

INDONESIA

**HCFC PHASE-OUT PROJECT
– POLYURETHANE FOAM SECTOR –
Stage 2**

**ENVIRONMENTAL
MANAGEMENT FRAMEWORK**

29 June 2017



**MINISTRY OF ENVIRONMENT AND FORESTRY
REPUBLIC OF INDONESIA**

1 Objective

The Government of Indonesia has requested the World Bank to assist Indonesia with the implementation of the HCFC Phase-Out Plan for the foam sector, which is part of the overall HCFC Phase-Out Management Plan (HPMP). The implementation of the HPMP is supported by a grant from the Multilateral Fund to assist Indonesia to meet its obligations under the Montreal Protocol. The implementation of the HPMP is led by UNDP as Lead Implementing Agency, with the World Bank as Cooperating Agency for the foam sector. The objective of the Stage 2 foam sector plan is to provide investment support in the form of Financial Incentives to four large, eight medium size and 201 small foam producing companies in the remaining PU foam subsectors, and two foam system houses, to phase out HCFC-141b in these companies and introduce alternative, non-HCFC consuming production technologies. The activities under Stage 2 repeat the same kind of activities (to be) completed in the 26 companies covered under Stage 1, for which the previous Environmental Management Framework (EMF) will continue to apply. Stage 2 implements the conversion of companies in the remaining foam sub-sectors as part of the overall foam sector plan, which was anticipated in the original project design, subject to approval of funding for Stage 2. The safeguards relevant features and requirements are the same for Stage 1 and Stage 2 activities. Stage 2 does not involve scaling-up to include companies with larger production volumes than under Stage 1.

Table 1. Consumption of HCFC, recommended substitute of participant of HCFC Phase out Stage 2

HCFC-141b consumption / year	Number of companies	Recommended substitute	HCFC-141b Consumption (kg) 2012-2014 average	Approach
Large: > 20 MT	4	Hydrocarbon	145,074	Individual agreement
Medium: 7-20 MT	8	Pre-blended hydrocarbon	73,399	Individual agreement
Small: < 7 MT	201	Pre-blended HFO*	175,004	Group project
Total	213		393,477	

The project involves investments for the conversion of the foam blowing technology in 213 enterprises from HCFC to suitable blowing alternatives, 12 large and medium enterprises will switch to hydrocarbons (cyclo-pentane), 201 small enterprises will use pre-blended HFO. The project must comply with applicable laws, policies and environmental best practices as described in this EMF. The EMF contains a series of mitigation and enhancement measures designed to ensure that the project will minimize any possible negative impacts and will deliver positive results.

The objectives of this EMF are to:

- (a) Provide information on safety and environmental requirements and capacities needed for the introduction of alternative foam blowing technologies in HPMP participating enterprises (sub-projects).
- (b) Adopt procedures and methodologies for proper handling of alternative foam blowing technologies and installation of related equipment, in particular protective equipment and safety measures for the use of hydrocarbons in compliance with applicable national regulations and international standards.
- (c) Provide a framework for the preparation of an Environmental Management Plan (EMP) for enterprises converting to hydrocarbon technology and for equivalent measures in Standard Operating Procedures (SOP) for companies converting to pre-blended HFO technology.
- (d) Specify roles and responsibilities, and outline the necessary reporting and approval procedures, for the management and monitoring of environmental concerns related to the conversion activities and the use of the alternative technologies in each participating company.

2 Project description

Hydrochlorofluorocarbons (HCFCs) are chemical substances commonly used as refrigerants in refrigeration and air-conditioning equipment and also as blowing agents for producing foam insulation. HCFCs were introduced as transitional substances to replace the wide use of chlorofluorocarbons (CFCs) that were phased out globally on 1 January 2010 in accordance with the Montreal Protocol on Substances that Deplete the Ozone Layer. Although significantly less potent than CFCs, HCFCs are included as ozone-depleting substances (ODS); therefore, they are controlled by the Montreal Protocol (MP), and the Parties have agreed to gradually phase them out. In addition, HCFCs are greenhouse gases (GHG) with a global warming potential (GWP) ranging from several hundred to several thousand times.

