Health and Safety Requirements for Fuel Handling.

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1.0 Introduction

This guidance is for personnel in offices responsible for the safe use, includes handling and storage of fuel (diesel and petrol) in UNHCR. It provides information on associated risks and sets out practical measures to protect people at work and others who may be affected by work activities.

2.0 Objectives

The objectives of this guidance are to:

- increase awareness of the potential risks associated with fuel handling and storage.
- advise on safe operating procedures and precautions to reduce injuries and damage.
- give guidance on appropriate standards for design, and installation of storage areas.
- advise on the need for appropriate maintenance, fire precautions and good housekeeping, and training related to fuel handling and storage.

3.0 Fuel handling and Storage Risks

Operations are advised to ensure that a risk assessment is carried out regardless of the quantity of fuel stored at the workplace.

- An assessment determines whether existing measures are sufficient or whether any additional controls or precautions are necessary.
- Risk assessments must include normal activities and assess non-routine activities, such as maintenance work, operating when pumping equipment is defective.
- A risk assessment needs to be conducted in all maintenance related activities around storage areas as there is a higher potential for fire and explosion incidents to occur.
- Potential consequences for failure to manage risks associated with fuel handling and storage include: Fatalities, injuries, property damage, environmental pollution.

Table 1 below provides a generic risk assessment on tasks associated with fuel handling and storage. It is expected that users review existing practices and align with approaches recommended. In conjunction with this generic risk assessment, staff assigned to perform tasks where they handle fuel must be informed and trained on risks they are exposed to and the same needs to be included in developed local safe operating procedures.

Activity/ Task	Risks/ unwanted events	Recommended Control Measures	Potential Consequences
1. Bulk fuel offloading	• Skin absorption from contact • Accidental Ingestion • Eye contact from splash incidents • Fire / explosion • Failure of pumping system resulting in manual offloading. • Failure of transfer pipes resulting in spillage to the ground.	• Use of Personal Protective Equipment (PPE) gloves, goggles, and coveralls • No smoking or open flames near the offloading area • Regular maintenance of pumping equipment • Installation & maintenance of grounding equipment • Use of spill containment measures (e.g., trays, berms, banding) • Proper grounding and bonding to prevent static electricity buildup • Emergency response procedures in place for spillages/ fire	• Skin irritation, dermatitis • Respiratory problems, nausea, vomiting • Eye irritation, burns • Fire, explosion, environmental damage • Delays in operations • Environmental pollution
2. Storage of fuel (Bulk storage tanks- above or below ground)	• Inhalation (from poor ventilation) • Fire / explosion • Failure of fuel storage tank integrity or accessories resulting in loss of containment and spill onto the ground.	• Regular inspections of tanks and equipment • Maintain proper ventilation • Use of spill containment measures (e.g., bunds, berms) • Fire suppression systems (e.g., foam, CO2) • Emergency response procedure	• Respiratory problems, headaches • Fire, explosion, • environmental damage Contamination of groundwater, soil, and surface water
3. Storage of fuel (in containers less or equal to 200L)	• Inhalation (from poor ventilation) • Fire / explosion • Failure of fuel storage container integrity or accessories resulting in loss of containment and spill onto the ground.	• Store containers in a cool, dry, and well-ventilated area • Use spill containment measures (e.g., trays) • Keep containers upright and secure Label containers clearly	• Respiratory problems, headaches • Fire, explosion, environmental damage • Contamination of groundwater, soil, and surface water

