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Executive Committee of the
Interim Multilateral Fund for the
Implementation of the Montreal Protocol

Seventh Meeting
Montreal, 23-26 June 1992

PROJECT PROPOSAL: JORDAN

**TECHNICAL SUPPORT AND INVESTMENT PROJECT
FOR THE REDUCTION OF CONSUMPTION OF
OZONE DEPLETING SUBSTANCES**

THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER

PROJECT COVER SHEET

COUNTRY: Hashemite Kingdom of Jordan

SECTORS COVERED: All (Aerosols, Refrigeration, Foam and Halon)

ODS CONSUMPTION IN

AFFECTED SECTOR(S):	Aerosols:	225 t/y
(1991 data)	Refrigeration:	220 t/y
	Foams:	120 t/y
	Halons:	77 t/y
	Others:	3 t/y

PROJECT TITLE: Technical Support and Investment Project for the Reduction of Consumption of Ozone Depleting Substances

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODSs PHASED-OUT: 10,000 tons over allowable phaseout period

PROPOSED BUDGET: \$1.5 million

**IMPLEMENTING
AGENCY:** World Bank

**COORDINATING
NATIONAL AGENCY:** Ministry of Municipal, Rural Affairs and the Environment

PROJECT SUMMARY

Please refer to attached Executive Project Summary

MONTREAL PROTOCOL
DRAFT EXECUTIVE PROJECT SUMMARY
JORDAN - OZONE DEPLETING SUBSTANCE PHASEOUT PROJECT

Country: Hashemite Kingdom of Jordan

Project Name: Technical Support and Investment Project for the Reduction of Consumption of Ozone Depleting Substances

Financing: U.S.\$1.5 million (from the Ozone Trust Fund)

Associated Bank Project: None. Stand-alone project.

Tentative Appraisal Date: September 1992

Tentative Approval Date: October 1992

Peer Reviewers: Messrs. King (ENVPR); Newcombe (ENVGC); Jordan (MN2IE)

Technical Reviewers: D. Rhatigan (LALIE); Mr. Geno Nardini (External Reviewer from the Ozone Operations Resource Group)

1. Project Purpose. This project has been developed for the purpose of implementing Jordan's Action Plan for the phaseout of regulated ozone depleting substances. Jordan is a signatory of the Montreal Protocol on Substances that Deplete the Ozone Layer and has therefore committed to the complete phaseout in accordance with the Protocol schedule.

2. ODS Sector Background. Jordan's consumption of Ozone Depleting Substances (ODS) in 1991 has been estimated at 625 tons or the equivalent of 779 ODP (ozone depleting potential) tons, which amounted to a per capita consumption of about 0.15 kg. All ODS are imported into Jordan as there are no production facilities. The 1991 consumption profile for Annex A Group I (refer to Protocol classification) substances is as follows: 200 tons of chlorofluorocarbon 12 (CFC-12) and 11 (CFC-11) in the refrigeration sector, 200 tons of CFC-11 in the foam sector (including foam used in refrigeration insulation) and 225 tons of CFC-12 in the aerosol sector. Consumption of Annex A Group II substances (Halon 1211 and 1301 which are used as fire extinguishants) was 77 tons while Annex A Group III substances (1,1,1-trichloroethane, also known as methyl chloroform which is used as an industrial degreaser) was negligible. The bulk of the usage has therefore been in the aerosol (36% of total) and refrigeration (32% of total) sectors (for both manufacturing and maintenance activities) and a non-negligible use of Halons. A detailed ODS consumption profile is presented in Annex A.

