

# **Jordan Ozone Depleting Substances HCFC Phase-Out Project (ODS3)**

## **Terms of Reference for Environmental Health and Safety Consultant**

### **1. BACKGROUND**

In order to protect the ozone layer, the Montreal Protocol on Substances that Deplete the Ozone Layer and its subsequent adjustments and amendments called for joint actions from both developed and developing countries to gradually phase out production and consumption of ozone depleting substances (ODS). The London Amendment to the Montreal Protocol decided in 1990 to set up a funding mechanism to meet the agreed incremental costs of complying with the Montreal Protocol by developing, i.e. “Article 5”, countries. The Multilateral Fund (MLF) for the Implementation of the Montreal Protocol has provided approximately US\$2 billion to developing countries around the world over the last 20 years.

The Hashemite Kingdom of Jordan is a Party to the Montreal Protocol since it became effective. Since initial signing on to the Protocol, the Government of Jordan has ratified all amendments and continuously put measures into place to implement the Protocol provisions with technical and financial assistance from the MLF given that it is classified as a Party operating under paragraph 1 of Article 5 of the Protocol. It also benefits from institutional strengthening support from the MLF, which provides all Art. 5 countries with two-year recurring grants to manage their Montreal Protocol programs including oversee the investment projects undertaken in cooperation with MLF Implementing Agencies.

The ODS phase-out program in Jordan began in 1993 in coordination with the World Bank which as an implementing agency, assisted Jordan to obtain the necessary financial support from the Multilateral Fund for a country programme which in turn identified early project interventions in the foam, refrigeration and aerosol sectors. In 2002, the MLF Executive Committee approved the NOPP for the remaining use of CFCs and CTC in Jordan. With this assistance, Jordan was able to achieve complete phase-out of CFCs and other ODS before the required deadline of January 1, 2010.

The Jordan Ministry of Environment has a long record of active engagement in various ODS-consuming sectors due to the history of CFC and halon phase-out projects under the MLF, and more recently the Country Programme Update and the associated National ODS Phase-Out Plan (NOPP). The nature of the Government’s interventions has been not only through controlling imports of ODS through licensed importers but of hands-on involvement in project implementation and monitoring of ODS-consuming and converted enterprises. In the nearly twenty years of managing the Jordan’s national ODS phase-out program, the Ministry of Environment, through the NOU has established a network of public and private sector actors. A large number of companies have benefitted from the MLF under Jordan’s ODS program over the years.

As a Party to the Protocol, Jordan has already started to phase out hydrochlorofluorocarbons (HCFCs) in accordance with the accelerated HCFC phase-out schedule set forth by the Parties in Decision XIX/6 in 2007. This has entailed meeting stepped reduction targets on consumption (imports minus exports), including the first two – a 2013 freeze on 2009-2010 average

consumption, i.e. baseline, and the 2015 10% reduction from the baseline. The Government of Jordan in fact committed to the MLF through Jordan-MLF Executive Committee HCFC phase-out agreements to move through the reduction steps at a faster rate than required in order to avoid potential hardship to consumers and downstream users in the servicing sector when HCFC becomes scarce globally.

The project is implemented in accordance with the Jordanian legislations as well as the World Bank Safeguards' Policies and Guidelines. As per the World Bank safeguards Policy OP. 4.01 on Environmental Assessment, an Environmental and Social Management Framework (ESMF) has to be prepared including procedures, arrangements and measures that should be applied for ensuring proper management of project and the technologies that will be adopted for phasing out HCFC.

## **2. OBJECTIVES**

The objective of this consultancy is to monitor and report on the implementation of the environmental and safeguards aspects under the ODSIII, and ensure that the Project's interventions are implemented in line with the requirements of the Environmental and Social Management Framework (ESMF) which is prepared in compliance with the World Bank Safeguards Policies and relevant laws and regulations of Government of Jordan.

## **3. SCOPE OF WORK**

In view of the above objective, and during the term of this contract, the Consultant will monitor the environmental safeguards and health and safety aspects of ongoing and planned interventions under the ODSIII. The consultant will be required to ensure proper implementation of the Environmental Management Framework (ESMF) through supporting and monitoring safeguards compliance during preparation and implementation phases by performing the following specific tasks:

### **3.1. Environmental and Social Management Framework (ESMF)**

- (1) Follow up and monitor the overall status of implementing the ESMF and its requirements, procedures, and arrangements including the preparation of the EMPs for each enterprise that is supported by the project
- (2) Monitor the technical capacity of participating enterprises to manage environmental and health and safety issues related to the conversion process
- (3) Provide technical expertise to participating municipalities on applicable environmental and health and safety standards, regulations and international good practices related to the use of HCFC replacement and phase-out in the foam, refrigeration and aerosol sectors,
- (4) Assist participating enterprises in the preparation of the EMPs in accordance with the template (attached) and provided in annex 3 and 4 of the Environmental and Social Management Framework (ESMF)

### **3.2. Environmental Management Plan (EMP)**

- (1) Coordinate with the EHS Officers at enterprise level and conduct field visits for monitoring the implementation of the EMPs and identifying areas of non-compliance with the measures of these plans, including OHS requirements

