

GEF

MOHAMED T. EL-ASHRY
CHIEF EXECUTIVE OFFICER
AND CHAIRMAN

Global Environment Facility

January 26, 1998

Dear Council Member:

The World Bank as the Implementing Agency for the project entitled: *Ukraine Ozone Depleting Substances Phaseout Project*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with World Bank procedures.

Over the next four weeks, the Secretariat will be reviewing the project document to ascertain that it is consistent with the proposal included in the work program approved by the Council in October 1996, and with GEF policies and procedures. The Secretariat will also ascertain whether the proposed level of GEF financing is appropriate in light of the project's objectives.

If by February 23, 1998, I have not received requests from at least four Council Members to have the proposed project reviewed at a Council meeting because in the Member's view the project is not consistent with the Instrument or GEF policies and procedures, I will complete the Secretariat's assessment with a view to endorsing the proposed project document.

Sincerely,

Attachments: *Ukraine Ozone Depleting Substances Phaseout Project*

cc: Alternates, Implementing Agencies, STAP

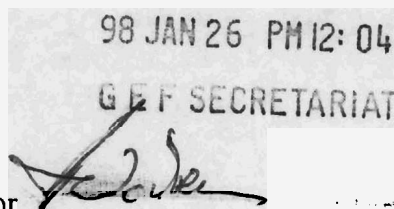
OFFICE MEMORANDUM

RECEIVED

DATE: January 26, 1998

TO: Mr. Ken King, GEF Secretariat

FROM: Lars Vidaeus, World Bank Executive Coordinator



EXTENSION: 34188

SUBJECT: **Ukraine Ozone Depleting Substances Phaseout Project
Final Council Review/CEO Endorsement**

Attached are two advance copies of the Ukraine Ozone Depleting Substances Phaseout Project Document which is being submitted for Global Environment Facility (GEF) CEO Endorsement. The project was approved by the GEF Council in October of 1996. Since the GEF Council Approval of the project, further preparation work has been completed, and the project was recently satisfactorily appraised by a World Bank team as described in the updated Project Document. Since GEF Council approval, the following changes have been made to the project:

- The number of beneficiary enterprises has decreased as the result of a financial viability screening. A few of the enterprises had shut down operations since the initial (94/95 Danish Government) project preparation work, while production levels at others had dropped substantially.
- All subproject costs and grant calculations were updated and brought into line with Montreal Protocol Multilateral Fund guidelines, including cost-effectiveness thresholds. This has resulted in an overall increase in project costs and in individual sub-project grant allocations.
- One solvent enterprise has been dropped because of a lack of counterpart financing.
- All refrigeration projects were re-evaluated in line with the GEF policy which gives preference to technologies with a zero global warming potential (GWP). Annex III of the project document describes the re-evaluation process for the only domestic refrigeration subproject (NORD). Commercial refrigeration subprojects have proposed technologies with the least GWP feasible (but not zero) based on current technological research.
- A halon technical assistance component has been added to the project, with the assistance of Canadian Government funds.
- A technical assistance sub-project (50/50 cost-shared with the enterprise) has been added to help the NORD enterprise gain the know-how for a future conversion to a hydrocarbon technology.
- The refrigeration servicing sub-project has been scaled down to a pilot project, focused on two large servicing companies and training of their servicing technicians.

Ukraine will seek bilateral support to expand the subproject to a national scale after the pilot phase has been completed.

- All new project components have been satisfactorily OORG reviewed.

CC:

Messrs./Mmes. Siegelbaum, Cleaver, Waltz, Shepardson, Cooke, Tuck, Goldberg, Hayward, Whitford.

Report No. 17211-UA

**UKRAINE
GLOBAL ENVIRONMENT FACILITY
OZONE DEPLETING SUBSTANCES PHASEOUT
PROJECT**

Project Document
December 1997

Rural Development and Environment Sector Unit
Ukraine Country Department
Europe and Central Asia Region

CURRENCY EQUIVALENTS

US\$ 1.00 = 0.____ Special Drawing Rights (SDR)
(____, 1997)