3. Other Country-Specific Background Information. Jordan ratified the Montreal Protocol on Substances that Deplete the Ozone Layer (the Protocol) in May of 1989. Given that Jordan is classified as a developing country for the purpose of the Protocol and its per-capita consumption of ODS is less than 0.3 kg, it qualifies under paragraph 1 of Article 5 of the Protocol for assistance from the Interim Multilateral Fund for the Implementation of the Montreal Protocol (the Fund). A prerequisite for obtaining funds is the preparation of a Country Program for the Phaseout of Ozone Depleting Substances (the "Country Program"). In addition to working on the preparation of its Country Program, Jordan has been very active in the Fund's activities and presently holds a seat on the Executive Committee. The Country Program, prepared with the assistance of the World Bank and which will soon be presented to the Executive Committee of the Fund, contains Jordan's proposed Action Plan for the phaseout of ODS to meet the requirements of the Montreal Protocol. The Action Plan is based on implementing the optimum phaseout strategy and encompasses a series of projects in a comprehensive program that supports a phaseout of ODS consumption as soon as is technically feasible. The Action Plan includes key interventions such as: the creation of a task force which will coordinate ODS phaseout activities, the training of government and industry in the tasks needed to accomplish a prompt and effective phaseout of ODSs and a series of investment project. The Action Plan was developed on the basis of an optimum phaseout scenario, in which the transition to ODS substitute is accomplished at a rate consistent with the availability of technology and which will be fully accomplished over the period 1992-1998. The proposed Action Plan will minimize the net incremental costs on the Jordanian economy and will also minimize the consumption of ODS over the phaseout period.

4. Project Objectives. The principal objective of this project is to assist the Government of Jordan and the private industry to effectively and efficiently phaseout the use of ODS through the timely adoption of policy, technological and monitoring measures, in compliance with the Protocol. A second objective of this project is to provide technical and engineering assistance to the industrial sectors which consume the bulk of the ODS and where phaseout can be accomplished in a most cost efficient manner.

5. Project Strategy. The strategy adopted in the design and proposed implementation of this project will focus on early phaseout of ODS in those applications where technology already exists and is well established, and where the incremental costs are relatively low. This project has also been designed not to duplicate technical assistance activities planned by any other implementing agencies.

6. Project Description. This Project has been designed on the basis of the key recommendations made in the Country Program and will be the central element of the ODS phaseout efforts. Both technical and organizational actions have been identified and included in the Action Plan and Project outline. Special attention was given to investment projects which would flow from UNDP's proposed technical assistance work program for Jordan on the ODS issue. This project should in no way duplicate planned UNDP activities. Refer to Annex B for ODS savings details. The Project consists of the following components:

Component 1: Technology Transfer and Technical Support

7. The principal focus of this effort will be to provide assistance for technology transfer and development to the private sector. An important focus is for the implementation of projects with early phaseout of ODS. Primary activities are to be:

A. Aerosol Sector

- (i) Purification of Liquid Petroleum Gas (LPG) in order to provide a local source of high quality deodorized LPG, an appropriate substitute for CFC propellants. This important investment project will be accomplished with Jordan's leading petroleum company. The equipment which will be required to carry out the deodorization of LPG includes: safe and secure storage facilities for LPG, an olefin removal system to remove odorous contaminants from the LPG and regeneration mechanism, filling and distribution facilities. Additional details on the project's technical challenges and equipment requirements are presented in Appendix C. This project will allow the phaseout of about 200 tons of ODS which are still used in aerosol applications. The LPG purification process is determined on the basis of the quality and composition of the raw LPG, and is therefore specific to each LPG source. The LPG presently available has extremely high levels of olefins (about 13,000 ppm) and cannot therefore be utilized in cosmetics and personal care products. Its use is limited to less sensitive applications such as insecticide propellants.