- (2) Check, assess and record the conformity of measures that are taken before and after the installation and operation of the technologies supported by the ODSIII Project with the provisions set forth in the EMP
- (3) Identify any environmental, health and safety risks and impacts to surrounding communities and workers, created by the installation or operation of technology conversion at enterprise level
- (4) Provide recommendations for corrective measures –where required– to offset or reduce adverse environmental health and safety risks and impacts, and follow up on recommendations of previous field visits.
- (5) Prepare and monitor database for all enterprises, detailing enterprise title, EHS Officer contract number, location, start of technology use, dates for each field visit, findings and recommended corrective actions, if needed. This database should be shared with ODSIII overall monitoring and evaluation system - this database might be as simple as an ‘Excel’ sheet that records each subproject’s ‘IDs’ and basic information to facilitate monitoring and reporting
- (6) Prepare regular monitoring reports, and report main findings to the NOU on semi-annual basis and reflect these findings in the progress reports that are submitted to the World Bank
- (7) Provide hands-on training to EHS Officers on implementing and monitoring the EMPs, as needed,
- (8) Ensure proper documentation – i.e. photographs- of the identified negative and positive environmental and health and safety risks and impacts in enterprises that are visited
- (9) Perform any environmental tasks and duties as required by the NOU and the World Bank ODSIII task team

#### **4. DELIVERABLES FOR EACH SUB PROJECT**

The consultant will submit the following reports to the ODSIII NOU, as follows:

- Bi-annual progress reports of ESMF’ and EMPs’ monitoring activities;
- Prepare contribution to the progress reports that are submitted to the World Bank
- In collaboration with the participating enterprises, submit to the NOU an EMP for each enterprise following the template (attached) which is provided as well in the project ESMF annex 3 & 4 available under [http://www.moenv.gov.jo/En/Environmental\\_Sectors/Atmosphere/Documents/Ozone%20Depleting%20Substances%20HCFC%20Phase-Out%20Project%20%28ODS3%29.pdf](http://www.moenv.gov.jo/En/Environmental_Sectors/Atmosphere/Documents/Ozone%20Depleting%20Substances%20HCFC%20Phase-Out%20Project%20%28ODS3%29.pdf)

#### **5. LANGUAGE OF THE REPORT AND THE EMPS**

The reports and EMPs shall be available in English.

#### **6. QUALIFICATIONS OF THE CONSULTANT**

The following qualification and experiences are required:

- 1) A university degree in environmental sciences or any other related field with minimum of 15 years of working experience;
- 2) Knowledge and understanding of international environmental impact assessment standards and practices;
- 3) Prior experience in preparing EIA and EMPs
- 4) Training in health and safety (national accreditation is an asset)
- 5) Experience with World Bank Group environmental safeguards policies and EHS Guidelines, including Operational Policies 4.01 (Environmental Assessment) is an asset

- 6) Demonstrated experience managing environmental health and safety in an industrial setting, preferably with experience in the foam, refrigerant and aerosol sectors.
- 7) Excellent Arabic and English writing and speaking skills

**7. TIME SCHEDULE**

<b>Activity</b>	<b>Time</b>	<b>Comments</b>
Advertising RFPs		
Deadline for submission of proposals		
Review of proposals		
Selection of consultant		
Consultant Contract signed		
Draft EMPs submitted for review by the NOU		
First Monitoring report submitted to NOU		

**8. BUDGET**

Amount not to be include in the RfP: xxxx

### Annex 3: Sub-Project Generic EMP Template

Name of company:			
Address:			
Contact person:		Tel:	
		E-mail:	
Location:	Mixed residential and commercial area	Located in building next to road.	
	Commercial zone		
	Industrial zone		
Number of employees			

<b>Brief description of the company and its production:</b>

<b>Occupational Health and Safety Coordinator Information:</b> (name(s), titles(s), contact information, educational background, technical training, years of experience in profession as well as at this facility)

<b>Baseline information:</b>						
<b>Equipment</b>	<b>Unit 1:</b>					
	<b>Unit 2:</b>					
<b>Current HCFC consumption</b>	<b>2014</b>		<b>2015:</b>		<b>2016:</b>	

<b>Approvals by relevant authorities</b>		
<b>Authorities</b>	<b>Item</b>	<b>Date</b>
	Chemical storage including HCFC (either pure or in pre-blended polyol) Max Amount	
	Fire safety plan	

<b>Drawings and maps</b>	
Map showing location of factory and surroundings	See annex
Floor plan production area	See annex
Plan showing location of HCFC storage area/tank	See annex

<b>Health, Safety, and Environmental Assessment (see accompanying table below)</b>	
Date conducted:	
Names and titles of those met with:	

<b>Other information not included in the table below:</b>
<b>Suggested follow-up date:</b>
<b>Immediate remedies required:</b>
<b>Conducted by:</b>

Firm XXXX will have the following responsibilities during subproject implementation:

- Bear all responsibility, but under monitoring and supervision of the PMU and the World Bank, for the conversion from HCFC-XX to XXXX in AC and/or foam manufacturing. Technical assistance will be provided through the project;
- Request chemical suppliers to provide safety data sheets for the [new refrigerant/blowing agent/pre-blended polyol] and full guidance and training on safely handling these chemicals;
- Follow stringently the safety data sheets when handling these chemicals;
- Assign technical staff to monitor the compliance with the safety occupational health and environment requirements on using chemicals;
- Keep workers continuously trained, in cooperation with the NOU and chemical and equipment suppliers on safe AC/foam production;
- Take all necessary measures to prevent leakage of [refrigerant/foam chemicals] during the manufacturing process;
- Carry out the mitigation measures for the chemical substance and in case of chemical leakage.
- Contract local services for collection and disposal of the empty chemical drums in accordance with national regulations;
- Prepare an EIA following the national regulations in the event that a plant is constructed or rehabilitated to implement the HCFC phase-out subproject.
- Destroy and dispose of baseline equipment in case they are replaced with new equipment support by MLF funding; and
- Monitor parameters as outlined in the table below.

**Particular Enterprise Responsibilities at Various Stages of the Project:**

**Foam manufacturing enterprises** are responsible for the safe conversion from HCFC-141b to cyclopentane, to HFO pre-blended polyol or to water blown foam production.