HCFC phase-out Stage 2 in the foam sector is a continuation of Stage 1. Likewise, it focuses on HCFC reduction in the production of polyurethane (PU) integral skin foam and foam used for insulation purposes in refrigeration appliances and iceboxes. The private sector participants include a tentative list of 12 large and medium foam enterprises consuming HCFC-141b in bulk procured from importers (Table 1), 201 small enterprises mostly using pre-blended polyols for making foam and two system houses that blend and supply raw materials to foam companies. (Two additional system houses are already being converted under Stage 1.) This project supports a series of investment activities in the production facilities of these foam enterprises, technical assistance, and policy and regulation development on new HCFC-based foam production facilities. A project management unit (PMU) has been set up by the National Ozone Unit (NOU) within the Ministry of Environment and Forestry.

The production facilities of the 12 large and medium foam enterprises that have been identified as potential project participants are located in West Java, Central Java, East Java and North Sumatera. None of the 12 enterprises plans to acquire land as a consequence of the project or concomitant with the implementation of the project. The 201 companies plan to adopt pre-blended HFO as blowing agents, which requires only very minor modification to their production process. Thus, each company's Standard Operating Procedure (SOP) will continue to apply in addressing environmental and safety concerns, provided the SOPs are properly updated to reflect the handling of the new blowing agents. The 12 large

and medium enterprises plan to use hydrocarbon (cyclo-pentane, a flammable substance or pre-blended cyclo-pentene with polyol) as alternative blowing agents. The 12 companies meet minimum distance from residential areas and will be able to implement the required safety measures within their facilities (note: verification will be carried out to ensure safety criteria are met). Four large enterprises plan to have cyclo-pentane delivered in drums or in bulk and transferred into a storage tank (aboveground or underground), which will be a constructed tank. Meanwhile, eight medium enterprises prefer the chemical delivered in form of pre-blended (i.e. CP + Polyol) in drums which will then be stored in a dedicated storage room.

3 Legal frameworks

The foam sector enterprises participating in the HCFC phase-out project must comply with all relevant safety, environmental and occupational health provisions in applicable national and local laws and regulations, in particular:

- Government Regulation (PP) No. 27 Year 2012 on Environmental Permit, which implements Law No. 32 Year 2009 on the Protection and Management of the Environment. According to the PP, an Environmental Impact Assessment ("AMDAL") or Environment Management Efforts and/or Environment Monitoring Efforts ("UKL/UPL"¹) are required as part of an application to obtain a business license and/or a license for certain activities.
- Government Regulation No. 74 Year 2001 on Management of Hazardous Substances (PP 74/2001), which regulates handling of hazardous substance.
- MoEF Regulation No. 18 Year 2009, which covers procedures on handling of hazardous wastes, including temporary storage of wastes.
- MOEF Regulation No. 05 Year 2012 on Types of Businesses and/or Activities requiring an AMDAL lists all type of business and activities (including size and volume of work) that must have an AMDAL.

For foam enterprises that convert to pre-blended HFO as foam blowing agent, there are no legal restrictions or requirements regulating such conversion. Given the similar nature of the previously used and the new blowing agent and no significant changes in the foam production process, the existing SOP with appropriate updates will still apply and should be sufficient to address environmental and safety concerns.

However, for enterprises that plan to use cyclo-pentane as blowing agent, they must increase the protection and safety facilities against fire hazards and explosions related to the use of hydrocarbons in the production process and observe applicable laws and regulations on safety and occupational health, in particular related to:

- Delivery and storage of cyclo-pentane at the production facility
- Pre-mixing of cyclo-pentane with polyols
- Electrical installations in accordance with area classification / grounding of foaming equipment and jigs in areas where cyclo-pentane is stored or used
- General fire safety measure in and around the foaming area

¹ UKL/UPL is a simplified version of an AMDAL, which contains forms of Environmental Management Efforts and Environment Monitoring Efforts that must be submitted by each proponent

- Ventilation, gas detectors and firefighting equipment, installed and in good working condition
- Emergency preparedness

In addition – and unrelated to the conversion technology supported by the project – all foam producing facilities must implement and observe certain occupational health and safety (OHS) measures related to the use of Isocyanides (MDI), which is one of the chemicals used in foam production and which is a moderate health and environmental hazard. Appropriate precautions must be taken in particular with regard to:

- Personal protection gear for handling of MDI and polyols (mixed with MDI)
- Handling of waste and empty MDI and polyol drums
- Training of staff involved in the foaming and production process
- Emergency preparedness

4 World Bank Safeguard Policies

The World Bank's Operational Policy OP 4.01 provides guidance on objectives and principles regarding environmental and social safeguards for Bank operations. The HCFC Phase-out Project is a category "B" project, which requires the client to furnish an Environmental Management Framework (EMF) prior to appraisal. Prior to the project implementation, each foam enterprise applying to receive the grant must submit an acceptable EMP for approval by the PMU and/or have updated SOP, which will be checked by the PMU. An excerpt of the applicable policy is below².