Activity/ Task	Risks/ unwanted events	Recommended Control Measures	Potential Consequences
4. Transfer into vehicles	• Inhalation (from poor ventilation) • Skin absorption from contact • Accidental Ingestion • Eye contact from splash incidents • Fire / explosion • Spillage of fuel onto the ground. • Defective pumping system	• Use of PPE (gloves, goggles, coveralls) • No smoking or open flames near the transfer area • Grounding and bonding to prevent static electricity buildup • Use of spill containment measures • Regular maintenance of transfer equipment • Emergency response procedures	• Respiratory problems, headaches • Skin irritation, dermatitis • Digestive problems • Eye irritation, burns • Fire, explosion • Spillages, environmental damage • Delays in operations
5. Transfer into portable containers	• Inhalation (from poor ventilation) • Skin absorption from contact • Accidental Ingestion • Eye contact from splash incidents • Fire / explosion • Defective pumping system	• Use of PPE (gloves, goggles, coveralls) • smoking or open flames near the transfer area • Grounding and bonding to prevent static electricity buildup • Use of spill containment measures (e.g., trays) • Regular maintenance of transfer equipment Emergency response procedures	• Respiratory problems, headaches • Skin irritation, dermatitis • Digestive problems • Eye irritation, burns • Fire, explosion, environmental damage • Delays in operations, increased labor costs
6. Maintenance activities (hot or cold work)	• Inhalation (from poor ventilation) • Asphyxiation of personnel entering confined spaces – enclosed storage rooms and work requiring entering in tanks. • Skin absorption from contact • Accidental Ingestion • Eye contact from splash incidents	• Permit-required confined space entry procedures • Adequate ventilation in confined spaces • Use of PPE (respiratory protection, gloves, goggles) • Fire watch during hot work activities • No smoking or open flames in designated areas	• Respiratory problems, suffocation • Skin irritation, dermatitis • Digestive problems • Eye irritation, burns • Fire, explosion, • Injuries to personnel

Activity/ Task	Risks/ unwanted events	Recommended Control Measures	Potential Consequences
	• Welding of material, dismantling of structures, personnel smoking can cause fire / explosion.	• Emergency response procedures	
7. Uncontrolled access of personnel to fuel handling and storage areas.	• Inhalation (from poor ventilation) • Skin absorption from contact • Accidental Ingestion • Eye contact from splash incidents • Fire / explosion	• Implement access control measures (e.g., locks, signs, restricted areas) • Train personnel on safety procedures and hazards • Regular inspections to ensure compliance	• Respiratory problems, headaches • Skin irritation, dermatitis • Digestive problems • Eye irritation, burns • Fire, explosion, • injuries to personnel

4.0 Personal Protective Equipment (PPE) and first aid response procedures

Provision of personal protective equipment is the last “line of defense” providing protection to any worker in preventing accidental contact. Operational must ensure that where applicable and based on local risk assessments that personnel handling fuel are adequately protected from through provision of PPE and are trained in respective first aid measures to take.

Table 2 below summarizes the minimum PPE required and first aid responses when dealing with personnel exposure to fuel; diesel or petrol (in liquid/ vapor form).

Body parts affected	Potential health effects	Personal Protective Equipment required	First Aid measures
Lungs	Respiratory irritation, dizziness, nausea and loss of consciousness or death in extreme exposure of large quantities of fumes and/ or over an extended period.	None *Where exposure is identified as a significant risk – wear FFP2/3 masks (temporary use) or a suitable cartridge respirator (contact Senior Occupational Safety Officer for any planned confined space* entry or work required).*	Remove personnel from further exposure (if breathing has stopped first aider to provide Cardiopulmonary resuscitation (CPR) or assist ventilation with mechanical device). Seek immediate medical attention. Personnel to Report incident in Home | myCority

Skin	Irritation/ Irritant contact dermatitis. May cause dermatitis skin cancer under conditions of poor personal hygiene, prolonged repeat contact and exposure to sunlight.	Wear clean laundered clothing. *(In absence of work suit/ overalls) – avoid synthetic clothing material.*	Remove contaminated clothing, cleanse exposed skin with soap and water or commercial hand cleaners. Personnel to Report incident in Home | myCorityhttps://unhcr.my.cority.com/
Eyes	Irritant	None *Safety glasses/ googles where exposure to face is a possibility (otherwise keep face away from direct splash or facing fumes in direction of wind)*	Flush eyes with clean running water for not less than 15minutes. Get medical assistance. Personnel to Report incident in Home | myCority
Ingestion	Poisoning occurs when fuel is swallowed and may enter lungs and cause lung damage.	None *Avoiding use of mouth to create pipe suction force for dispensing into secondary containers or vehicles.*	Seek immediate medical attention. Do not induce vomiting. Personnel to Report incident in Home | myCority

5.0 Design and Installation of Fuel storage

Heads of Offices must consult DFAM GIS for any design and construction requirements. The design and installation project teams can also utilize support or technical expertise from local country reputable fuel storage and distribution specialist engineers.