**In order to be eligible for MP financing, foam enterprises must:**

- Prepare an EMP for the implementation of the conversion project following the guidance in this EMF including its annexes;

**Before conversion:**

- Obtain approval from local authorities and fire protection authority as per local and national requirements;
- Obtain safety specifications from fire protection measures from the suppliers;

- Obtain approval from relevant authorities for storage and use of hydrocarbons;
- Prepare and file an environmental impact assessment following national regulations if required, e.g. for a new and an expansion of the existing foam production facility; and
- Prepare and file safety and health reports if and as required by national or local regulations, and report accidents to the competent authorities. Serious accidents and incidents must be reported to the Implementing Agency and the World Bank within 48 hours.

#### **Before starting production with alternatives:**

- Request from chemical supplier the safety data sheets for each chemical used in the foam production process;
- Obtain full instructions and training on the safe handling of these chemicals and keep workers continuously trained on all safety and health aspects related to the use of chemicals and foam production;
- Ensure that production managers enforce and workers follow the guidance in safety data sheets and comply with all other safety and environmental requirements when handling chemicals and in the foam production process;
- Make arrangements with an environment servicing company for the collection and disposal of polyurethane waste and empty chemical drums;
- In case existing foam injection equipment is replaced with new equipment support by MLF funding, make arrangements to destroy key component to render foam injection equipment inoperable and dispose in accordance with national regulations.
- Assign technical staff to monitor compliance with (i) all OHS measures and environment requirements and (ii) all safety requirements and fire protection rules when working with cyclopentane during and after the conversion process;
- Arrange for a safety audit and obtain a fire safety certificate from a competent fire protection authority when conversion is completed and before start of production with hydrocarbon; and
- Send copies of any environmental, safety and health plans and reports related to HCFC conversion to the NOU for information and oversight.

#### **After start of production**

- Take adequate measures to prevent leaking and spilling of chemicals during storage and manufacturing;
- Respond to chemical contamination and accidents promptly by carrying out mitigation measures to minimize environmental and health impacts of as appropriate for each chemical and step in the production process;
- Prepare safety protocols, procedures and checklists on preparedness for and mitigation of fire emergencies, explosions, accidents, and environmental contamination and keep these documents accessible and regularly updated;
- Conduct Testing of fire and other safety equipment and procedures regularly by following established checklists and procedures, ensure good operational conditions and promptly replace failing, used up, worn or expired devices and personal safety equipment and materials; and
- Prepare and file environmental, safety and health reports if and as required by national or local regulations, and report accidents to the competent authorities. Serious accidents and incidents must be reported to the Implementing Agency and the World Bank within 48 hours.

The **NOU** is responsible for proper management and oversight of the overall HCFC phase-out project including environmental and safety aspects of each HCFC conversion sub-project. In execution of this responsibility, under guidance from Ministry of Industry and Trade and the World Bank, the NOU/PMU will:

- Provide technical assistance to participating foam enterprises on alternatives to HCFC-based foam production including their environmental and health risks;
- Review and assess the adequacy of the HCFC conversion plan including the EMP of all participating companies;
- Include the approved EMP in the sub-grant agreement with each participating foam enterprise such that the responsibilities and commitments in the EMP become contractual obligations of the participating enterprises;
- Supervise the implementation of the HCFC conversion project and the company's compliance with the agreed environmental and safety requirements and standards;
- If necessary, cooperate with competent national and local authorities to enforce environmental, health and safety compliance by participating companies; and
- Prepare reports on environmental, health and safety compliance of the overall HCFC phase-out project.

**Equipment suppliers** are responsible for safe design and installation of the foam production line, and safety equipment in particular when using cyclo-pentane. In execution of this responsibility, equipment suppliers will:

- Assess the production facility and location and design the foam production line in a manner that will meet all environmental, health and safety concerns;
- Install, or assist with the installation of, the foam production line and related equipment to ensure safe production conditions;
- Provide to the production company complete information manuals and operational instructions on the installed equipment and inform customers on any newly emerging safety concerns related to the installed equipment;
- Provide training on the safe operation of the supplied equipment, including environmental and health risks and mitigation measures; and
- Provide after-sales services and warranties in the case of accidents due to technical equipment failure.

**Potential Environmental and Social Impacts & Proposed Mitigation Measures as Part of Sub-Project EMP for small enterprises - Firm XXX**

<b>Potential Negative Impact</b>	<b>Health, Safety and Environmental Assessment</b> (To be Conducted by the Inspections directorate of the M of Environment in collaboration with the NOU and the Civil Defence Directorate)	<b>Proposed Mitigation Measure(s)</b>	<b>Cost of Environmental , health and safety measure</b> (to be included by the small enterprises as part of the incremental cost in the grant application form)- Pls specify item requested, its specifications and unit cost and number of units requested)	<b>Monitoring conducted by</b>
1) Risk of handling compressed gases				
2) Air emissions				
3) Water emissions				
4) Noise				
5) Hazardous chemicals				
6) Non-hazardous waste				
7) Hazardous waste				
8) Occupational health and safety				
9) Training of workers in environment, health and safety				
10) Environmental and Social risks				

Table # : Potential Environmental and Social Risks/Impacts & Compliance Indicators as part of the sub-project EMP of the large Enterprises

<b>Potential Negative Risks/Impacts</b>	<b>Health, Safety and Environmental Assessment</b>	<b>Mitigation Measures</b>	<b>Compliance Indicator</b>	<b>Monitoring</b>
11) Risk of handling compressed gases	➤ Does the storage of HFO, cyclo pentane cylinders comply with the	➤ Follow manufacturer's safety data sheet of the compressed	➤ Full compliance with safety data	Regular inspection

