections

Fuel tank sealant (MIL-S-83318/83430 PR-1750/1826)

Isopropyl Alcohol – used for non-destructive inspections  
 JP-8 jet fuel  
 Leak detection compound  
 Leak detection powder  
 Methyl Ethyl Ketone (MEK)  
 Petrolatum (VV-P-236)  
 Purging fluid (MIL-38299)

MSDSs for these items are available from the web site maintained in the 649<sup>th</sup> Support Section Workers Right to Know Book.

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** *Serviceability of item will be checked prior to use.*

Chemical and fuel resistant gloves  
 Cotton coveralls  
 Ear headsets  
 Ear plugs  
 Face shields  
 Goggles  
 Respirators – Full Face  
 Safety glasses

**RESCUE EQUIPMENT:**

Full body harness – universal type  
 6' Nylon lanyard  
 Portable utility crane

**ATMOSPHERIC MONITORING EQUIPMENT FOR LEL/OXYGEN TESTING:**

Photoionization Detector (PID)

(An equivalent meter must be approved/coordinated with the item manager, equipment specialist, MAJCOM Fuel Systems Representatives, AFIERA/RSHI, and the manager of T.O. 1-1-3.)

**OTHER SUPPORT EQUIPMENT:**

HDU-13M heater, MA-1A blower, Rhine air blower or air conditioner used to ventilate confined space  
 B-1 or B-4 maintenance stand  
 Rhine Air – Ambient Air Breathing Pump  
 Rhine Air – Blower

**RECLASSIFICATION OF PERMIT REQUIRED CONFINED SPACES ON F-16 AND A-10 AIRCRAFT**

The entry supervisor may reclassify a permit required confined space to a non-permit confined space provided the following has been done:

Testing of the confined space has been accomplished prior to entry with the results showing the space to be free of all hazards. NOTE: If entry is required to eliminate the hazards in the permitted space, the entry must be made according to the Master Entry Plan.

All actual or potential atmospheric hazards or hazardous conditions are eliminated, and continuous monitoring is used to ensure the atmosphere remains free of hazards.

The entrant does not take tools or introduce any material into the space that could themselves cause a hazard.

The entrant does not perform any work that would cause a hazardous condition.

The entry permit is revoked whenever any test, monitoring instrument, or observation shows hazardous conditions are developing in confined space.

The entry supervisor has signed and dated this document and attached it to the permit

Once the above items have been completed the space can be reclassified as a non-permit required space. Such reclassification allows entry without a permit, without personnel being suited with a harness, without respirators, and without an attendant. Ref. AFOSH STD 91-25, para. 6.4.11.

I certify that the above items have been completed and the space is free of all hazards.

Printed Name:

Signature:

Date:

#### Annual Confined Space Extraction Exercise

Confined space entry requirements must be met prior to performing exercise. The extraction can be accomplished using either rescue method, at either bldg. 237 or BORTA on either the A-10 or F-16. The crane is available through the 419th CLSS, remaining support equipment is available from support section. Notifying the emergency agencies will be simulated. All personnel will be familiar with wearing the body harness, while only one person will be physically removed from the space. The attendant will direct all actions during rescue operations (see CLSS OI 91-301 para. 11.3 page 20 for specific procedures).

**Attachment 3****Confined Space Master Entry Plan CLSS-001**

DEPARTMENT OF THE AIR FORCE  
Confined Space Master Entry Plan CLSS-001  
OGDEN AIR LOGISTICS CENTER (AFMC)  
649 CLSS/LGMS  
Hill Air Force Base, Utah 84056

20 May 2003

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**LOCATION:** Bldg 237, Bldg 5, Base Operational Training Area (BORTA) and various TDY locations.

**PURPOSE:** Provide 649 CLSS personnel permit-required confined spaces entry guidance. The last Bioenvironmental Engineering evaluation was completed on 23 Jul 2002. This authorization plan will be reviewed annually.

**1. Workplace Description:****1.1. Permit-required spaces common to the 649 CLSS:**

1.1.1. F-16 F-1 fuel tank bladder cell. It is located inside the forward fuselage.

1.1.1.1. On the F-16C it is accessed through the upper left side of the aircraft, under panel 2413. On the F-16D it is accessed under panels 3432 and 3434 (aft of the cockpit). The dimensions of the access door is length = 19", width = 11". F-16C fuel bladder cell physical dimensions are length: 4'6", width: 3', height: 3'6". F-16D fuel bladder cell physical dimensions are length: 2", width: 3'2", height: 2'10". Each contains jet fuel (JP-8), manifolds, pumps and related mounting hardware.

1.1.2. A-10 confined spaces include the right main (fwd), left main (aft) fuel tank bladder cells, left and right wing tanks. The two bladder cells are located inside the fuselage. The left and right wing tanks are located in between the left and right wing Wing Station (WS) 90.0.