The location and layout of a fuel storage installation should be selected with care.

- Surface Storage Tanks: Storage in open air has advantages:
  - because leaks are easily detected and contained,
  - and any vapor produced will be dispersed by natural ventilation.
  - Inspections, and repairs are easier,
  - and corrosion can be identified and controlled.
- Underground Tanks: Give better fire protection and save space. Leakage resulting from damage or corrosion may be difficult to detect and leading to ground contamination.
- Site boundary to consider distance from other stakeholders and vulnerable populations or sensitive environments. This includes on-site occupied office or warehouse buildings,

condition of electrical installations – electrical wiring and generators, warehouse storage areas, and road tanker transfer facilities.

Useful Resources: The storage of flammable liquids in tanks - HSE176, https://www.hse.gov.uk/pubns/books/hsg176.htm

6.0 Maintenance requirements at fuel storage areas

Large quantities of fuel (mainly diesel) stored, pose a significant fire risk potentially of causing harm to UNHCR personnel and facilities. This occurs as a result of a failure in loss of containment.

To proactively manage risks the following measures must be applied fuel storage areas:

- Heads of Offices to implement measures for conducting informal and formal inspections to identify any fuel loss of containment and ensure remedial measures such as cleaning spills and contaminated soil,
- Heads of Offices to ensure that electrical works at diesel storage facility are done by a competent person as per host country regulations and comply to UNHCR Guide on Electrical Safety,
- Heads of offices to ensure an initial integrity test is done and there after every 2years, or as determined by Original Equipment Manufacturer (OEM) or as determined by host country regulations. Integrity tests must be done by host country registered competent contractor.
- Management of contractors engaged shall follow the Guidance on OHS requirements for contractors

Prohibition notices to all offices having diesel storage areas in their locations.

- *No hot work – open flame, heating or spark generating work shall be done without consultation with the Senior Occupational Safety Officer (email: Safety Incident safetyincident@unhcr.org).*
- *No entry into a confined space* (empty tank being prepared for diesel storage or previously containing any organic solvent) shall be done without consultation with the Senior Occupational Safety Officer.*

**Confined Spaces where diesel can be stored - can include unventilated rooms, storage containers, dug out bunkers/ tunnels and tanks (usually with one restricted entrance and no means of egress). These are oxygen depleted or enriched spaces, possible toxic and or flammable atmosphere i.e., gas fumes, vapor produced from diesel stored and any hot work or chemical reactions.*

7.0 Fuel handling procedures (including dispensing from secondary containers)

The following are general precautionary measures to be applied during any fuel handling process:

- Fuel dispensing shall be done in designated places only.
- Heads of Offices must ensure that personnel involved in the handling of fuel are inducted/ trained on the Occupational Health and Safety risks associated with improper handling (see table 1 on risks and precautionary measures). Such training shall also include the prevention of fire incidents through the following: keeping product form high energy ignition sources, sparks, open flames, cigarette smoking zones.
- Where electrical equipment and fittings are used for handling processes, they shall comply with UNHCR Guidance on Electrical Safety. This includes dispensing pumps (*which need to be operated and maintained as per Original Equipment Manufacturer (OEM) requirements*) and facility installations.
- All machinery (include mobile vehicles, pumps, and generators) must shut down before refueling can occur.
- Offloading of fuels shall take place in ventilated areas and refueling must be away from potential high energy ignition sources. *In general, personnel are required to avoid refueling activities from storage tanks during thunderstorms.*
- During offloading the vehicle must be grounded to avoid any uncontrolled static electricity. The vehicle must be connected to the ground through a copper or steel wire that's attached to an electrode in the ground. *Without proper grounding, static electricity can accumulate, creating a serious risk of fire or explosion.*
- In situations where manual loading of fuel into generators cannot be avoided Occupational Health Safety Focal Points and Field Security Advisers must be engaged to assist with conducting a risk assessment with the inclusion of treatment options involving use of safe lifting techniques and provision of a mobile pump.