<p>(While the project will have a positive impact on the environment by phasing out use of HCFCs, there are safeguards-related risks and impacts associated with the operational processes of the industries involved. Key risks include occupational and community health and safety requirements)</p>	<p>supplier MSDS? Most importantly in relation to the flammability risks associated with the use and transport of hydrocarbons (cyclopentanes) when selected as the blowing agent to replace HCFC-141b that are used by the foam sector.</p> <ul style="list-style-type: none"> <li>➤ Hydrofluoro-olefin (HFOs), where flammability is not a major concern, will have risks associated with safe storage and use and will present operational challenges for smaller foam enterprises that will be using this technology.</li> <li>➤ Where no control measures are adopted against compressed gas storage, need alert signs, and a chained storage areas.</li> <li>➤ Are there any (<b>installed</b>) flash back arrestor devices on cylinders as a kind of fire prevention during welding</li> </ul>	<p>gases.</p> <ul style="list-style-type: none"> <li>➤ Oxy- acetylene gas cylinders shall be handled in a chained manner.</li> <li>➤ Install flash back arrestors</li> </ul>	<p>sheet.</p> <ul style="list-style-type: none"> <li>➤ All cylinders must be chained</li> </ul>	
<p>12) Air emissions</p>	<ul style="list-style-type: none"> <li>➤ Are there adequate ventilation provided in the production area,</li> <li>➤ How is the <b>ventilation efficiency condition observed? Is it sufficient</b> in the maintenance area?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provide adequate indoor ventilation for fugitive emissions.</li> <li>➤ Collection of Volatile Organic Compounds (VOCs) through air extractors and remove VOCs with control devices such as condensers or activated carbon absorption.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Workers suffer from odor in the workplace</li> <li>➤ Test results (VOC) report by certified laboratory.</li> <li>➤ Tested VOC shall be compared with OSHA regulation OSHA for industry sector</li> </ul>	<p>VOC measurements 2 times/year</p> <p>Annual respiratory examination for the workers</p>
<p>13) Wastewater effluent treatment and discharges</p>	<ul style="list-style-type: none"> <li>➤ Is the wastewater connected with municipal sewage network?</li> <li>➤ Is there wastewater pre- treatment prior to sewer discharge?</li> </ul>	<ul style="list-style-type: none"> <li>➤ How is wastewater effluents discharge issues being handled?</li> </ul>	<ul style="list-style-type: none"> <li>➤ No issue</li> </ul>	<p>Clarify monitoring measures used</p>
<p>14) Noise</p>	<ul style="list-style-type: none"> <li>➤ Do assembly equipment complying with lower noise level.</li> <li>➤ Do Metal machines generate higher noise levels (&gt; 85 dB (A)) and not</li> </ul>	<ul style="list-style-type: none"> <li>➤ Selecting equipment with lower sound power level;</li> <li>➤ Installing silencers for fans;</li> <li>➤ Installing acoustic enclosures</li> </ul>	<ul style="list-style-type: none"> <li>➤ Compliance of the measured noise level at 1 m from machine (Leq (A))</li> </ul>	<p>Noise measurements 2 times/year</p>

	<p>equipped with silencers.</p> <ul style="list-style-type: none"> <li>➤ Has ambient and occupational sound power levels been measured before?</li> </ul>	<p>for equipment;</p> <ul style="list-style-type: none"> <li>➤ Reduce working time to less than 8 hours according to the measured noise level</li> <li>➤ Installing vibration isolation for mechanical equipment</li> </ul>	<p>with Labour law No. 8, 1996</p> <ul style="list-style-type: none"> <li>➤ Workers suffer from the noise level at workplace</li> </ul>	Annual hearing examination for workers
15) Hazardous chemicals	<ul style="list-style-type: none"> <li>➤ Are foaming chemicals stored in the storage area being stored with taking spill containment measures? Are there alert signs in place?.</li> <li>➤ Are there documented procedure to display to the workers how to manage these chemicals to prevent any possible of occurrence of chemical spills.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Follow Management, Transportation and Handling of Harmful and Hazardous Substances Regulation, no. 24, 2005 (see Table 6)</li> </ul>	Compliance with the regulation during the inspection	Regular inspection
16) Non-hazardous waste	<ul style="list-style-type: none"> <li>➤ Are the non- hazardous wastes from the production area such; cartoons, metal, plastic stored properly such as in a designated storage area at the backyard to be then sold to collectors.</li> <li>➤ Is work place clutter cited?</li> <li>➤ Is the backyard covered and paved with asphalt ?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Evaluate of waste production process and identification of potentially recyclable material, then recycle and/or reuse it;</li> <li>➤ Non-hazardous waste should be stored in separate watertight storage area and then disposed of via approved collector(s) by MoEnv.</li> </ul>	Proper storage according to solid waste management law 2005, and labour law no. 8 , 1996	Regular inspection
17) Hazardous waste	<ul style="list-style-type: none"> <li>➤ Are the barrels containing foaming chemicals stored properly in a designated storage</li> <li>➤ Are they sold as metal junk?</li> <li>➤ Are the wastes of polystyrene and faulting foam pieces mixed with non-hazardous wastes that are to be ultimately dumped into landfill?</li> <li>➤ Are there designated labels/ signs/ MSDS placed at the barrels to alert the handlers and collectors?</li> <li>➤ Are there any secondary containment for hazardous waste storage facility?</li> <li>➤ Are there emergency response plans that are documented and undertaken by all personnel when spills/</li> </ul>	<ul style="list-style-type: none"> <li>➤ Hazardous waste should be stored segregated from non-hazardous waste</li> <li>➤ Store closed containers away from direct sunlight, wind and rain;</li> <li>➤ Provide adequate ventilation</li> <li>➤ Conducting periodic inspections of storage areas and documenting the findings;</li> <li>➤ Preparing and implementing spill response and emergency plans to address accidental releases;</li> <li>➤ Provide secondary containment for all on-site</li> </ul>	Visual inspection to ensure hazardous waste is stored appropriately according related regulation no. 24, 2005	Regular inspection