1.1.2.1. Access to right main (fwd) fuel cell is through the upper surface, under panel F-52. Access to the left main (aft) fuel cell is through the upper surface, under panels F-58 and F-62. The dimensions of all three access doors are length = 30", width = 24". Access to the wing tanks is through panels W-3 to W-10 in the bottom of the wing. The dimensions of the access doors are length = 16", width = 12". Right (fwd) main tank bladder cell physical dimensions are length: 6", width: 4', height: 5' with shelf approximately 18" high on aft half. Left (aft) main tank bladder cell physical dimensions are length: 6", width: 4', height: 5' with shelf approximately 18" high on forward third. The wing integral tanks are divided into 4 sections each with physical dimensions length: 6", width: 2', height: 2'. Each tank contains jet fuel (JP-8), manifolds, pumps and related mounting hardware.

**2. Task/Operations to be Performed:**

**2.1. Fuel Cell/Cavity Repair Tasks and Expected Conditions:** The tasks listed will be performed by 649 CLSS Fuel Systems Repair (2A6X4) and Structural (2A7X3) personnel. Personnel on the entry team are trained and tank entries will be made in accordance with the requirements of T.O. 1-1-3, AFOSH 91-25, and CLSS OI 91-301.

**2.1.1. Specific Tasks:**

2.1.1.1. Removal and installation of the F-16 F-1 cell. The F-1 cell on the F-16A/C model aircraft is located under panel 2413 and the dimensions are length: 4'6", width: 3', height: 3'6". The F-1 cell on the F-16B/ D model aircraft is located under panels 3432/3434 and the dimensions are length: 2', width: 3'2", height: 2'10".

2.1.1.2. Removal of all associated structural hardware, sealant, fuel lines and components inside F-16 fuel tanks.

2.1.1.3. Inspect, clean, and repair the F-16 F-1 fuel cell/cavities.

2.1.1.4. Removal and installation of the A-10A left and right main cells. The left and right main bladder cells on the A-10A aircraft are located under panels F-52, F-58 and F-62. The dimensions are: length 6', width 4', height 5'.

2.1.1.5. Removal of all associated structural hardware, sealant, foam, fuel lines and components inside A-10 fuel tanks.

2.1.1.6. Inspect, clean and repair the A-10A left and right main fuel cells/tanks/cavities. Inspect, clean and repair left and right integral wing tanks, located under panel's W-3, 5, 7, 9 left wing and panel's W-4, 6, 8, 10 right wing and the dimensions are: length 6', width 2', height 2'.

<u>SPECIFIC TASK</u>	<u>TECH ORDERS</u>	<u>CHEMICALS</u>	<u>PPE</u>
Component replacement	Applicable Aircraft Technical Orders	See Appendix 1	See Appendix 1
Sealant removal and Application	Applicable Aircraft Technical Orders	See Appendix 1	See Appendix 1

**2.2. Non-fuel Cell/Cavity Repair Tasks and Expected Conditions:** The tasks listed below will be performed by the workcenters listed. Personnel on the entry team are trained and tank entries will be made in accordance with the requirements of TO 1-1-3, AFOSH 91-25, and CLSS OI 91-301.

**2.2.1. Specific Tasks:**

2.2.1.1. Removal of all associated structural hardware, sealant, fuel lines and components inside F-16 fuel tanks.

2.2.1.2. Inspect, clean, and repair the F-16 F-1 fuel tank/cavity. The F-1 cell on the F-16A/C model aircraft is located under panel 2413 and the dimensions are length: 4'6", width: 3', height: 3'6". The F-1 cell on the F-16B/D model aircraft is located under panels 3432/3434 and the dimensions are length: 2', width: 3'2", height: 2'10".

2.2.1.3. Removal of all associated structural hardware, sealant, fuel lines and components inside A-10 fuel tanks.

2.2.1.4. Inspect, clean and repair the A-10A left and right main fuel tanks/cavities. The left and right main bladder cells on the A-10A aircraft are located under panels F-52, F-58 and F-62. The dimensions are: length 6', width 4', height 5'. The left and right integral wing tanks on the A-10A aircraft are located under panel's W-3, 5, 7, 9 left wing and panel's W-4, 6, 8, 10 right wing and the dimensions are: length 6', width 2', height 2'.

Note: All hot work, i.e. grinding, welding and brazing on aircraft and fuel systems facilities shall be approved by the Fire Department. AF Form 592, *USAF Welding, Cutting and Brazing Permit* shall be completed.

<u>WORKCENTER</u>	<u>TASK</u>	<u>TECH ORDER</u>	<u>CHEMICALS</u>	<u>PPE</u>
Structural Maintenance (LGMF)	Repair/install Hardware/structure	Applicable Aircraft Technical Orders	See Appendix 1	See Appendix 1
Non-destructive Inspection	Various NDI inspections	Applicable Aircraft Technical Orders	See Appendix 1	See Appendix 1

**Confined Space Entry/Work Conditions:** The remainder of this master entry plan applies to all permit-required entries, regardless of specialty performing entry.