UNITS AND MEASURES

Ton = Metric Ton = 1000kg

ACRONYMS AND ABBREVIATIONS

NH3	Ammonia
CEO	Chief Executive Officer
CFC	Chlorofluorocarbons
CIS	Commonwealth of Independent States
CTC	Carbon tetrachloride
DCP	Donetsk Chemical Plant
ECA	Europe and Central Asia Region
EPA	Environmental Protection Agencies
EPS	Executive Project Summary
FA	Financial Agent
FSU	Former Soviet Union
GEF	Global Environment Facility
GET	Global Environment Trust Fund
GWP	Global Warming Potential
HAP	Hydrocarbon Aerosol Propellants
HC	Hydrocarbon
HCFC	Hydrochlorofluorocarbons
HFC	Hydrofluorocarbons
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Agency
IOC	Incremental Operating Costs
IPID	Initial Project Information Document
JSS	Joint Stock Society
LIB	Limited International Bidding
TCA	Methyl chloroform
MFMP	Multilateral Fund of the Montreal Protocol
MEPNS	Ministry of Environmental Protection and Nuclear Safety

MP	Montreal Protocol
MT	Million Tons
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substances
OECD	Organization for Economic Cooperation and Development
OORG	Ozone Operations Resource Group
PPA	Project Preparation Advance
Q/A	Quality Assurance
QCBS	Quality and Cost-Based Selection
SA	Special Account
SHCP	Simferopol Household Chemicals Plant
SOE	Statement of Expenditures
SPN	Supervision
TA	Technical Assistance
TOR	Terms of Reference
VAT	Value Added Tax
NGOs	Non-Governmental Organizations