	<p>accidents might occur?</p> <ul style="list-style-type: none"> <li>➤ Are there any adequate fire fighting equipment in place as per the civil defence requirements?</li> </ul>	<p>hazardous waste and waste storage facilities;</p> <ul style="list-style-type: none"> <li>➤ Equip facility with adequate fire fighting equipment</li> </ul>		
18) Occupational health and safety	<ul style="list-style-type: none"> <li>➤ Is there worker commitment to wearing the personnel protective equipment against fugitive emission, hand injuries, slip hazard, manual handling is observed.</li> <li>➤ Are there sufficient Fire extinguishers? Do they have an ongoing validity period and not expired?</li> <li>➤ Is there an emergency response and evacuation plan observed to be in place at the workplace?</li> <li>➤ Is there a senior health and safety supervisor assigned in the facility as per the labour law?</li> <li>➤ Is there a health and safety committee which is formed as per the labour law?</li> <li>➤ Did the workers receive regular training on fire prevention that is conducted by the civil defence directorate?</li> <li>➤ Are there other safety training topics provided to workers; such as ergonomics, electrical safety, manual handling, hazardous substances handling, ....etc.?</li> <li>➤ Is smoking banned in the workplace? Is food consumption banned in the production areas?</li> <li>➤ Are there alert signs placed at the workplace</li> <li>➤ Are electrical management/safety aspects proper especially for wiring/sockets/appliance and cables and not allowed on the ground across the walk ways?</li> <li>➤ Are safeguards installed at metal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Under operating conditions, workers should wear personal protective equipment, e.g. gas masks, PE gloves and other personal protection equipment. Appropriate measures such as ventilation, fire prevention and cooling should be planned and installed to accommodate the use of different chemicals.</li> <li>➤ The workers should receive proper safety training and proved to be qualified through tests before assuming the position; when the use of hazardous chemicals is involved, a safety facilitator/officer with adequate knowledge of safety operations and of hazardous chemicals should be recruited.</li> <li>➤ No Smoking, No Food and No open Fire should be allowed on project site;</li> <li>➤ Mark the caution signs both in Arabic and in English;</li> <li>➤ Ensure safety use of electrical appliance.</li> </ul>	<p>Regularly inspection to ensure compliance with labour law and OSHA regulation for industrial sector.</p> <p>Accident/incident records of workers should be well maintained (done)</p> <p>Worker complains records should be available</p>	Regular inspection

	forming machines and on others where they are required to be installed?.			
19) Training of workers in environment, health and safety	<ul style="list-style-type: none"> <li>➤ Is periodic training for HSE aspects provided?</li> <li>➤ Is there HSE orientation for new workers to ensure they are adopted by them?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Project training requirements and Jordanian labour law</li> </ul>	<ul style="list-style-type: none"> <li>➤ Training records and attendance sheet</li> </ul>	Monthly
20) Environmental and community risks	<ul style="list-style-type: none"> <li>➤ Is spill containment at the workplace, backyard, and storage area implemented?</li> <li>➤ Is there a documented emergency response plan in the workplace?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Install spill containment area;</li> <li>➤ Provide spill tool kit at workplace</li> <li>➤ Provide emergency response plan.</li> <li>➤ Participating enterprises (large industries in the short term) will be provided with an introductory environmental, health and safety training by the staff of the MoEnv Ozone Unit and potentially Civil Defense with regards to Life and Fire Safety (LFS) aspects</li> </ul>	<ul style="list-style-type: none"> <li>➤ Spill accident records</li> <li>➤ Inspection checklist</li> <li>➤ Emergency response plan is in place</li> <li>➤ Training records for emergency response plan</li> </ul>	Regular inspection
21) Labor and community grievance risks	<ul style="list-style-type: none"> <li>➤ Does the company have a grievance and redress system (GRM)?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Workers training and information sessions on the labor law and worker rights</li> </ul>	<ul style="list-style-type: none"> <li>➤ GRM records at MOL</li> </ul>	Regular inspection of records and by Ministry of Environment Inspectors

**Table # : Monitoring plan for Mitigation Measures of the Potential Negative Environmental and Social Impacts as part of the sub-project EMP of the Enterprise**

Potential Negative Impacts	Mitigation Measures	Monitoring	
		Pollutant Element of Measurement	Time/frequency
1. Risk of handling compressed gases	➤ Follow manufacturer's safety data sheet and provisions of Annex		
2. Air emissions	➤ Provide adequate ventilation for fugitive emissions. ➤ Collection of Volatile Organic Compounds (VOCs) through air extractors and remove VOCs with control devices such as condensers or activated carbon absorption.	TSP, SO <sub>2</sub>	2 times/year
3. Wastewater emissions	➤ Identify opportunities to prevent or reduce wastewater pollution through such measures as recycle/reuse within their facility; ➤ Wastewater will be treated in the wastewater treatment unit in enterprises to comply with the applicable standard before discharged into the drainage trench.	COD, pH	2 times/year
4. Noise	➤ Selecting equipment with lower sound power level; ➤ Installing silencers for fans; ➤ Installing acoustic enclosures for equipment casing radiating noise; ➤ Improving the acoustic performance of constructed building, apply sound insulation; ➤ Installing vibration isolation for mechanical equipment	Leq (A)	2 times/year
5. Hazardous chemicals	Follow Management, Transportation and Handling of Harmful and Hazardous Substances Regulations	Visual inspection. Ensure non-hazardous waste is stored appropriately	Regularly
6. Non-hazardous wastes	➤ Evaluate of waste production process and identification of potentially recyclable material, then recycle and reuse it; ➤ Non-hazardous waste will be stored in separate watertight storage area and then treated by the sanitation department	Visual inspection. Ensure non-hazardous waste is stored appropriately	Regularly
7. Hazardous wastes	➤ Hazardous waste will be stored segregated from non-hazardous waste ➤ Store in closed containers away from direct sunlight, wind and rain; ➤ Provide adequate ventilation ➤ Conducting periodic inspections of storage areas and documenting the findings; ➤ Preparing and implementing spill response and emergency plans to address their accidental release; ➤ Provide secondary containment for all on-site hazardous waste and waste storage facilities; ➤ Equip enterprise with adequate fire fighting equipment in case of a fire or spill as per Civil Defence Requirements	Visual inspection. Ensure hazardous waste is stored appropriately	Regularly