**2.3. Acceptable Entry Conditions/Procedures for Bldg 237 and Bldg 5:** Aircraft will be fluid purged prior to cell/tank/cavity entry when possible and testing will verify that oxygen content of 19.5% - 23.5% is sustained and a 5% LEL or lower is maintained. Test cell/tank/cavity prior to any entry/re-entry, every eight hours, continuously for foamed filled aircraft and at any time the personnel question the integrity of the cell/tank/cavity. LEL and oxygen content percentage will be annotated on AF Form 1024 Confined space permit or continuation checklist. All entries will be ventilated with an HDU-13 heater, MA-1A blower or Rhine air blower. Constant communication (visual or voice) will be maintained following the requirements of AFOSH 91-25, T.O. 1-1-3 and CLSS OI 91-301. When using NDI equipment the LEL will be maintained at 1.5% or less.

**2.4. Minimum Acceptable Field Level Entry Conditions/Procedures:** Oxygen level content will be tested first, followed by atmospheric combustibility. Oxygen levels will be between 19.5-23.5% prior to tank entry. Using atmospheric testing equipment that meets or exceeds various standards outlined in AFOSH 91-25 par. 3-6 to test oxygen content and LEL (combustibility) level. Combustibility levels will be 10% LEL (20% for aircraft with foam) or lower for depuddling operations when fuel or chemicals are present. The entry permit must be completed and signed by the entry authority/designated alternate. Entrant has performed a fit test of respirator prior to entry, ensuring serviceability of breathing equipment. Field permits for cell/cavity entries not consistent with the conditions of T.O. 1-1-3 and this MEP letter will not be issued without prior approval from the LG/CC, Base Safety, Bioenvironmental Engineering, and the Fire Department. After receiving approval, routine and reoccurring tasks may be added to this MEP on attached sheets with references to the appropriate paragraph.

**3. Chemicals:** See Appendix 1.

**4. Technical Data Required:** T.O. 1-1-3, AFOSH 91-25, CLSS OI 91-301, and applicable aircraft T.O.

**5. Prevention of Unauthorized Entry:** Roping off area and posting restricted entry signs. A confined space entry sign, OO-ALC-HAFB VA 127-3, *Confined Space Danger* will be posted at the access area (single entry point). The attendant maintains control over the entry area inside and outside of the cell/cavity area. The attendant also ensures accurate accounting of entrants and prevents unauthorized personnel from entering the confined space. The attendant will not be required to monitor multiple spaces. Entries not consistent with the conditions outlined in this MEP will not be authorized by the entry supervisor (Entry Chief) or designated alternates.

## **6. Potential Hazards:**

**6.1. Potential Hazard Description:** Personnel entering or working in confined spaces may encounter a number of potentially serious hazards. These may include atmospheric hazards such as lack of sufficient oxygen to support life (< 19.5%), excessive oxygen levels (>23.5%) that increase the danger of fire or explosion, presence of flammable or explosive materials (JP-8) and, or the presence of toxic gases or materials (Methyl Ethyl Ketone, Sealant). In addition, the confined workspace may include electrical hazards that must be locked/tagged out IAW T.O. 1-1-3, section V and applicable aircraft T.O.s. For information concerning hazards associated with chemicals and fuel that may be encountered see the Material Safety Data Sheets (MSDS), located in the Workers Right To Know book located in the 649 CLSS Main Tool Crib.

Potential hazards that may exist are:

### HAZARD

Vapor:

Fire Hazard:

Health, Ingestion:

IDLH atmosphere:

### SYMPTOMS/COMMENTS

Benzene content of 0.5 to 1 %. (*known carcinogen*)

Combustible atmosphere above 20% LEL.

Nausea, vomiting, loss of appetite, headaches, dizziness, euphoria, muscular twitching followed by loss of consciousness, convulsions and death.

Any condition which poses immediate threat to life or may result in acute severe health effects. Oxygen less than 19.5% or greater than 23.5 %.

Prolonged contact: Dryness, irritation of the skin and possibly severe dermatitis.  
Eye: Immediate irritation and possible loss of sight.

6.2. **Control of Hazards:** Aircraft will be fluid purged prior to entry when possible. Forced air ventilation will be used while personnel are in the permit-required confined space. Ventilation ducts will be directed to ventilate the immediate areas where the entrant is or will be present within the space and will continue until the entrant has departed the space. Verbal communication and physical observation will be maintained between entrant and attendant at all times while entrant is in the permit-required confined space. Individuals from the OO-ALC Aircraft Division or 649 CLSS personnel trained in atmospheric testing will accomplish sampling. Documentation of readings will be annotated on AF Form 1024, *Confined Space Entry Permit* and LEL checklist.