- A fit for purpose and serviced fire extinguisher (foam) shall be appropriately always placed within reach by personnel handling fuel.
- Personal Protective Equipment shall be worn while handling fuel storage when deemed necessary based on a risk assessment and examples include, wearing goggles, respirators, FFP2/3 masks, safety gloves, protective clothing and footwear is essential in handling fuel storages (Take note of personnel displaying any allergic reactions).

8.0 Storage requirements for fuel in fixed tanks and portable containers

UNHCR offices store bulk fuel, mainly large quantities of diesel in holding tanks and containers placed above or below ground.

Note: Storage tanks above ground can be made from reinforced plastic composite material or made of steel. Storage tanks below ground are made from steel.

The following minimum requirements shall be complied to by offices to maintain safe diesel storage facilities:

- Heads of Offices must ensure that a safe location is identified for diesel storage facilities and the location must be as far as reasonably possible from personnel, waterways, and infrastructure (based on security and fire risk assessment of location).
- Diesel holding receptacles below ground must be installed and integrity checks conducted by registered and certified experts as per host country regulations.
- Diesel holding receptacles stored above ground shall be placed on top of a concrete surface or suitable impermeable lining material to prevent ground contamination. Bulk storage facilities holding 500litres or more are recommended to be within a bund wall to prevent run away spillage from a loss of containment.
- It is recommended that any above ground storage facility be covered from harsh weather elements. In this case suitable shade such as netting or non-flammable roofing material can be used.
- Access to the top of overhead tanks e.g., to use the dip stick shall be minimized where applicable. External reading gauges are recommended. The risk of fall shall be minimized by use of a fixed ladder & handrails. The area shall be cleaned to avoid slips from fuel spillages.

- To facilitate dissipation of electrical and static charge, protection of storage tanks must comply with host country regulatory requirements, which may include installation of appropriate grounding vessel system.
- Portable containers holding quantities less than or equal to 100 litres per container shall be considered as temporary diesel carriers or holders. The conditions for placement on concrete or impervious lined ground surface as well as covering from weather elements must apply. The storage of diesel in portable containers must be in well-ventilated area, away from waterways and infrastructure, and with a fire extinguisher located in proximity.
- Storage facilities shall be properly labeled with signage as per host country requirements. For example:
    - Information signs - Label fuel type kept and the storage capacity of the holding tank and switch off sign for dispenser.
    - Warning signs – no smoking and no open flames

9.0 Accidental environmental spillage measures.

Staff assigned to handle fuel shall ensure all leaking containers are not used. All spillages to be immediately cleaned and contained. Spills must not be allowed to drain into waterways, stormwater or sewerage infrastructure. Heads of Offices shall ensure residue spilled onto the ground surface is handled as suggested below where applicable, in the event of a spillage:

- Eliminate sources of ignition.
- Warn building occupants of fire and explosion hazard. Warn them to stay clear.
- Keep unauthorized personnel away from the affected area.
- Personnel attending the spillage should be in appropriate protective (PPE) clothing.
- Stop and contain the spill using appropriate dry and absorbent material and bunding. These materials are commonly found in standard commercially available spill kits.
- Spill kits should be readily available in accessible locations, and all personnel should be familiar with their use.
- Recovered spillage should be treated as hazardous waste and disposed of accordingly in line with environmental regulations/ guidance of host country.
- Where evidence of ground contamination is evident, soil from sand buckets, sawdust, or spill-absorbent materials (e.g., absorbent pads, granules, or spill socks) can be used to soak liquid diesel.

- Prevent runoff by creating a barrier using spill containment booms, dikes, or bunds (built with sandbags, soil, or absorbent socks) to prevent the spill from spreading; isolate and divert by blocking drains & waterways with drain covers, rubber mats or spill containment barriers over nearby storm drains and redirect flow to a controlled collection point. If the spill has seeped into the ground, remove the affected soil and replace it with clean material.
- Operations are required to report spill/ releases to UNHCR Greening and Sustainability Team for further assistance and report to relevant environmental management authorities in line with host country regulations when reportable incident contaminations have occurred.
- Procedures are in place for personnel to report incidents in Occupational Safety myCority: How should safety incident reporting be done? (unhcr.org)

10.0 Fire prevention and control requirements

Heads of Offices must ensure the inclusion of fuel (diesel/ petrol) storage and handling areas as part of the Office Fire Safety Risk Assessment.