8. Occupational Health and Safety	<ul style="list-style-type: none"> <li>➤ Under operating conditions, workers should wear personal protective equipment, e.g. gas mask, PE gloves and other personal protection equipment. Appropriate measures such as ventilation, fire prevention and cooling should be planned and installed to accommodate the use of different chemicals.</li> <li>➤ The workers should receive proper safety training and proved to be qualified through tests before assuming the position; When the use of hazardous chemicals is involved, a safety facilitator with adequate knowledge of safety operation of hazardous chemicals should be recruited.</li> <li>➤ No Smoking, No Food and No Fire in project site;</li> <li>➤ Mark the caution signs both in Arabic and in English;</li> <li>➤ Safety use of electrical appliance.</li> </ul>	Visual Inspection	2 times/year
9. Training of workers in environment, health and safety	<ul style="list-style-type: none"> <li>➤ Provide provision of training as per manufacturer requirements and Jordanian labor law</li> </ul>		2 times / project
10. Community environmental risks	<ul style="list-style-type: none"> <li>➤ Install alarm and spill adsorption facility;</li> <li>➤ Prepare emergency response plan.</li> </ul>	Annual inspection	
11. Environmental and Social Management planning	<p>Implement the Environmental Management Plan (EMP) to ensure compliance with Jordanian environmental law and World Bank safeguards policies, including Environment, Health, and Safety Guidelines  <a href="http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines">http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines</a>)</p> <p>On the social safeguards, the provision of Complaints handling and Complaints Resolution Mechanisms (GRM) and Complaints Redress Services (GRS) relating to this project are to be located in the Ministry of Labor and the Ministry of Environment and</p> <p>Grievance Redress Mechanisms relevant to the Jordan ODS3 AF project are of two types: those relating to workers' conditions in ODS3 participating firms and those relating to environmental management of firm production. Workers in ODS3 participating firms will be able to access the Hotline/Complaints Department of the Ministry of Labor. This channel include walk-ins; letters, faxes, complaints made to the Minister and to other Ministries. Additionally, the Ministry of Labor Inspectorate Unit will carry out inspections relating to compliance with international and Jordanian labor standards, especially if there is a complaint relating to occupational health and safety of workers or related to child or forced labor.</p>	<p>Continuous implementation</p> <p>Safeguards performance reporting will be made public as part of the Implementation Status Reporting (ISR) dissemination process, available on the <a href="http://www.worldbank.org">www.worldbank.org</a> website, on the Jordan country page, under the "projects" tab.</p>	Reviewed Quarterly

**Table # : Potential Parameters to be subjected to the Monitoring Plan during Conversion and Operation as part of the sub-project EMP of the Enterprise**

**Indicative Potential Parameters to be Monitored as part of Sub-Project EMP for Firm XXX**


<b>Parameters to be monitored</b>	<b>Includes Table 5 Impacts</b>	<b>Location</b>	<b>Method of Monitoring</b>	<b>Monitoring Frequency</b>	<b>Standard Applied</b>	<b>Monitoring Cost</b>  (Must be included here by the enterprise (broken down by the item, no of items and total cost ) to be included in the loan application as an incremental operating cost)	<b>Responsible Party</b>	<b>Party to Report to</b>
Manufacturing equipment specifications and design – AC: charging machine, leak detectors, Foam: injection machine, detectors, ventilation system	Compressed gases and foam blowing agents	Production area	Verification of specs & design in implementation & procurement plans	Before procurement	Manufacturer equipment specifications	Enterprise need to include in conversion costs financed by the project	Enterprise and Technical Consultant	NOU
A/C or foam production lines	Occupational health & safety	Production area	Inspection by safety officer	daily	Labor law No 8, 1996		Enterprise, Supplier	NOU

<b>Parameters to be monitored</b>	<b>Includes Table 5 Impacts</b>	<b>Location</b>	<b>Method of Monitoring</b>	<b>Monitoring Frequency</b>	<b>Standard Applied</b>	<b>Monitoring Cost</b>  (Must be included here by the enterprise (broken down by the item, no of items and total cost ) to be included in the loan application as an incremental operating cost)	<b>Responsible Party</b>	<b>Party to Report to</b>
Manufacturing (leakage of refrigerant/blowing agent)	Air emissions, wastewater emissions, noise	Production area	Internal and External visual inspection  Indoor measurements regarding noise and VOC emissions	2 times/year	Labor law No 8, 1996  USA OSHA Regulations		Enterprise	Local authorities, NOU
Empty drums and waste	Hazardous chemicals &  Non-hazardous waste	Store and Production area	Joint inspection	Quarterly	• Solid waste management Law 2005		Enterprise	Local authorities, NOU