B. Line-of-Grant for ODS Phaseout Projects in Other Sectors

This second sub-component consists in establishing a line-of-grant, through an appropriate financial intermediary, for the private sector to enable receipt and disbursement of adequate funds for demonstration and investment projects for the phaseout of ODS in the foam, refrigeration and other ODS using sectors. The initial project pipeline will involve the following interventions:

- (ii) ODS Phaseout in Rigid Foam Applications with an emphasis on rigid foam insulation used in the refrigerator manufacturing industry (National Refrigeration, Household Appliances Manufacturing and Middle East Electrical) and in commercial refrigeration applications where rigid foam might be utilized (Ihsan & Tahseen Balkaki, Arab Refrigerators Industries and Petra Engineering). Typically the phaseout of ODS in rigid foam applications will involve a two-step approach, the first being a 50% reduction in CFC-11 by substitution with water and a second phaseout step which will depend on the application and which remains under scientific investigation. The conversion will most likely involve a switch from low-pressure blowing to a high-pressure system and will typically cost from \$20,000 to \$30,000 per facility.

- (iii) ODS Phaseout in Flexible Foam Applications with the emphasis on the largest producers of foam bunstock used for mattress and cushion production (National Foam, Jordan Plastic, International Foam, Kholi Gasi Foam and Arab Foam). The actions needed here are low cost trial runs with new foam formulations and/or alternative blowing agents. The cost effectiveness of ODS in the flexible foam sector is typically very good.
- (iv) Investment Projects which meet the project eligibility criteria set forth by the IMLF. In addition to the refrigeration and foam sectors, the air conditioning and commercial/industrial cooling sectors could utilize the funds for ODS phaseout projects. Projects which will be particularly important will be the introduction of new refrigeration technology in the domestic refrigeration sector.
- (v) Demonstration Projects in the key areas where feasibility and cost effectiveness must be confirmed. These demonstration projects could also follow-up on UNDP technical seminars planned in their 1992 Work Program. Areas of interest include:
 - Recycling and recovery of CFC-12 in the manufacture and maintenance of refrigerated equipment of refrigerated equipment.
 - New recycling and maintenance procedure for Halon systems which could significantly (up to 90%) reduce annual consumption.

Component 2: Technical and Organizational Assistance
to Government's Institutional Strengthening Efforts

8. This component will target the agencies and institutions which will be involved in the phaseout in order to develop or enhance the key management systems and required to fully support the phaseout. The institutional framework will be further analyzed and evaluated to set up an efficient operational unit (ODS Phaseout Committee) with responsibility for implementation of the Action Plan. This component will provide technical and logistics support to enhance the efforts of the Government of Jordan in developing its institutional capabilities to deal with the Ozone issue. The capacities of these agencies will be strengthened in order to properly implement the following key measures:

(vi) Technical Awareness and Assistance

- familiarize Jordanian industry with ODS free technologies, handling procedures, and cost implications, and enhance public awareness of the ozone issue and the importance of conservation practices;
- organize and conduct information clearinghouse activities on new and emerging ODS-free technologies and processes.

(vii) Monitoring

- develop and implement a system to monitor the consumption and uses of ODS including a proposed licensing system;

(viii) Financial

- establish procedures and guidelines for the establishment of a line-of-grant for financing ODS phaseout projects and develop and implement the financial flow mechanism for funds which are to be provided by the Interim Multilateral Fund,

(ix) Institutional

- develop the terms of reference for the joint industry-government ODS Phaseout Committee and establish the secretariat within the MMRAE,

9. Project Costs and Financing Arrangements. It is proposed that incremental costs of this Project be funded as a grant to the Government of Jordan and passed to the enterprises/institutions also on a grant basis through an appropriate intermediary. Funds would be provided from the Ozone Trust Fund. The following inputs will be required:

Component 1: Technology Transfer and Technology Support

A.	Investment project -deodorization of LPG	\$0.7 million
B.	Line-of-grant for private sector	<u>\$0.7 million</u>
	Sub-Total	<u>\$1.4 million</u>