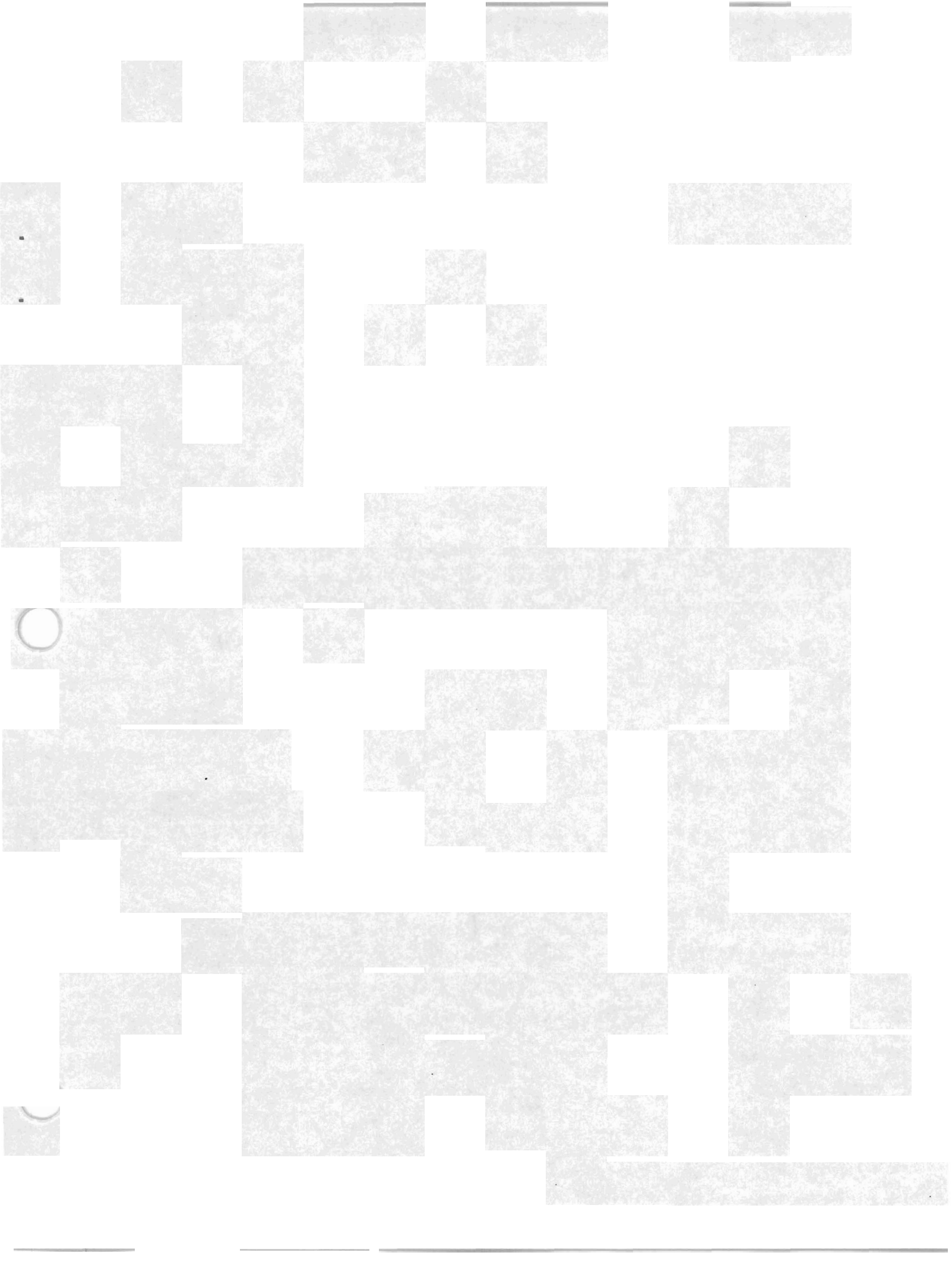


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UKRAINE
GLOBAL ENVIRONMENTAL FACILITY OZONE DEPLETING SUBSTANCES
PHASEOUT PROJECT

GRANT AND PROJECT SUMMARY

GRANTEE: Government of Ukraine

BENEFICIARY: Ministry of Environmental Protection and Nuclear Safety (MEPNS) and enterprises using Ozone Depleting Substances (ODS)

AMOUNT: US \$ 23.2 Million equivalent

TERMS: Grant

PROJECT OBJECTIVES: The project's main objective is to assist Ukraine with the rapid phaseout of ODS consumption in a manner consistent with international efforts and within internationally agreed timeframes. Assistance to high consumption enterprises in Ukraine would enable them to make the transition to non-ODS materials before supplies diminish. The project would also provide needed technical assistance and institutional strengthening to an Ozone Office operated by the Ministry of Environmental Protection and Nuclear Safety.

FINANCING PLAN:

US \$ million

GEF Grant	23.2
Equity/Commercial Loans	9.5
<u>Total</u>	<u>32.6</u>

ECONOMIC RATE OF RETURN:

N/A

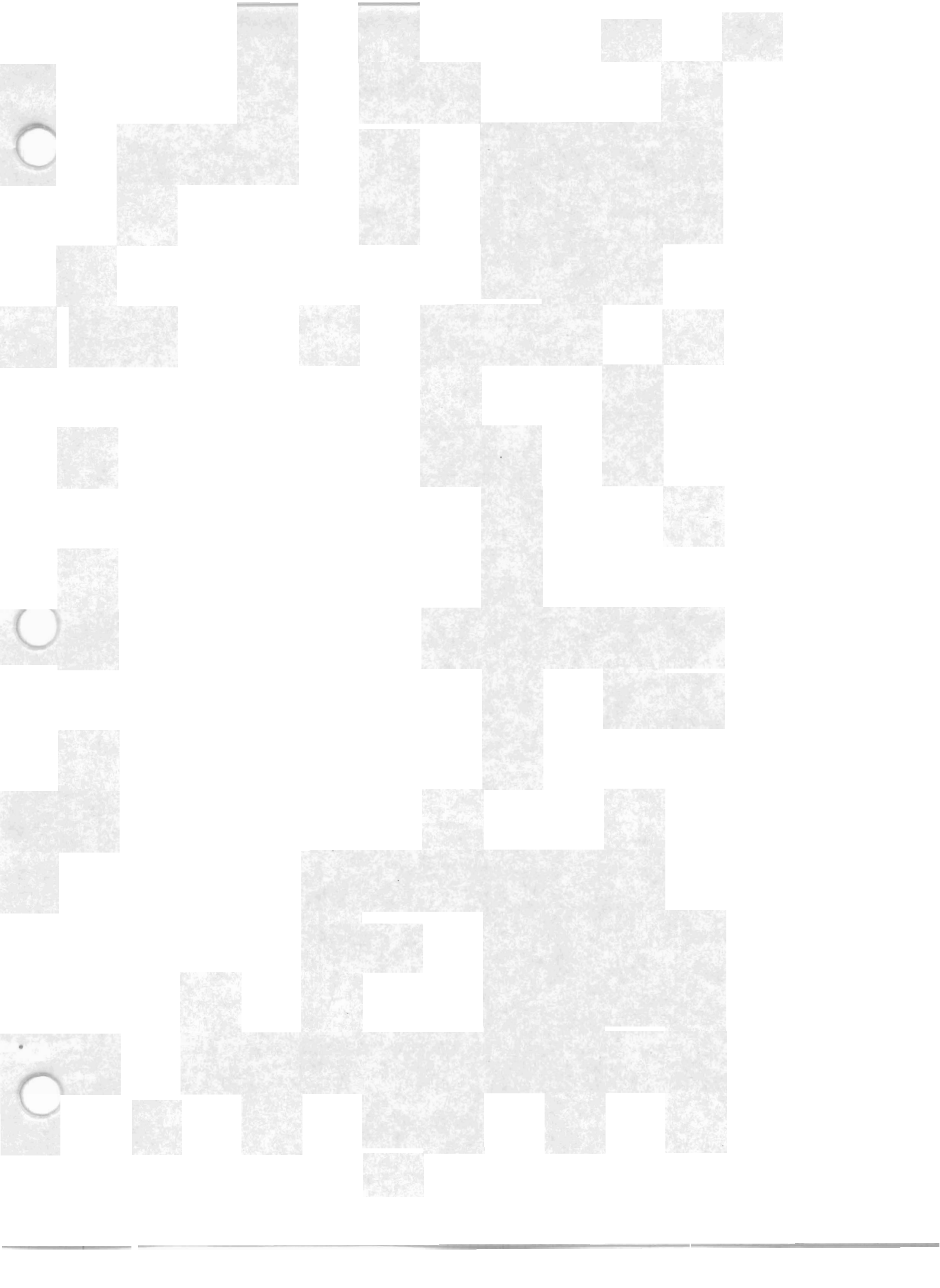
PEER REVIEW:

Ellen Tynan

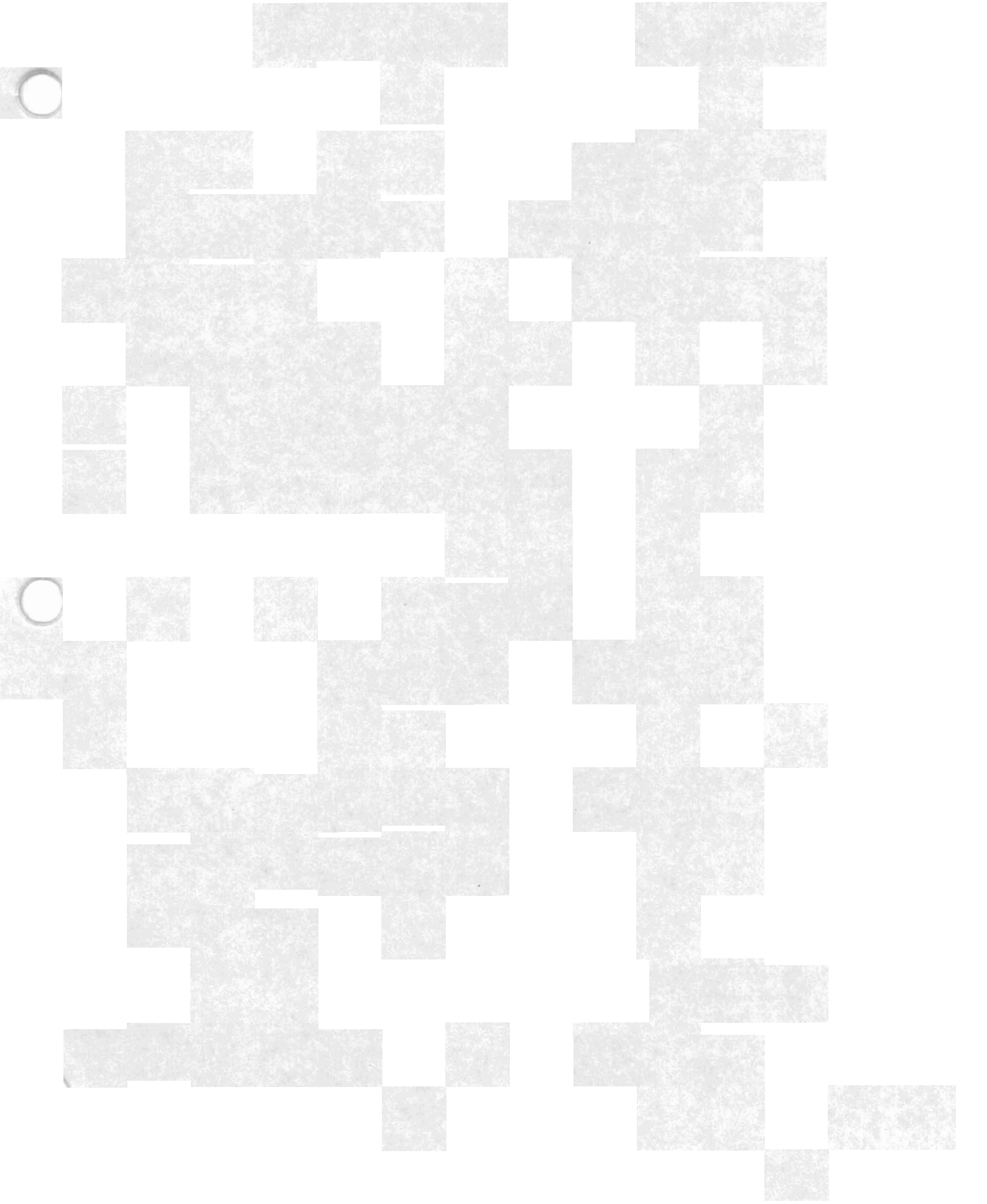
GEF OORG REVIEWERS:

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PART I: PROJECT SUMMARY



UKRAINE

GLOBAL ENVIRONMENT FACILITY OZONE DEPLETING SUBSTANCES PHASEOUT PROJECT

I. BACKGROUND

1. General recognition of upper atmosphere ozone depletion has led to a substantial international effort to phaseout Ozone Depleting Substances (ODS). The ozone layer forms a thin shield in the stratosphere protecting biological systems from the sun's harmful rays. Ozone layer thinning can cause impacts such as: increased skin cancer, eye cataracts, decreased plant productivity, and deterioration of the marine food chain. In the mid-1980's it was confirmed that chlorofluorocarbons (CFCs) and other chemicals used in refrigeration, foams, aerosol sprays, fire protection, and solvent cleaning were destroying the ozone layer. ODS include: CFCs, halons, several halogenated solvents, the agricultural fumigant methyl bromide, and a class of transitional chemicals known as hydrochlorofluorocarbons (HCFCs).

2. International efforts to phase out ODS consumption are based on the 1987 Montreal Protocol, which was ratified by all developed and most developing countries. Since the 1987 Montreal Protocol, it has been further recognized that ozone depletion is occurring more rapidly than first anticipated. This has led to two protocol amendments which added materials and accelerated phaseout schedules. The first in June 1990 (London Amendment) added methyl chloroform (TCA) and carbon tetrachloride (CTC), as well as tightening the phaseout schedule. The Copenhagen Amendment in November 1992 added HCFCs and methyl bromide as regulated substances, as well as further accelerating phaseout. Ukraine (as the Socialist Republic of Ukraine) ratified the Montreal Protocol in October 1988, as a part of the Former Soviet Union (FSU). Based on its ratification status as a developed country under the Montreal Protocol, Ukraine's obligations for ODS phaseout are in accordance with the developed country phaseout schedule. Ukraine is also expected to assume obligations to contribute to the Multilateral Fund of the Montreal Protocol (MFMP). Ukraine ratified the London Amendment in October 1996, but has not ratified the Copenhagen Amendment. Due to the current economic situation, Ukraine has not been able to meet the most accelerated phaseout dates under the Copenhagen Amendment. However, with the financial assistance of the Global Environment Facility (GEF), it would have the necessary resources to target phaseout under the London Amendment schedule (January 2000).

3. Ukraine is dependent upon on ODS supplies from producers in Russia, whose production is rapidly declining and who are currently scheduled to discontinue production by the year 2000, under the terms of Russia's Phaseout Program, as accepted by the Parties to the Montreal Protocol. GEF assistance to ODS-consuming enterprises in Ukraine would allow them to make the transition to non-ODS materials in a planned manner and avoid a crisis when supplies are cut off. Early reduction of ODS consumption will also reduce the demand for ODS materials from black market suppliers. Ukraine is a significant consumer of ODS in the aerosol, refrigeration, foam and solvent industries, where ODS are used in the production of consumer and industrial products. Consumption of ODS in 1994 was 3,310 tons which represents a decline from 7,061 tons in 1991, largely due to economic conditions. The most recent ODS consumption figures for the calendar year 1996 show further significant declines in consumption. Overall sector estimates indicate ODS consumption levels of 2,140 tons (1780 tons ODP).

ODS consumption identified on an enterprise specific basis was 1,480 tons (1220 tons ODP). The refrigeration sector accounts for approximately 67% of this consumption, followed by the aerosol sector (28%), and solvent sector (5%) industries.