Parameters to be monitored	Includes Table 5 Impacts	Location	Method of Monitoring	Monitoring Frequency	Standard Applied	Monitoring Cost  (Must be included here by the enterprise (broken down by the item, no of items and total cost ) to be included in the loan application as an incremental operating cost)	Responsible Party	Party to Report to
					<ul style="list-style-type: none"> <li>• Labor law No 8, 1996</li> <li>• Regulation no 24 FY 2005 Management, Transportation and Handling of Harmful Substances Regulation</li> </ul>			

<b>Parameters to be monitored</b>	<b>Includes Table 5 Impacts</b>	<b>Location</b>	<b>Method of Monitoring</b>	<b>Monitoring Frequency</b>	<b>Standard Applied</b>	<b>Monitoring Cost</b>  (Must be included here by the enterprise (broken down by the item, no of items and total cost ) to be included in the loan application as an incremental operating cost)	<b>Responsible Party</b>	<b>Party to Report to</b>
Storage of New [Refrigerant/blowing agent/pre-blended polyol]	Hazardous chemicals	Store	Joint inspection	Monthly	<ul style="list-style-type: none"> <li>Regulation no 24 FY 2005 Management, Transportation and Handling of Harmful Substances Regulation</li> </ul>		Enterprise	Local authorities, NOU
Implementation of Action Plans	Occupational health & safety, training of workers in	Enterprise	Joint inspection	2 times/year	<ul style="list-style-type: none"> <li>Jordanian Laws</li> <li>Environmental</li> </ul>	Operating costs of the regulatory authorities	Ministry of Environment, Ministry of Labor, Civil Defense, M. of	NOU

Parameters to be monitored	Includes Table 5 Impacts	Location	Method of Monitoring	Monitoring Frequency	Standard Applied	Monitoring Cost  (Must be included here by the enterprise (broken down by the item, no of items and total cost ) to be included in the loan application as an incremental operating cost)	Responsible Party	Party to Report to
	environment, health & safety, and social risks				Protection Law No 52 FY 2006  <ul style="list-style-type: none"> <li>• Labor law No 8 FY 1996</li> <li>• Fire prevention Codes (Civil Defense Directorate )</li> </ul>		Health and Ministry of Social Affairs	

## Annex 4: Additional EMP Table for Cyclopentane Use

### Checklist for safety measure for conversion to Cyclopentane and delivered by tank truck and stored in storage tank

Components/area	National requirements	Safety measures	Complied with/ Implemented by
<b>CP storage tank above or underground.</b>	National requirement for storage of CP	CP storage tank located outside the building in a well ventilated area, and Protected against direct exposure to sunlight	
	Minimum distance to boundary of the property, to the factory and other buildings.	Location of CP storage tank approved by relevant authority	
	Access road for delivery of CP	Easy access and exits for trucks delivering CP	
	Electrical code normally include requirements regarding electrical installation in areas where explosive gases can occur	Electrical installation in CP tank area in accordance with Jordan Electrical Code	
		CP gas detectors installed	
		Fence around the CP storage area	
		Safety marking and signs	
<b>CP Pre-mixing unit</b>	As per the foam equipment supplier specifications	See supplier specifications regarding safety measures. (Safety measures are normally part of the pre-mixing unit package)	
<b>Foaming area and jigs</b>	As per recommendation by MLF and Foam equipment supplier	HP foaming equipment designed for the use CP (ex-proof electrical installation and wiring).	
		Electrical installations in the area consistent with ex-area classification.	
		Grounding of foaming equipment and jigs.	
		Ventilation system with design capacity (m <sup>3</sup> /h) as specified by equipment supplier installed.	
		CP Gas Detection System installed.	
		CP Gas detectors installed.	
		Nitrogen system installed.	
Fire fighting equipment installed.			

<b>Awareness and training</b>	Involve local fire authority	General awareness Training of workers	
<b>Operational manual for workers involved in handling CP foaming</b>	Supplier of foaming and safety equipment	Training of workers involved in foaming.	
		Use of spark free tools in areas with risk of CP.	
<b>Checking and maintenance of safety measures</b>	Recommended practice by foam equipment supplier and suppliers of fire safety equipment and relevant safety authorities	Develop a daily, monthly quarterly and annual program for checking and reporting.	
<b>Emergency Response plan</b>	Prepared in cooperation with suppliers and local safety authorities	Develop an emergency plan by internal team and with advice from local fire safety authorities.	

**Special Occupational Health and Safety precautions for handling and using Cyclopentane based foam blowing agents**

**STORAGE**

Cyclopentane should be stored in a cool, dry, well-ventilated area in tightly sealed containers that are labeled in accordance with OSHA’s hazard communication standard {26 CFR 1910.1200}. Storage areas must meet OSHA requirements for Class IB flammable liquids. Outside or detached storage is preferred; inside storage should be in a standard flammable liquids storage room. Containers of cyclopentane should be protected from physical damage and should be stored separately from strong oxidizing agents (such as chlorine, bromine, and fluorine), heat, sparks, and open flame. Drums must be equipped with self-closing valves, pressure vacuum bungs, and flame arresters. Only non sparking tools may be used to handle cyclopentane. To prevent static sparks, containers should be grounded and bonded for transfers. Because containers that formerly contained cyclopentane may still hold product residues, they should be handled appropriately.

**SPILLS AND LEAKS**

In the event of a spill or leak involving cyclopentane, persons not wearing protective equipment and clothing should be restricted from contaminated areas until cleanup has been completed. The following steps should be under-taken following a spill or leak:

1. Do not touch the spilled material; stop the leak if it is possible to do so without risk.
2. Notify safety personnel.
3. Remove all sources of heat and ignition.
4. Ventilate the area of the spill or leak.
5. For small liquid spills, take up with sand or other noncombustible absorbent material and place into closed containers for later disposal.
6. For large liquid spills, build dikes far ahead of the spill to contain the cyclopentane or later reclamation or disposal.