6.2.1. **Entry Permit:** The individuals listed on Appendix 2 are authorized by the entry authority/supervisor, as designated alternates for the 649 CLSS Fuels Section to issue confined space permits for entry into the F-1 fuel cell/cavity on F-16 aircraft and the main/wing fuel cells/tanks on A-10 aircraft.

6.2.1.1. **Permit:** Confined Space Entry Permit AF Form 1024

**Permit Requirements:** Field permits are required for all permit required confined space fuel tank entries. Entry means the action by which a person passes through an opening into a permit required confined space. It includes ensuring work activities in that space and is considered to have occurred as soon as any part of the entrants body breaks the plane on an opening into the space. All personnel assigned to the 649<sup>th</sup> CLSS Fuels and Structural Element will read and adhere to the current bioenvironmental survey, this OI/MEP. NDI will be briefed on case-by-case basis, prior to required entries.

6.2.1.2. **Deployment and Readiness procedures:** This Master Entry Plan gives personnel authorization to perform confined space maintenance, when deployed to an Air Force or non-Air Force installation that does not have fuel tank entry procedures established. Established local procedures take precedence at the deployed location. When deployed to a bare base or remote location the unit will make provisions for at least two qualified fuel systems repair specialists or one qualified fuel systems specialist and one qualified confined space person for each entry. The attendant/runner will be selected from available on-site personnel and will be trained on their duties including emergency response procedures. Confined space entries will not be made until emergency medical response procedures appropriate to the location have been identified and are available. The team will deploy with one combustible gas and oxygen analyzer, sufficient airline respirators, PPE (coveralls, footwear, etc.) and support equipment to ensure a safe entry.

## 6.2.2. **Confined Space Reclassification:**

6.2.2.1. The entry supervisor may reclassify a permit-required confined space to a non-permit confined space provided the following has been done:

6.2.2.1.1. Testing of the confined space has been accomplished prior to entry with the results showing the space to be free of all hazards. **NOTE:** *If entry is required to eliminate the hazards in the permitted space, the entry must be made according to the Master Entry Plan.*

6.2.2.1.2. All actual or potential atmospheric hazards or hazardous conditions are eliminated, and continuous monitoring is used to ensure the atmosphere remains free of hazards.

6.2.2.1.3. The entrant does not take tools or introduce any material into the space that could themselves cause a hazard.

6.2.2.1.4. The entrant does not perform any work that would cause a hazardous condition.

6.2.2.1.5. The reclassification is revoked whenever any test, monitoring instrument, or observation shows hazardous conditions are developing in confined space.

6.2.2.1.6. The entry supervisor has signed and dated a reclassification letter (see Appendix 3) and attached it to the permit.

6.2.2.2. Once the above items have been completed the space can be reclassified as a non-permit-required space. Such reclassification allows entry without a permit, without personnel being suited with a harness, without respirators and without an attendant. (Reference) AFOSH STD 91-25, para. 6.4.11.

## **7. Entry Procedures:**

7.1. **Confined Space Isolation Methods/Lockout Tag out:** Will be accomplished IAW T.O. 1-1-3 section V, applicable aircraft T.O.s, and applicable local O.I.s.

7.2. **Acceptable Entry Conditions:** See paragraphs 2.3 & 2.4 above for acceptable minimum entry conditions required for specific location.

## **8. Authorization:**

8.1. **Confined Space Entry Team:** Structural Maintenance (2A7X3), Non Destructive Inspection (2A7X2), Fuels System (2A6X4).

### **8.2. Confined Space Entry Team Responsibility:**

#### **8.2.1. Entry Authority will:**

8.2.1.1. Be designated via the 649 CLSS Master Entry Plan 91-301.

8.2.1.2. Can perform Entry Supervisor duties as required IAW T.O. 1-1-3, para. 1-6.2.2.1.

8.2.1.3. Maintain the organizational Master Entry Plan (MEP).

8.2.1.4. Keep records on training, safety drills and respirator fit test results.

8.2.1.5. Forward closed and canceled permits to Ground Safety who will maintain them for one year.

#### **8.2.2. Entry Supervisors (Entry Chief) will:**

8.2.2.1. Be familiar with the organizational Master Entry Plan (MEP).

8.2.2.2. Plan each entry and describe the work to be done.

8.2.2.3. Identify the technicians who will be on the confined space entry team.

8.2.2.4. Identify all hazards within the space and any hazards that may be introduced by scheduled work.

8.2.2.5. Ensures that all necessary procedures, practices and equipment for safe entry are in use.

8.2.2.6. Verify confined space-training dates for all members of the confined space work team.

8.2.2.7. Prepare entry permit and contact Wing Safety, Fire Department and Bioenvironmental Engineering for all entries not covered under a MEP.

8.2.2.8. Perform or arrange for atmospheric testing and monitoring. Prior to entry into the confined space, testing for potential hazards must be completed and the types of tests listed on the permit.