Component 2: Technical and Organizational Assistance

C.	Policy and Monitoring Measures	<u>\$0.1 million</u>
	Sub-Total	<u>\$0.1 million</u>
	TOTAL	<u>\$1.5 million</u>

10. Project Implementation. The Ministry of Municipal, Rural Affairs and the Environment (MMRAE) will have overall responsibility for the implementation of the Action Plan for the phaseout of ODS, which includes policy, monitoring and public awareness components in addition to the investment projects. The MMRAE would act as general administrator of the project during the implementation of the action plan and act as secretariat of the ODS Phaseout Committee. It is proposed that the Committee also include representation from the Ministry of Planning, Ministry of Finance, Ministry of Industry, Civil Defense, Amman Chamber of Industries and the Royal Scientific Society. The funds would flow from the

Ozone Trust Fund through an appropriate intermediary which would provide grant administration services. Appropriate project reviews procedures will be set-up to deal with the applications for assistance from the line-of-grant.

11. Project Sustainability. The funds for this project are being provided on a grant basis and the project is therefore inherently unsustainable. The Project, which is part of a comprehensive Action Plan, is expected to initiate additional phaseout activities as the market forces to substitute increase. The sustainability should be further enhanced by the introduction of:

- a) policy measures through the imposition of levies
- b) monitoring system through regulating import/export of CFC
- c) licensing program and monitoring CFC users

12. Rationale for Montreal Protocol Financing. As per the Implementation Guidelines and Criteria for Project Selection established by the Executive Committee of the Montreal Protocol during its third meeting in April 1991, all technical assistance, demonstration projects, pre-investment and investment activities which lead to reductions in ODS emissions are eligible for financing. The proposed project is an important part of the Action Plan developed in the preparation of the Country Program.

13. Issues. The Government of Jordan has received and reviewed the Country Program, and has actively participated in the design of this investment project. Support for the project was sought and obtained before presentation to the Fund. Arrangements for the flow of funds will be an important component of the project appraisal effort.

14. Environmental Aspects. All components of the project are environmentally sound as they will reduce the emission of ODS into the environment. It will be the responsibility of the MMRAE to ensure that companies being provided assistance under the Montreal Protocol comply with applicable environmental and health and safety regulations. This project will be reviewed and as per the Bank's OD4.01 Annex A environmental classification system. The environmental screening will be conducted during project preparation and will be finalized during project appraisal.

15. Project Benefits. The project's major benefit is to assist Jordan to achieve its objective of completely phasing out the use of controlled substances as soon as it is technically feasible while reducing the net incremental costs on its economy. The adoption of the optimum phaseout scenario of which this project is an essential part will reduce emissions of ODSs by 50% by 1995 and 95% by 2000. The cumulative effect of the optimum phaseout strategy will be prevention of over 10,000 tons of ODS emissions by the turn of the century. In addition to the reduction in ODS emissions to the environment, the proposed Action Plan, when fully implemented, will minimize the net incremental cost of the complete ODS phaseout on the Jordanian economy.

16. Project Risks. The project risks are considered to be small. The proposed technical aspects will rely on proven technologies and processes. Policy and regulatory aspects will provide the required support to mitigate market

distortions which could impede transition to substitutes. The total number of companies involved is relatively small and geographically concentrated, this will greatly simplify the monitoring activities.

17. Staff Review Arrangements. The following staff is responsible for the Project and for its review:

Task Manager:	To be determined
Division Chief:	V. Bhargava (MN2IE)
Bank Technical Advisor:	Don Rhatigan (LA1EI)
External Reviewer:	Mr. Geno Nardini (expert from the Ozone Operations Research Group)

18. Project Review and Next Steps. The following steps are planned for processing the project:

- 1) A project preparation mission to Jordan where the Country Program and the project will be reviewed and discussed and further documented in order to be presented to the Executive Committee (EC) of the Interim Multilateral Fund for the Implementation of the Montreal Protocol (IMLF) (May 1992);
- 2) Presentation of the Project proposal to the EC of the IMLF at their June 1992 meeting;
- 3) Presentation of the Country Program (in draft version) to the IMLF by the Government of Jordan at the June 1992 meeting;
- 4) Following EC approval, the project pre-appraisal will be scheduled for July 1992.
- 5) Project appraisal in September 1992
- 6) Grant Negotiation in November 1992
- 7) Grant agreement in December 1992.