Word Bank Safeguard	Abstract
Environmental Assessment (EA) (OP 4.01)	EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.
Environmental, Health and Safety (EHS) Guidelines	The Environmental Health and Safety Guidelines (EHS) are technical reference documents with general and industry-specific examples of Good Industry Practice (GIP), as defined in IFC's Performance Standard 3 on Pollution Prevention and Abatement. The General EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group and are generally considered to be achievable in new facilities at reasonable costs by existing technology. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.

² For more details about WB guidelines and Policies, please visit Bank websites:

<http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTSAFEPOL/0,,menuPK:584441~pagePK:64168427~piPK:64168435~theSitePK:584435,00.html> and <http://www.ifc.org/ifcext/sustainability.nsf/Content/EHSGuidelines>

5 Environmental and Social impacts

Foam production impacts the environment when (part of) the blowing agent and/or other chemicals used in the foaming process are emitted to the environment from storage containers, during the production process or in the use of the final product. Details on the impacts of chemicals used for foam production, key mitigation measures and residual impacts are contained in material safety data sheets available from chemical suppliers.

- a) **Ozone depletion:** The phase-out of HCFC as blowing agent will contribute positively to the recovery of the ozone layer. HFO, HFCs and cyclo-pentane are categorized as non-ODS.
- b) **Global climate change:** HCFCs and HFCs are greenhouse gases with different global warming potentials (GWP). The impact on the global climate will decrease due to reduction of the formulation of HFC-245fa as foam blowing agent. Whereas switching to cyclo-pentane may also results in a 95% reduction of GHG emissions compare to HCFC-141b.
- c) **Local air pollution:** While HCFC, HFO and HFC-245fa are chemically stable and do not affect local air quality, cyclo-pentane is a volatile organic compound (VOCs), which can contribute to fugitive emissions and ground-level smog pollution when leaked to the surroundings. Cyclo-pentane is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life in air is approximately three days. It is estimated that emission of the blowing agent is limited to 2-3%. While the environmental impact of this emission is not significant, emissions from the foam blowing process will be contained through regular leak inspections.
- d) **Soil and water pollution:** Other chemicals involved in foam production are MDI, amine catalysts and fire retardants. The probability that a spill of polymeric MDI (liquid at room temperature) contaminates the soil and water is very low, because the floor of the foam production areas consists of cement coated with an anti-leakage, low permeability chemical layer such as epoxy. If MDI leaks into the soil, it will react with moisture or water, and the reaction would result in CO₂ and insoluble polyurea compounds, which are not biodegradable and chemically inert. Fire retardant and amine catalysts (very small amount) are mixed with polyol by system house suppliers. They remain in the final foam products and are not emitted to the environment during foam production or later.
- e) **Solid waste** related to the replacement of old production system will be scrap metals, which will be stored until the destruction of the replaced equipment has been audited. These materials will then be send for recycling. Drums in which foaming agent are delivered will be returned to suppliers.
- f) **Social impacts:** The conversion of the foam production system will not result in worker layoffs. Participating companies will not need to acquire land to implement the project. Replacement of old with new system will take place at the existing footprint. Although very unlikely, should a participating company wish to relocate to new site that it already owns, a due diligence review of the land acquisition process will be undertaken by the Bank team to confirm that there are no any legacy issues related to the acquired land.

6 Mitigation Measures - Environmental Management Plan

Enterprises that convert to pre-blended HFO should include adequate environment and safety measures in their SOPs, which will be checked by the PMU. For companies converting to cyclo-pentane, the safety requirements associated with the use of flammable hydrocarbons present operational challenges, in particular for smaller foam enterprises. Therefore, the World Bank's Environmental Assessment (OP/BP 4.01) policy is triggered. Provided the environmental assessment above, participating companies planning to use hydrocarbons will need to prepare a site-specific Environmental Management Plan (EMP) for the conversion to address the safety concerns of cyclo-pentane use.

Prospective project participants must submit the EMP to the PMU as part of their sub-project proposal. The PMU will assess conformance of the EMP with the EMF's requirements and its acceptability to the Bank, before the EMP becomes a part of the sub-grant agreement. The EMP must introduce appropriate occupational health and safety (OHS) measures as well as emergency preparedness and response measures for:

- Prevention of direct contact with and inhalation of MDI vapors (which can cause irritation)
- Spill prevention, control, and countermeasures
- Fire protection and countermeasures

In addition, the EMP must contain provisions for:

- Training of production facility managers and operational staff on environment, health and safety requirements during the conversion process and in the handling of cyclo-pentane in the foam production process.
- At least one safety inspection and audit before the start-up of normal foam production using cyclo-pentane.