8.2.2.9. Complete, date, sign and post the permit prior to entry at the aircraft so that the entrant and attendants can confirm the pre-entry preparations have been completed prior to any entry.

8.2.2.10. The permit will be cancelled and confined space maintenance terminated if the conditions are changed by any of the following: The original tasks change, the aircraft is moved, conditions not IAW T.O. 1-1-3, chemicals other than originally permitted are introduced into the tank, previously non-authorized personnel require entry into the tank and any condition outside the scope of the Master Entry Plan/Authorization Letter. Any conditions or changes not consistent with the Master Entry Plan/Authorization Letter require approval from the squadron commander, Bioenvironmental, Ground Safety, and Fire Department before entry.

8.2.2.11. Ensure proper classification of the confined space being entered.

8.2.2.12. Reclassify confined spaces from permit to non-permit, or non-permit to permit IAW appropriate guidelines contained in Chapter 9 of this MEP.

8.2.2.13. Determine if conditions are acceptable for entry into a confined space.

8.2.2.14. Watch for hazards outside of the confined space.

8.2.2.15. Notify the attendant and entrant to evacuate if conditions warrant.

8.2.2.16. Ensure workers are properly trained and qualified in safe operating procedures, emergency procedures, proper use of Personal Protective Equipment (PPE) and how to egress confined spaces.

8.2.2.17. Brief workers on the hazards of entry.

8.2.2.18. Inspect work areas, tools and equipment to identify and correct hazards.

8.2.2.19. Ensure all physical and atmospheric hazards are abated to meet acceptable conditions listed in this MEP.

8.2.2.20. Select proper PPE and ensure that it is readily available and that it works properly.

8.2.2.21. Ensure that emergency procedures have been developed and that emergency services are readily available.

8.2.2.22. Be prepared to call for emergency help and assist in response/rescue procedures if needed.

**8.2.3. Entrants will:**

8.2.3.1. Fully understand all procedures, safeguards and emergency egress and/or rescue procedures associated with the entry.

8.2.3.2. Follow safe work practices and immediately notify the supervisor when an unsafe condition is identified.

**8.2.4. Attendants will:**

8.2.4.1. Implement the Emergency Response Plan.

8.2.4.2. Maintain an accurate count of all personnel entering and exiting the space.

8.2.4.3. Maintain constant communication with the entrant during the entry.

8.2.4.4. Remain alert for early signs of asphyxiation, fire hazard, and other dangers within the space

8.2.4.5. Maintain clear access to and from the confined space.

8.2.4.6. Remain alert for early symptoms of danger, inside and outside the space and orders the evacuation of the space if there is any possible hazard to the entrants.

8.2.4.7. Monitor the atmospheric testing equipment.

8.2.4.8. Attend to the respirator air lines to prevent entanglement.

8.2.4.9. Ensure ventilation equipment is operational and ventilating air is not contaminated by outside sources.

8.2.4.10. Notify emergency services when required.

8.2.4.11. Prevent unauthorized persons from entering the space.

8.2.4.12. Remain outside the space until all entrants have exited the space or unless replaced by a qualified attendant.

8.2.4.13. Not perform any rescues that require entry until the rescue team has been notified and properly trained/qualified assistance (i.e. runner) has arrived (non-ALC bases). On ALC bases notify base fire department rescue services, rescue entries are not authorized in accordance with Note following T.O. 1-1-3 par. 2-8.3.8.

8.2.4.14. Be responsible for maintaining control over the entry area inside and outside of the cell/cavity area.

8.2.4.15. Not normally monitor multiple spaces. Multiple spaces may be monitored if conditions in T.O. 1-1-3 par. 2-8.4.4.f.(2) are met.

#### 8.2.5. **Runner:**

8.2.5.1. Must meet the requirements of the Attendant if being utilized as rescue team member.

8.2.5.2. Notify base fire department rescue services by most direct means available upon notification by attendant of emergency.

**9. Training:** All members of the confined space entry team will be trained at a minimum to the level indicated by position title in T.O. 1-1-3, Table 1-2. Specific training requirements are outlined in Chapter 3 of CLSS O.I. 91-301.

**10. Entry Equipment:** All of the following equipment is located at Bldg 237/225. Aerospace Ground Equipment (AGE) will be requested as needed through the AGE dispatch contractor (e.g. maintenance stands, manually operated crane):

- \* Respirators (3M 7800 series)
- \* Personnel Protective Equipment (coveralls, footwear, head coverings, etc.)
- \* Atmospheric Tester
- \* Universal Body Harness with Lanyard

**11. Testing:** Atmospheric Monitoring Equipment: Photoionization Detector. Verify that these testers are in operational condition and have current certification tags from PMEL (ALC-TI/TIPL). This equipment will be used to test and verify safe working atmosphere for confined space of the cell/cavity and integral tanks on fluid purged aircraft. 649 CLSS personnel or OO-ALC Aircraft Division personnel trained in atmospheric testing will test each confined space prior to any entry. See paragraphs 2.3 & 2.4 of this MEP for proper sequence of testing. Atmospheric testing frequency will be every 8 hours, after work interruptions occur and when operations and/or conditions change while confined space maintenance is in work IAW T.O. 1-1-3. All Oxygen/LEL monitoring results will be documented on AF Form 1024 and local continuation sheet.