## SPECIAL REQUIREMENTS

U.S Environmental Protection Agency (EPA) requirements for emergency planning, reportable quantities of hazardous releases, community right-to-know, and hazardous waste management may change over time. Users are therefore advised to determine periodically whether new information is available.

- Emergency planning requirements

Cyclopentane is not subject to EPA emergency planning requirements under the Superfund Amendments and Reauthorization Act (SARA) {42 USC 11022}

- Reportable quantity requirements for hazardous releases

Employers are not required by the emergency release notification provisions of the comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) {40 CFR 355.40} to notify the National Response Center of an accidental release of cyclopentane, there is no reportable quantity for this substance.

- Community right-to-know requirements

Employers are not required by Section 313 or SARA to submit a Toxic Chemical Release Inventory from (From R) to EPA reporting the amount of cyclopentane emitted or released from their facility annually.

- Hazardous waste management requirements

EPA considers a waste to be hazardous if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity, as defined in 40 CFR 261.21-261.24. Although cyclopentane is not specifically listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) {40 USC 6901 et seq.}, EPA requires employers to treat any waste as hazardous if it exhibits any of the characteristics discussed above.

Providing detailed information about the removal and disposal of specific chemicals is beyond the scope of this guideline. The U.S.

Department of Transportation, EPA, and State and local regulations should be followed to ensure that removal, transport, and disposal of this substance are conducted in accordance with existing regulations. To be certain that chemical waste disposal meets EPA regulatory requirements, employers should address any questions to the RCRA hotline at (800) 424-9346 or at (202) 382-3000 in Washington, D.C. In addition, relevant State and local authorities should be contacted for information about their requirements for waste removal and disposal.

- Emergency procedures

<p style="text-align: center;"><b>WARNING!</b> Seek immediate medical attention for severely affected victims or for victims with signs and symptoms of toxicity or irritation!</p>
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Keep unconscious victims warm and on their sides to avoid choking if vomiting occurs. Initiate the following emergency procedures:

1. *Eye exposure*: Irritation may result from exposure to concentrated solutions, vapors, mists, or aerosols of cyclopentane. *Immediately and thoroughly* flush the eyes with large amounts of water, occasionally lifting the upper and lower eyelids.
2. *Skin exposure*: Irritation may result. *Immediately* remove contaminated clothing and *thoroughly* wash contaminated skin with soap and water.
3. *Inhalation exposure*: Move the victim to fresh air *immediately*.  
If the victim is not breathing, clean any chemical contamination from the victim's lips and perform cardiopulmonary resuscitation (CPR), if breathing is difficult, give oxygen.
4. *Ingestion exposure*: Take the following steps if cyclopentane or any material containing it is ingested:
  - Have the victim rinse the contaminated mouth cavity several times with a fluid such as water.
  - Have the victim drink a glass (8 oz) of fluid such as water.
5. *Rescue*: Remove an incapacitated worker from further exposure and implement appropriate emergency procedures (e.g., those listed on the material safety data sheet required by OSHA's hazard communication standard {29 CFR 1910.1200}). All workers should be familiar with emergency procedures and the location and proper use of emergency equipment.

## RESPIRATORY PROTECTION

- Conditions for respirator use

Good industrial hygiene practice requires that engineering controls be used where feasible to reduce workplace concentrations of hazardous materials to the prescribed exposure limit. However, some situations may require the use of respirators to control exposure. Respirators may be used (1) before engineering controls have been installed, (2) during work operations such as maintenance or repair activities that involve unknown exposures, (3) during operations that require entry into tanks or closed vessels, and (4) during emergencies. Workers should use only respirators that have been approved by NIOSH and the Mine Safety and Health Administration (MSHA).

- Respiratory Protection Program

Employers should institute a complete respiratory protection program that, at a minimum, complies with the requirements of OSHA's respiratory protection standard {29 CFR 1910.134}. Such a program must include respirator selection, an evaluation of the worker's ability to perform the work while wearing a respirator, the regular training of personnel; respirator fit testing, periodic workplace monitoring, and regular respirator maintenance, inspection, and cleaning. The implementation of an adequate respiratory protection program (including selection of the correct respirator) requires that a knowledgeable person be in charge of the program and that the program be evaluated regularly. For additional information about the selection and use of respirators and about the medical screening of respirator users, consult the *NIOSH Respirator Decision Logic* {NIOSH 1987b} and the *NIOSH Guide to Industrial Respiratory Protection* {NIOSH 1987a}.

#### PERSONAL PROTECTIVE EQUIPMENT

Protective clothing should be worn to prevent any skin contact with cyclopentane. Chemical protective clothing should be selected on the basis of available performance data, manufacturers' recommendations, and evaluation of the clothing under actual conditions of use. Butyl rubber and natural rubber have been tested against permeation by cyclopentane and have breakthrough times of less than one hour, therefore, they are not recommended for use with cyclopentane. No other reports were found on the resistance of additional protective clothing materials to cyclopentane permeation. If permeability data are not readily available, protective clothing manufacturers should be requested to provide information on the best chemical protective clothing for workers to wear when they are exposed to cyclopentane.

If cyclopentane is dissolved in an organic solvent, the permeation properties of both the solvent and the mixture must be considered when selecting personal protective equipment and clothing.

Safety glasses, goggles, or face shields should be worn during operations in which cyclopentane might contact the eyes (e.g, through splashes of solution). Eyewash fountains and emergency showers should be available within the immediate work area whenever the potential exists for eye or skin contact with cyclopentane. Contact lenses should not be worn if the potential exists for cyclopentane exposure.