With regard to the storage of cyclo-pentane in underground storage tanks (USTs)³ or aboveground storage tanks (ASTs), the General EHS guidelines require that USTs or ASTs have to be designed and built according to recognized industry standards. They should have secondary containment systems to prevent the uncontrolled release and must be equipped with leak detection systems as well as devices that prevent spills and overfills, such as overfill alarms, automatic shut-off devices and catch basins around fill pipes.

7 Responsibilities

Each EMP shall allocate the responsibilities for the implementation of said mitigation measures as follows:

Foam enterprises are responsible for the safe conversion from HCFC-141b to cyclo-pentane or to pre-blended HFO. In execution of this responsibility, foam enterprises shall:

Before conversion:

³ <http://www.ifc.org/wps/wcm/connect/47d9ca8048865834b4a6f66a6515bb18/1-5%2BHazardous%2BMaterials%2BManagement.pdf?MOD=AJPERES>

- Request from chemical supplier the safety data sheets for each chemical used in the foam production process.
- Obtain safety specifications for fire protection measures from equipment suppliers.
- Obtain approval from fire protection authorities as per local and national requirements.
- Obtain approval from relevant authorities for storage and use of hydrocarbons.
- Prepare an EMP for the implementation of the conversion project (only for conversion to cyclo-pentane, see Annex A).
- Prepare and file an environmental impact assessment following national regulations, if required, e.g. for new facilities and expansion of existing foam production facility.

Before starting production using alternatives:

- 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.
- Assign technical staff (e.g. an environmental, health and safety officer) to monitor compliance with (i) all OHS measures and environment requirements and (ii) all safety requirements and fire protection rules when working with cyclo-pentane 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.
- Send copies of any environmental, safety and health plans and reports related to HCFC conversion to the PMU 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 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.
- Test fire and other safety equipment and procedures regularly following established checklists and procedures, ensure good operational conditions and promptly replace failing, used up, worn or expired facility and personal safety equipment and materials.
- Prepare and file environmental, safety and health reports if and as required by national or local regulations, and report accidents to the competent authorities.
- Report production and consumption data to the PMU as required (foam produced, HFC, HFO, or cyclo-pentane consumed).

The PMU is responsible for the 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 MoEF and the World Bank, the 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 and SOPs of 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 enterprise.
- Supervise the implementation of the HCFC conversion project and the company's compliance with the agreed environmental and safety requirements and standards.
- Ensure that the critical part of old production system is destroyed, then request the enterprises to store the old production system until financial audit by National Audit Agency (i.e. BPK, BPKP) is completed. Once completed, the scrap metal can be sent to recycling companies who have license for collecting and recycling the scrap metal.
- If necessary, cooperate with competent national and local authorities to enforce environmental, health and safety compliance by participating companies.
- 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, 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 standards and requirements.
- Install, or assist with the installation of, the foam production line and related equipment to ensure safe production conditions.
- Provide to the foam 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.
- Provide after-sales services and warranties in the case of accidents due to technical equipment failure.

The **World Bank** is responsible to ensure compliance with safeguard requirements at the project preparation and supervision stage. Prior to the signing of Foam Technology Replacement Agreements (FTRA), the project beneficiaries and the PMU must agree on a schedule for site verification and check each milestones achievement before payments can be processed. A joint team, consisting of the Bank environmental specialist, PMU staff, the national technical specialist and a beneficiary representative will undertake an onsite inspection, during which they will checking each item in the EMP check list to ensure compliance. Further, the Bank team will:

- Upon request, assist the PMU to review the foam technology conversion proposal and the site-specific EMP submitted by foam enterprises before signing of the FTRA.

- Review safeguard documents and compliance by the PMU and participating enterprises with the EMF and EMPs.
- Participate in site visits and safeguard inspections at participating production sites.

8 Institutional arrangement

The Ministry of Environment and Forestry (MoEF) is responsible for the implementation of the Montreal Protocol. The National Ozone Unit (NOU), established within MoEF, is responsible for day-to-day operations of the Montreal Protocol Program under the guidance of a National Steering Committee, in which the relevant ministries are represented. A PMU has been established under the NOU for the implementation and day-to-day management of the HCFC Phase-out Management Plan and the related sector plans.