#### **12. Communications and Observation:**

12.1. **Method:** Visual physical observation and/or verbal communication.

12.2 **Equipment:** None required for these confined spaces.

**12.3 Testing:** 649 CLSS personnel or OO-ALC Aircraft Division personnel trained in atmospheric testing will test each confined space prior to any entry and record the results on the permit.

**Note:** *Cell phone 911 calls go off base. For base rescue services call 777-1911 when using a cell phone. Base Phones: Call 911 to notify base rescue service. All notifications must be made from outside the fuel repair area.*

**13. Emergency Response Plan:** Is intended to provide rescue procedures for an individual incapable of self-rescue from a confined space. Confined Space rescues on ALC bases will be performed by the fire department rescue team. The rescue methods listed below will be utilized outside of the depot.

**13.1. Organizational Rescue team will consist of the following:**

13.1.1. One Attendant- 2A6X4 (Fuels) or 2A7X3 (Structural); 1 Attendant and 1 Runner are required if a manually operated utility crane is not used.

13.1.2. Trained persons assigned as attendants will initiate initial rescue/removal attempts from outside the confined space after notifying the runner of the emergency.

13.1.3. Runners will be used to notify fire department rescue team of an emergency and assist the attendant with initial rescue attempts.

13.1.4. The Fire Department alerts medical personnel of emergency, responds to scene, and takes charge of rescue operations.

**13.2. ALC Center Rescue Procedures:**

13.2.1. The attendant will alert the runner to activate rescue procedures, ensure that the tank is being properly ventilated. Determine, through contact with the entrant if possible, the nature of the emergency. Assess the conditions of the tank and make any rescue attempts possible from outside the tank.

13.2.2. The runner will alert the dock chief or any individual in the immediate area that an emergency is in progress and to call 911 from a base phone or 777-1911 from any cell phone outside the repair area. The caller will provide the following information to the fire department: name and phone number of caller, building number, and nature of emergency.

13.2.3. If removal of entrant fails or is not possible for any reason from outside the tank/cavity, the attendant will continue to ventilate the confined space until the fire department arrive and assume responsibility for rescue procedures.

**13.3. NON-ALC Center Rescue Execution:** (These methods will only be utilized outside of ALCs, the fire department has sole rescue responsibility in the ALCs.)

**13.3.1. Primary Rescue Method:**

13.3.1.1. Prior to any tank entry for removal of an incapacitated entrant, the attendant will alert the runner, ensure that the tank is being properly ventilated. Determine, through contact with the entrant if possible, the nature of the emergency. Assess the conditions of the tank and make any rescue attempts possible from outside the tank.

13.3.1.2. The runner will alert the repair area dock chief or any individual in the immediate area that an emergency is in progress and call 911 from a base phone or local 7-digit emergency number from any cell phone outside the repair area. The caller will provide the following information to the fire department: name and phone number of caller, building number, and nature of emergency.

13.3.1.3. The attendant will ensure the tank is being properly ventilated, don respiratory protection, but will not enter the tank until the runner assumes the duties of the attendant. The runner will direct immediate area personnel to aid in the rescue procedures and assist the attendant in the removal of a tank entrant from the outside area of the confined space. Special care will be given in guiding the tank entrant's head, shoulders and arms through the access opening as not to inflict injuries upon them during rescue process. If removal of entrant fails or is not possible for any reason, the attendant/runner will continue to ventilate the confined space until the fire department arrives and assumes responsibility for rescue procedures.

13.3.1.4. After entrant is removed from a confined space transport them to a fresh air environment and administer cardiopulmonary resuscitation, rescue breathing and self-aid and buddy care as required until fire department or emergency medical personnel arrive and assume responsibility at the scene.

**13.3.2. Alternate Rescue Method:** All entry persons will wear a universal/adjustable full body harness with a 6 foot nylon lanyard attached to the D-ring to aid in rescue procedures.

13.3.2.1. The attendant will alert the runner or dock chief that an emergency is in progress and to dial 911 from a base phone or 777-1911 from any cell phone outside of the repair area. The caller will provide the following information to the fire department: name and phone number of caller, building number, and nature of emergency.

13.3.2.2. The attendant will direct the runner in the rescue procedures such as utilization of a manually operated utility crane and assisting the attendant in the removal of a tank entrant from the outside area of the confined space.

13.3.2.3. The attendant will hook the lanyard end to the cable crane hook, if not previously done, and instruct the crane operator to slowly crank crane handle to the up position while attendant guides tank entrant through access opening. Special care will be given in guiding the tank entrant's head, shoulders and arms through the access opening as not to inflict injuries upon them during rescue process. If removal of entrant fails or is not possible for any reason, the attendant will continue to ventilate the confined space until the fire department arrive and assume responsibility for rescue procedures.

