



Hashemite Kingdom of Jordan  
Ministry of Environment  
National Ozone Unit

**Ozone Depleting Substances HCFC Phase-Out Project (ODS3)**  
**Additional Financing (AF)**  
**Environmental Management Framework (EMF)**  
**Executive Summary -- English**

Final

May 22, 2017

The Government of Jordan would like to address all remaining hydrochlorofluorocarbon (HCFC)-based foam manufacturing primarily through the Jordan Ozone Depleting Substances (ODS3) Additional Financing (Stage II). According to Jordan's official 2015 data reporting of HCFC consumption, use of HCFC-141b in foam manufacturing amounted to 20.8 Ozone Depleting Potential (ODP) tons of bulk HCFC-141b use and 19.8 ODP tons of HCFC-141b in imported pre-blended polyol.

Elimination of all HCFC-141b consumed in Jordan in two sectors (foam and refrigeration) is in alignment with the Multilateral Fund (MLF) Executive Committee (ExCom) policy that HCFC-141b, which has a higher ODP than other HCFCs, is addressed as a priority, along with manufacturing. The removal of access to HCFC-141b in imported pre-blended polyol is expected to also remove any future pressure for an enterprise of the blending house to source bulk HCFC-141b.

The project will have a positive impact on the global environment by reducing the use of HCFCs, which are ozone-depleting substances and greenhouse gases with a global warming potential (GWP) ranging from several hundred to several thousand times that of CO<sub>2</sub>. While HCFCs have an impact on the global environment, they have no adverse local impact as these chemicals are stable and not considered toxic or otherwise dangerous for the environment.

The project will include a series of investment activities with commercial refrigeration manufacturing, refrigerated transport, domestic refrigeration, and various foam sector entities. No closure, relocation, or expansion of enterprises is expected. All enterprises are located in industrial zones.

Hydrocarbon, hydrofluoro-olefin (HFOs) and, possibly water/CO<sub>2</sub> have been selected as blowing agents to replace HCFC-141b that is being used across the foam sector. Hydrocarbon has a GWP of less than 25. Hydrocarbon (cyclopentane) is classified as a Volatile Organic Compound (VOC), but its use results in very low levels of emissions of about 2-3% of the blowing agent. Therefore, there is no significant environmental impact from the chemical hydrocarbon itself. HFOs, also known as unsaturated hydrofluorocarbons (HFCs), are emerging blowing agents that have no ODP and GWPs under 5 and are considered by HFO producers nonflammable.

The other chemicals involved in foam production are MDI (isocyanates), amine catalysts and fire retardants. The foam enterprises purchase pre-formulated polyol (blended with or without HCFC-141b) and polymeric MDI for their rigid foam production. The probability that a spill of polymeric MDI (a liquid at room temperature) contaminates the soil and water is very low, because the floor of the foam production areas consist of cement coated with an anti-leakage, low permeability\chemical layer such as epoxy. In the case that MDI leaks into the soil, it will react with the moisture/water, and the reaction would result in CO<sub>2</sub> and insoluble polyurea compounds, which are not biodegradable but chemically inert. Fire retardant and amine catalysts (very limited amount) are mixed/pre-formulated in the polyol at the system houses (pre-blended polyol suppliers), from which the foam enterprises purchase pre-blended polyol and MDI, so the foam enterprises will not handle these toxic chemicals directly. Fire retardant and amine catalysts will remain in the final foam products and are not likely to be emitted to the environment during the foam production or later. Therefore, there are no anticipated legacy environmental contamination issues that are associated with the production at the foam enterprises.

However, safety requirements associated with hydrocarbons (cylco-pentanes under the project) due to the flammability may still present operational challenges for smaller foam enterprises. Therefore, the Environmental Assessment (OP/BP 4.01) policy is triggered.

Based on the above, it is not considered necessary to prepare an Environmental Impact Assessment (EIA); rather, an Environmental Management Plan (EMP) for enterprises' use during the project implementation stage will address the safety concerns of hydrocarbon.

In addition to this overall EMF, the enterprises have also been requested to prepare their site-specific EMPs as an integrated part of their subproject proposals in order to participate in the Project and receive access to any funding. The enterprises' managers and operational staff will be trained annually on environment and

health/safety requirements during the foam conversion under the Project. Safety audits before the start-up of normal foam production using hydrocarbons will be carried out by technical consultants hired by the National Ozone Unit (NOU). World Bank supervision missions will also follow up on implementation of the EMP.

Technical assistance (TA) is required under the proposed sector plan for the enterprises and the country to ensure efficient and effectual phase-out across the sectors and nation-wide. This will be made up of training workshops for the foam and refrigeration enterprises, training of government officers, organized industry consultations, study tours on HCFC alternatives, information management for monitoring of HCFC-using sector, and consultant services on alternative technologies.

The Technical Assistance and Policy Component of this Jordan ODS3 AF project is allocated as \$215,129. These funds will support the activities detailed above. Additionally, one of the staff in the project management unit (PMU) in the NOU will be dedicated to supporting conversions in the facilities, including environmental safety concerns and training associated with technology changes. The budget for the percentage level of effort dedicated to environmental safeguards support for this staff member is estimated at \$10,000/year. The total budget of the ODS3 AF partially or fully dedicated to environmental safeguards is estimated at \$215,129, which is approximately 10% of the total ODS3 AF budget.

Complaints Resolution Mechanisms relating to this project are located in the Ministry of Labor and the Ministry of Environment.

Safeguards performance reporting will be made public as part of the Implementation Status Reporting (ISR) dissemination process, available on the [www.worldbank.org](http://www.worldbank.org) website, on the Jordan country page, under the “projects” tab.