For the implementation at the enterprises level, a sub-grant agreement will be signed between MoEF and each participating foam enterprise. This agreement will include the company's HCFC conversion plan and EMP, which are to be prepared by the applicant enterprise and must be submitted to the PMU for approval. The PMU will monitor compliance with the sub-grant agreement and the EMP, which is a prerequisite for the release of any grant payment to the participating companies.

Participating companies will report on their HCFC conversion and compliance with the EMP and will furnish required documents, which will be verified by the PMU. The PMU will record and maintain all information related to the HCFC conversion in participating companies in a secure database.

The World Bank task team will supervise the implementation of the project including its environmental and safety provisions. Supervision will include discussion with selected foam enterprises and visits to their production sites.

9 Capacity requirements

It is the responsibility of the participating foam enterprise to select suppliers, contractors and in-house staff and workers, who are trained and capable of following the EMP, the company's SOPs and any applicable environmental protocols and safety provisions, and supervise their work.

As part of project implementation, the PMU will offer technical workshops for foam enterprises, their staff, suppliers and other stakeholders. These workshops will include sections on HCFC alternatives and their environmental impact (including global warming potential), the installation of new foam blowing equipment, in particular for cyclo-pentane use, the proper handling of blowing agents and chemicals as well as health, safety and environmental requirements. They will also cover reporting requirements by foam enterprises. In addition, the PMU plans to organize safety trainings for foam production workers in cooperation with chemical and equipment suppliers and local fire and environmental authorities.

The technical consultant to be hired by the PMU will be fully familiar with the HCFC conversion process, including the handling of blowing agents and other chemicals, health and fire hazards and mitigating measures. The PMU and its technical consultant will be available to advise participating foam enterprises if needed.

10 EMF Implementation under Stage 1

The EMF for Stage 1 has been consistently applied by the PMU and participating enterprises. The project safeguard performance was regularly reviewed by the Bank team during supervision missions, and no safeguard issues were reported.

In preparation of Stage 1 and equally for Stage 2, the PMU identified and visited enterprises in foam sub-sector, collected information on foam production and safeguards-relevant conditions and arranged stakeholder consultations. Foam enterprises were then invited to submitted foam technology replacement proposals, including workshop and equipment layout and a safety plan (to mitigate fire hazards) as well as a site-specific EMP. After the PMU's review and acceptance, the enterprises were invited to sign a foam technology replacement agreement, which includes the EMP. The same process is applied for Stage 2.

Foam enterprises are familiar with the Bank's safeguard requirements since their participating the CFC phase-out project launched in 1994, and implementation of safeguard requirement by the enterprises has been satisfactory. The World Bank team was always invited in joint site inspections led by the PMU for all medium and large enterprises and some small enterprises. The Bank team consisted of a technical and environmental specialist, who conducted safety check to ensure compliance with the EMP. For companies converting to cyclopentane, the safety checks include confirmation that they had submitted fire prevention and emergency response plans to their local fire department and obtained required clearances and permits.

Based on the safeguards performance of Stage 1, the Bank team's safeguard specialist has assessed the safeguard risk for Stage 2 as remaining the same. The potential environmental and social impact is also the same as for Stage 1. The participating medium and large foam enterprises are familiar with Bank procedure based on their participation in the earlier CFC phase-out project. These enterprises have been pre-assessed by the PMU, and there is no environmental liability or legacy issue associated with these enterprises.

11 Project Stakeholder Consultation

The stakeholder consultation for Stage 2 was held on 9 March 2017 and attended by about 50 enterprises. The main objective of the consultation was to introduce non-HCFC technologies, the project application procedures, and World Bank requirements, including safeguards that enterprises must follow. Enterprises were aware of the safety issues involving flammable foam blowing agents and understood the safety requirements. All enterprises, including those planning to use preblended HFO, understood the role of Standard Operating Procedures (SOP) and are aware of the need to update them.

12 Budget

Participating foam enterprises bear the financial responsibility for the conversion of their HCFC-using production facilities to alternative technologies including any environmental mitigation activities required by the EMF/EMP. The project will pay in accordance with the agreement to participating foam enterprises, which will cover part of the conversion costs including any environmental and safety measures. The final payment to foam enterprises will only be made after the PMU has confirmed compliance of participating enterprises with all EMF/EMP requirements. The cost of the technical consultant, workshops and trainings organized by the PMU will be borne by the HCFC Phase-out Project.