13.3.2.4. After entrant is removed from a confined space transport them to a fresh air environment and administer CPR, rescue breathing and self-aid and buddy care as required until fire department rescue emergency medical personnel arrive and assume responsibility at the scene.

**14. Contractor Interface:** N/A

**15. Permit Routing and Control:** Once the work is completed, permits will be cancelled and forwarded to Ground Safety and retained on file for one year.

**16. Amendment to the MEP:** The MEP must be reviewed at least once a year. Changes to the MEP other than spelling and grammar must be coordinated with the entry supervisor, organizational safety office, Bioenvironmental Engineering /SGPB, Fire Department /CEF and Base Safety Office /SEG

**17. Coordination:**

TRAVIS P. CUOGHI, MSgt, USAF  
649 CLSS Entry Authority

FRANK J. FORTE, GS-8, Training Officer  
75 CEG Fire Department

RON L. JAMES, GS-12, Safety Engineer  
OO-ALC/SEC Ground Safety

WILLIAM W. WOODS, GS-11  
75 MDG/SGPB, Industrial Hygienist

CRAIG W. HALL, Lt Col, USAF  
Commander, 649 CLSS

**Confined Space Master Entry Plan 649 CLSS OI 91-301  
APPENDIX 1**

**1.1 Confined Space Chemical Listing.** The following is a list of chemicals/equipment authorized for use during confined space entry.

**1.1.1. HAZARDOUS CHEMICALS:** *(MSDSs for these items are maintained in the 649<sup>th</sup> Support Section)*

1. Adhesion promoter
2. Electron dielectric cleaner – used for non-destructive inspections
3. Fuel tank sealant (MIL-S-83318/83430 PR-1750/1826)
4. Isopropyl Alcohol – used for non-destructive inspections
5. JP-8 jet fuel
6. Leak detection compound
7. Leak detection powder
8. Methyl Ethyl Ketone (MEK)
9. Petrolatum (VV-P-236)
10. Purging fluid (MIL-38299)

**1.1.2. PERSONAL PROTECTIVE EQUIPMENT (PPE):** *(Serviceability of items will be checked prior to use)*

1. Chemical and fuel resistant gloves
2. Cotton coveralls
3. Ear headsets
4. Ear plugs
5. Face shields
6. Goggles
7. Full face respirators (3M 7800 series)
8. Safety glasses

**1.1.3. RESCUE EQUIPMENT:**

1. Full body harness – universal type
2. 6' Nylon lanyard
3. Manually operated crane

**1.1.4. ATMOSPHERIC MONITORING EQUIPMENT FOR LEL/OXYGEN TESTING:**

1. Photoionization Detector(PID)

**1.1.5. OTHER SUPPORT EQUIPMENT:**

1. HDU-13M heater, MA-1A blower, or air conditioner used to ventilate confined space
2. B-1 or B-4 maintenance stand
3. Rhine Air – Ambient Air Breathing Pump
4. Rhine Air - Blower

**1.1.6. CHEMICAL EXPOSURE LEVEL/RECLASSIFICATION:**

1. Confined Space: F-16D F-1 Cell

Chemical Name	Duration and Amt. Of Chemical Used Per Task	Bioenvironmental Engineering Evaluation/Exposure Potential Levels	Conditions to Reclassify the Confined Space
JP-8	½ Gallon / 1 hr.	May exceed PEL for JP-8	Forced Air Ventilate, Full Face Air-supplied respirator with 5 minute escape
Sealant MIL-S-83318/83430 PR-1826/1750	12 oz. / 2 Hours	May approach PEL for Solvent	Forced Air Ventilate
Isopropyl Alcohol	8 oz. / 1 Hour	Will be below PEL	Forced Air Ventilate

Leak Detection Compound	6 oz. / 1 Hour	Strong Odor, will not meet PEL	Forced Air Ventilate or Full Face Air Purify Respirator with Ammonia Cartridges/OV/P100
Methyl Ethyl Ketone	4 oz. / ½ Hour	May exceed PEL for MEK	Forced Air Ventilate or Full Face Air Purify Respirator with Cartridges/OV/P100
Purging Fluid MIL-38299	½ Gallon / 1 Hour	May approach PEL for Solvent	Forced Air Ventilate

## 2. Confined Space: A-10A Wing Tank

NOTE: Exposure to vapors from solvents introduced into spaces of the A-10 may exceed AFOSH OELs. Required PPE includes a full face, air-purifying respirator with organic vapor cartridges. Air supplied respirators (3M 7800 Series) may be used, but are not required. Other PPE includes chemical resistant gloves and overalls where allowed.