ANNEX A - DETAILED ODS CONSUMPTION DATA

Table 2.1: ODS Consumption in Jordan for 1990 and 1991

	1990		1991	
	Tonnes	ODP Tonnes	Tonnes	ODP Tonnes
CFC-11	162	162	163	163
CFC-12	400	400	375	375
CFC-113	0	0	0	0
CFC-114	18	18	20	20
CFC-115	0	0	0	0
Total CFC	<u>580</u>	<u>580</u>	<u>548</u>	<u>548</u>
Halon 1211	85	255	77	231
Halon 1301	0	0	0	0
Halon 2402	0	0	0	0
Total Halons	<u>85</u>	<u>255</u>	<u>77</u>	<u>231</u>
TOTAL	665	835	625	779
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ANNEX B - SUMMARY OF ODS PHASEOUT PROJECTS

Component 1: Technology Transfer and Technical Support	Year (Project Duration)	Annual Reduction of ODS Consumption in Tons	Project Cost (in millions of US dollars)
A. Aerosol Sector			
i) Purification of LPG	(1992-1994)	200	\$0.7
B. Line-of-Grant^{1/} for ODS Phaseout in Other Sectors			\$0.7 divided as follows:
ii) Rigid foam	(1993-1994)	50	\$0.12
iii) Flexible foam	(1993-1994)	120	\$0.03
iv) Demonstration projects in key areas:	(1993-1996)		\$0.05
- Recycling of CFC-12			
- Maintenance program			
- Alternative Halon testing procedures			
v) Investment projects for remaining ODS phaseout sectors such as in air conditioning, commercial cooling and domestic refrigeration	(1993-1996)	Up to 300	\$0.5
		Total: 670	Sub-total: <u>\$1.2</u>
Component 2: Policy and Monitoring Measures			
C. Technical and Organizational Assistance to Governments Actions			\$0.1
vi) Technical and ozone awareness			
vii) Monitoring			
viii) Financial			
ix) Institutional			
			Sub-total: <u>\$0.1</u>
			TOTAL: \$1.5 million

ANNEX C - DETAILS ON LPG PURIFICATION PROJECT

C1. The activities and project that are proposed in the Country Program are being presented to the Executive Committee of the Interim Multilateral Fund for the Implementation of the Montreal Protocol. These projects are the result of discussions between the Ministry of Municipal, Rural Affairs and the Environment, and the Bank and of reconnaissance missions by UNDP.

Proposed Investment Project for ODS Reduction in the Aerosol Sector

C2. Deodorization of LPG. The objective of this project is to produce a hydrocarbon product of sufficient quality to be used as an aerosol propellant in replacement of chlorofluorocarbons (CFC). The product, which is usually a mixture of propane and butane, will be purified and then stored in tanks before being loaded onto transportation trucks or more probably into 50-60 kg cylinders. This project would be carried out at the Jordan Petroleum Refinery Company Ltd. in Zerka. The project would provide for technical support and consultation on the key technical aspects, training, preparation of specifications and design document. The project would lead to the production of a CFC-substitute which would displace about 200 to 250 tons of CFC per year. A very preliminary capital cost estimate has been made on the basis of the following equipment being required:

- (i) Odor removal system
- (ii) Two storage tanks
- (iii) Two pumps
- (iv) Two filling points with scale
- (v) 50 kg cylinders
- (vi) Civil engineering
- (vii) Electrical facilities
- (viii) Business development costs
- (ix) Training
- (x) Design
- (xi) Quality control
- (xii) Fire prevention

C3. The initial cost estimate is about \$700,000 (this will vary in accordance with the optimal size of the plant). A more comprehensive engineering report is presently being prepared. An interim report is attached.