13 Supporting documents

The following documents will support the implementation of this EMF:

- EMP template – in Annex A
- World Bank Environmental, Health and Safety (EHS) Guidelines – see Annex B
- Material Safety Data Sheets – to be provided by chemical and equipment suppliers
- Project Operations Manual –prepared by the PMU
- Information materials for foam enterprises, equipment suppliers and foam system houses – to be prepared by PMU

ANNEX A

Environmental Management Plan

The preparation of an EMP is a project requirement for foam sector enterprises that convert their foam production to the use of cyclo-pentane (or pre-blended) as blowing agent. Enterprises that convert to pre-blended HFO do not need to prepare an EMP, but are required to update and follow their Standard Operating Procedures (SOP), which will be verified by the PMU.

Prospective project beneficiaries may prepare an EMP by completing the template below and submitting it together with their project application and conversion plan to the PMU for approval and inclusion in the Sub-grant Agreement.

The EMP is designed to ensure that mitigation measures are implemented and have the intended results. Additional remedial measures must also be indicated in the EMP and be carried out if the mitigation measures identified below are inadequate or the impacts have been underestimated.

Instructions:

The EMP template below contains a section on general information and two checklists: checklist 1 shall be used for “cyclo-pentane delivered by tank trucks and stored in tanks” and checklist 2 for “cyclo-pentane (or pre-blended) delivered in drums”.

Please complete the general information section and submit it to the PMU along with the checklist that applies to your situation. If necessary, please provide additional information, details and background documents (drawings, technical specifications ...) as attachment.

During or promptly after the conversion process, the checklist must be completed by the manager appointed to oversee the conversion (date / signature confirming compliance) and, once completed, the original checklist must be sent to the PMU.

Acronyms:

CP – cyclo-pentane

Ex – explosive / explosion

EMP Template – General information

Name of company:			
Address:			
Contact person:		Tel:	
		Email:	
Location:	Mixed residential and commercial area		
	Commercial zone		
	Industrial zone		
Number of employee			

Brief description of the company and its production:

Baseline information:

Foaming equipment	Unit 1:				
	Unit 2:				
HCFC-141b consumption	2010		2011:	2012:	

Approvals by relevant authorities

Authorities	Item/	Date
	Storage of cyclo-pentane. Max CP Amount	
	Fire safety plan	

Attachments

Map showing location of factory and surroundings	Annex
Floor plan foam production area	Annex
Plan showing location of CP storage area/tank	Annex
Standard Operating Procedures (SOP) after conversion	Annex (for information)

Checklist 1:

Please submit this table for conversion projects involving

Safety measure for conversion to cyclo-pentane delivered by tank truck and stored in storage tank

Components / area	National requirements	Safety measures	Complied / Implemented
CP storage tank above or underground	National requirement for storage of CP.	CP storage tank located outside the building, 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 includes requirements regarding electrical installation in areas where explosive gases can occur.	Electrical installation in CP tank area in accordance with Indonesian Electrical Code.	
		CP gas detectors installed.	
		Fence around the CP storage area.	
		Safety marking and signs.	
CP Pre-mixing unit	As per the foam equipment supplier specifications.	See supplier specifications regarding safety measures. (Safety measures are normally part of the pre-mixing unit package.)	
Foaming area and jigs	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 ³ /h) as specified by equipment supplier installed.	
		CP Gas Detection System installed.	
		CP Gas detectors installed.	
		Nitrogen system installed.	

		Firefighting equipment installed.	
Awareness and training	Involve local fire authority.	General awareness. Training of workers.	
Operational manual for workers involved in handling CP foaming	Supplier of foaming and safety equipment.	Training of workers involved in foaming.	
		Use of spark free tools in areas with risk of CP.	
Checking and maintenance of safety measures	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.	
Emergency plan	Prepared in cooperation with suppliers and local safety authorities.	Develop an emergency plan by internal team and with advice from local fire safety authorities.	

Checklist 2:

Please submit this table for conversion projects involving

Safety measure for conversion to cyclo-pentane (or pre-blended⁴) and delivery of cyclo-pentane (or pre-blended) in drums

Components / area	National requirements	Safety measures	Complied / Implemented
CP and Preblended Polyol with CP drums stored outdoor in designated area	National requirements for storage of CP in drums. Requirements and guidance from CP supplier.	Location of CP and Preblended Polyol with CP drums storage area approved by relevant authority.	
		Drums in stored in area with fence around.	
		Drums protected against direct exposure to sunlight.	
		Electrical installation in the CP storage area as per Ex-area classification.	
		Firefighting equipment.	
		Safety marking and signs of storage area.	
Indoor room for CP drums storage	National requirement for storage of flammable gas inside buildings. Requirements and guidance from CP supplier.	Rooms separated from foam production area and rest of the factory with fire resistance walls and doors.	
		Access from outside directly to the CP storage room. (for delivery of CP drums and pickup of empty drums.)	
		Ventilation system installed with capacity as specified by regulation/ supplier.	
		Electrical installation as per Ex area classification.	
		CP Gas detection system and CP gas detectors.	
		Fire equipment as specified by authority.	
		Safety marking and signs at storage area.	