Chemical Name	Duration and Amt. Of Chemical Used Per Task	Bioenvironmental Engineering Evaluation/Exposure Potential Levels	Conditions to Reclassify the Confined Space
JP-8	3 Gallon / 1 hr.	May exceed PEL for JP-8	Forced Air Ventilate, Full Face Air-supplied respirator with 5 minute escape
Sealant MIL-S-83318/83430 PR-1826/1750	12 oz. / 2 Hours	May approach PEL for Solvent	Forced Air Ventilate
Isopropyl Alcohol	8 oz. / 1 Hour	Will be below PEL	Forced Air Ventilate
Leak Detection Compound	6 oz. / 1 Hour	Strong Odor, will not meet PEL	Forced Air Ventilate or Full Face Air Purify Respirator with Ammonia Cartridges/OV/P100
Methyl Ethyl Ketone	4 oz. / ½ Hour	May exceed PEL for MEK	Forced Air Ventilate or Full Face Air Purify Respirator with Cartridges/OV/P100
Purging Fluid MIL-38299	3 Gallon / 1 Hour	May approach PEL for Solvent	Forced Air Ventilate

**Confined Space Master Entry Plan 649 CLSS-91-301  
APPENDIX 2**

MEMORANDUM FOR WHOM IT MAY CONCERN

FROM: 649 CLSS Confined Space Entry Authority

SUBJECT: Alternate Entry Authority Appointment

1. The individuals listed are designated as Alternate Entry Authority for 649 CLSS Fuels Section to issue confined space permits for entry into the F-1 fuel cell/cavity on F-16 aircraft and the main/wing fuel cells/tanks on A-10 aircraft.

RANK/NAME	JOB TITLE	POSITION
MSgt Wyrick	Depot Fuel Systems Craftsman	Alternate
MSgt King	Depot Fuel Systems Craftsman	Alternate
MSgt Schmidt	Depot Fuel Systems Craftsman	Alternate
TSgt Reynolds	Depot Fuel Systems Craftsman	Alternate
TSgt Homkes	Depot Fuel Systems Craftsman	Alternate
TSgt Carballo	Depot Fuel Systems Craftsman	Alternate
TSgt Hopkins	Depot Fuel Systems Craftsman	Alternate
SSgt Willis	Depot Fuel Systems Craftsman	Alternate
SSgt Owen	Depot Fuel Systems Craftsman	Alternate
SSgt Barton	Depot Fuel Systems Craftsman	Alternate
SSgt Gorup	Depot Fuel Systems Craftsman	Alternate
SSgt Kaczmarek	Depot Fuel Systems Journeyman	Alternate
SSgt Triplett	Depot Fuel Systems Journeyman	Alternate
SSgt R. Johnson	Depot Fuel Systems Journeyman	Alternate
SrA Barker	Depot Fuel Systems Journeyman	Alternate

TRAVIS P. CUOGHI, MSgt, USAF  
649 CLSS Entry Authority

**Confined Space Master Entry Plan 649 CLSS-91-301**  
**APPENDIX 3**

RECLASSIFICATION OF PERMIT-REQUIRED CONFINED SPACES ON F-16 AND A-10 AIRCRAFT

1. The entry authority may reclassify a permit-required confined space to a non-permit confined space provided the following has been done:
  - a. Testing of the confined space has been accomplished prior to entry with the results showing the space to be free of all hazards. NOTE: If entry is required to eliminate the hazards in the permitted space, the entry must be made according to the Master Entry Plan.
  - b. All actual or potential atmospheric hazards or hazardous conditions are eliminated, and continuous monitoring is used to ensure the atmosphere remains free of hazards.
  - c. The entrant does not take tools or introduce any material into the space that could themselves cause a hazard.
  - d. The entrant does not perform any work that would cause a hazardous condition.
  - e. The entry permit is revoked whenever any test, monitoring instrument, or observation shows hazardous conditions are developing in confined space.
  - f. The entry authority has signed and dated this document and attached it to the permit.
2. Once the above items have been completed the space can be reclassified as a non-permit-required space. Such reclassification allows entry without a permit, without personnel being suited with a harness, without respirators, and without an attendant. Ref. AFOSH STD 91-25, para. 6.4.11.
3. I certify that the above items have been completed and the space is free of all hazards.

Printed Name:

Signature:

Date:

**Confined Space Master Entry Plan 649 CLSS-91-301  
APPENDIX 4**

20 May 2003

MEMORANDUM FOR 649 CLSS/LGMS

FROM: 649 CLSS/CC

SUBJECT: Confined Space Entry Authority

1. The following individual is appointed as Entry Authority for the 649 CLSS Squadron Confined Space program:

649 CLSS/LGMS

MSgt Travis P. Cuoghi, 7-3902

2. This letter supersedes all previous 649 CLSS Confined Space Entry Authority letters. If there are any questions concerning this letter, please contact MSgt Cuoghi at 7-3902.

CRAIG W. HALL, Lt Col, USAF  
Commander