- Appropriate fire extinguishing media based on risk assessment shall be installed. Suitable extinguishing media include Aqueous Film Forming Foam (AFFF) (effective for suppressing hydrocarbon fires) and dry chemical powder (suitable for flammable liquid fires and electrical hazards).
- The fire **extinguishers** shall be placed under a scheduled service by experts and monthly inspections conducted by security personnel in operations. OHS facilities assessments will also include checking firefighting equipment.

Note: Do not use water as an agent to extinguish diesel fires - water has high density than diesel and occupies space below burning diesel and carrying it to other structures in proximity and causing more harm or damage.

- Operations shall implement preventative measures to open flames and uncontrolled electrical discharge at diesel storage and dispensing areas as an efficient way of preventing an easily preventable fire from breaking out.
- Due to different flashpoint and autoignition temperatures, different fuel types, i.e., diesel, petrol, should not be stored in the same area.

- Personnel must be inducted and be aware on hazards associated with open flames from smoking and electrical discharge from portable battery powered electrical devices i.e. cell phones near storage areas. Strictly prohibit smoking in and around fuel storage and handling areas.
- Ensure electrical wiring and equipment in storage areas are safe and installed by competent electrician.
- Personnel handling fuel do not wear synthetic clothing which can generate static electricity.
- Use grounding and bonding techniques when transferring fuel to prevent static buildup.
- Personnel to participate in regular evacuation drills on response procedures in case of a spillage or fire outbreak.

11.0 Training and Competency of Personnel

Heads of Offices must ensure that personnel assigned to tasks associated with handling fuel must be provided with appropriate training which is not limited to the following:

General Safety Training/ Awareness:

- **Hazard Identification & Risk Assessment:** Training on identifying and understanding the general work hazards available OHS courses on workday. Create awareness and understanding of Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS).
- **Fire Safety:** Training on fire prevention, fire suppression techniques, and the use of fire extinguishers (appropriate types for fuel fires). This should include evacuation procedures and emergency response plans. *Organised by Security Personnel in the respective offices.*
- **First Aid and CPR:** Basic first aid and CPR training is crucial in case of accidents or injuries. This training is *organised by FSA in respective offices.*

Fuel Handling Specifics:

- **Safe Fuel Handling Practices:** Training on proper procedures for transferring fuel, including:
    - Grounding and bonding techniques to prevent static electricity buildup.
    - Use of proper equipment (e.g., pumps, hoses, funnels).
    - Minimizing spills and controlling leaks.
    - Procedures for refuelling vehicles and equipment.
- **Spill Response Procedures:** Training on how to respond to fuel spills, including:
    - Containment and cleanup methods.

- Use of spill kits and absorbent materials.
- Reporting procedures for spills. How to report incidents on mycority

- **Confined Space Entry (if applicable):** This task is to be conducted by competent contractors as the organisation is not capacitated to handle this task. If personnel will be entering confined spaces (e.g., fuel tanks), they must receive specific training on confined space entry procedures, including:
  - Atmospheric testing.
  - Ventilation requirements.
  - Rescue procedures.
- **Personal Protective Equipment (PPE):** Training/ awareness on the proper selection, use, and maintenance of PPE, such as:
  - Gloves (chemical-resistant)
  - Safety glasses or goggles
  - Face shields
  - Coveralls
  - Respiratory protection (if necessary)

Additional Considerations:

- **Frequency of Training:** Regular refresher training should be conducted to reinforce knowledge and skills.
- **Documentation:** Training records should be maintained for all personnel.

12.0 References

- Occupational Health and Safety self-paced learning resources
- UNHCR incident Reporting FOR OCCUPATIONAL Health and Safety events
- Evacuation Drill Report | myCority
- Safety UNHCR facilities checklist | myCority
- Security Management Operations Manual