⁴ Pre-blended means the participant company receives the blowing agent in form of pre-blended of cyclo-pentane and polyol

Delivery of drums	Requirements and specification from CP drum supplier.	Easy access for off-loading and loading CP drums and transportation to the CP storage room.	
		Access to the room from the outside for delivery of drums.	
		Storage area marked with signs and max storage capacity clearly shown.	
Pre-mixing unit (if applicable)	As per the supplier specifications.	The premixing unit will normally include safety measures.	
		Grounding of foaming equipment	
		CP Gas system and gas detectors.	
		Ventilation system installed with design capacity as specified by supplier.	
		Electrical installations consistent with Ex area classification.	
		Nitrogen system.	
		Firefighting equipment.	
Awareness and training	Involve local fire authority.	General awareness and training of workers.	
Operational manual for workers involved in handling CP foaming	Supplier of foaming and safety equipment.	Training of workers involved in foaming.	
		Use of spark free tools in areas with risk of CP.	
Checking and maintenance of safety measures	Recommended practice by foam equipment supplier and suppliers of fire safety equipment and relevant safety authorities.	Develop and daily, monthly quarterly and annual program for checking and reporting.	
Emergency plan	Prepared in cooperation with suppliers and local safety authorities.	Develop an emergency plan by internal team with advice from local fire safety authorities.	

ANNEX B

World Bank Environmental, Health and Safety (EHS) Guidelines

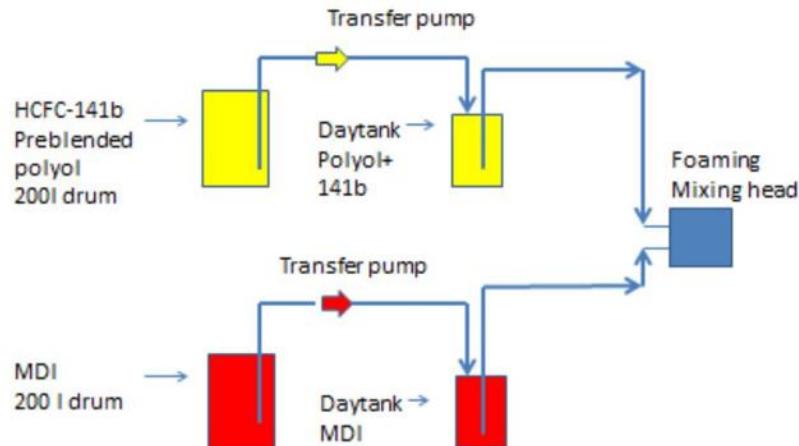
The World Bank Environmental, Health, and Safety (EHS) Guidelines are available at:

<http://www1.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

ANNEX C

Diagram of Existing HCFC-141b Foaming Set and
HFO Foaming Set in Cooled Storage Room

Existing HCFC-141b foaming set



Pre-Blended HFO Foaming Set

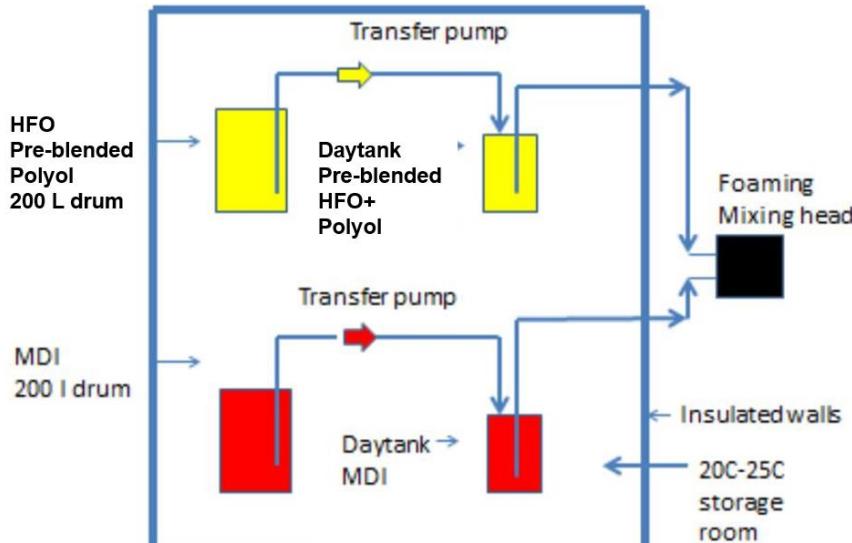
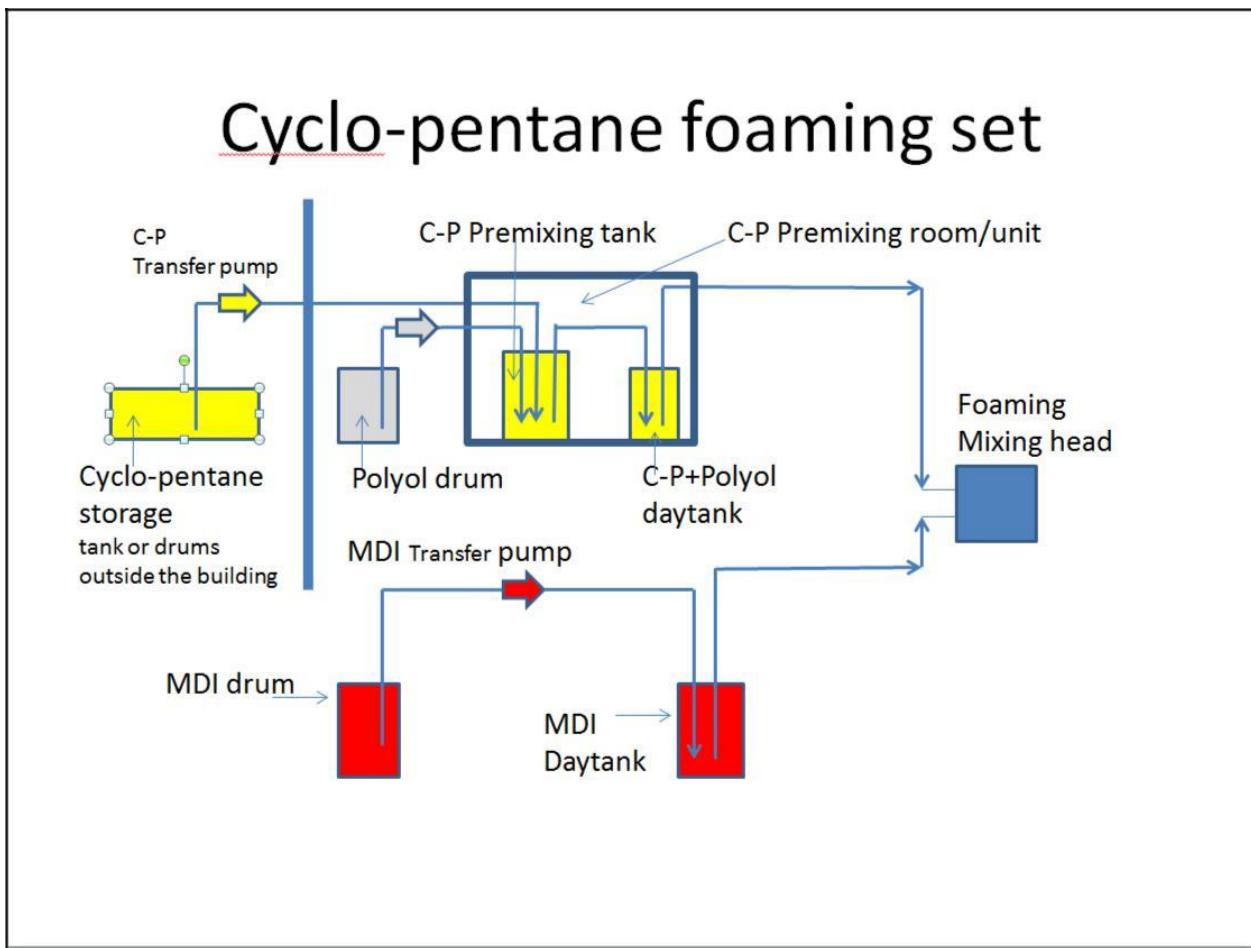


Diagram of New Cyclo-Pentane Foaming Set
with Storage and Premixing Room





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