4. Thirty-one enterprises, service organizations and agencies were identified as ODS consumers in these sectors in 1994, when Ukraine's ODS Phaseout Country Program was prepared. Seventeen enterprises and organizations, representing the major consumers and nineteen investment sub-projects were presented to the GEF Council in October 1996. The framework of Ukraine's ODS Phaseout Project was approved by the GEF Council subject to completion of project preparation, including financial viability assessments of beneficiary enterprises, and a re-assessment of technology choice in the refrigeration sub-projects (giving a preference for technology alternatives with zero global warming potential). Additional project preparation and enterprise financial viability evaluation have reduced the number of enterprises and organizations with sub-projects being proposed to eleven. This number also includes one sub-project to address phaseout of ODS in the halon sector.

II. ODS PHASEOUT STRATEGY

5. Ukraine's formal ODS Phaseout Country Program was completed in October 1995, using bilateral assistance from the Danish government. The ODS Phaseout Country Program, and the national phaseout strategy it recommends, have been formally adopted by the Government (Annex 3) and accepted by the Parties to the Montreal Protocol as evidence of the country's commitment. To achieve the goals of the ODS Phaseout Country Program, substantial investment in replacement facilities and technology is required for conversion from ODS use. A series of investments to achieve this goal were identified during the Country Program development and, subsequently, the most promising were prepared using a GEF Project Preparation Advance (PPA). Because of its limited financial capacity and the difficult economic situation, Ukraine has requested GEF assistance for a project to implement the proposed investments within the framework of its ODS Phaseout Country Program and National Strategy¹.

6. The ODS Phaseout Country Program adopted by the Government calls for the complete phaseout of ODS consumption by the end of 1997, based on receiving international financial assistance in 1995. Assuming such financial assistance will now be committed by early-1998, phaseout is now targeted for achievement within the London Amendment schedule (January 2000). On this basis, realistic phaseout dates by principal consuming sectors are as follows: refrigeration manufacturing—January 2000; aerosols - June 1999; and solvents -July 1999. Halon use in the fire protection sector will continue beyond 2000, but the project is supporting initiatives to have an effective halon inventory and management system in place by January 2000, to ensure that existing supplies are effectively used. Similarly, continuing ODS requirements will occur beyond 2000 in the refrigeration servicing sector. However, the project provides for two demonstration pilots to recover and recycle refrigerant, training of an initial 100 service technicians, and studies for the development of a national program and retrofit alternatives.

¹ As a developed country signatory to the Montreal Protocol, Ukraine is not eligible for assistance from the Montreal Protocol Multilateral Fund, but is eligible for Global Environment Facility (GEF) financial assistance through the Global Environmental Trust Fund (GET).

III. PROJECT OBJECTIVES

7. The project's main objective is to assist Ukraine with the rapid phaseout of ODS consumption in a manner consistent with international efforts and within internationally agreed timeframes. Assistance to high consumption enterprises in Ukraine would enable them to make the transition to non-ODS materials before supplies diminish. The project would also provide needed technical assistance for the phaseout of the halon sector and technology transfer associated with low GWP refrigerants for domestic refrigeration; and institutional strengthening to the Ozone Office, which will be subordinated to the Ministry of Environmental Protection and Nuclear Safety (MEPNS), which will act as the implementing unit for the proposed project.

IV. PROJECT DESCRIPTION

8. The project targets priority consumption phaseout activities in the refrigeration, aerosol, solvent and halon sectors. It also provides modest technical assistance at both the institutional and enterprise levels to facilitate implementation of the ODS Phaseout Country Program, and technology transfer for phaseout in the fire protection and domestic refrigeration sectors. It is structured as a framework project consisting of a series of nine enterprise-specific technology conversion and technology transfer investment sub-projects, and two technical assistance sub-projects. The technical assistance (TA) components would provide support at both the national level and to local enterprises to facilitate implementation of the ODS Country Program. A total of 1205 tons/year of ODS consumption would be phased out under the project, based on 1996 consumption.

9. The project has been designed consistent with relevant GEF policies, particularly those on cost effectiveness, discounting of exports to OECD countries, retroactive financing, operational costs, and financial viability as included in chapter five of the GEF Operational Strategy. The overall project, along with the division between the two proposed stages is summarized by sub-project and sub-component in Schedule A and a summary of each investment sub-project is provided in Annex 2. The development and experience with substitute refrigerant technologies has evolved rapidly during the project's preparation period making it difficult for the project proposals to remain current. The GEF also adopted a policy during the preparation period (October 1995) giving preference to recently available technologies with a zero global warming potential (GWP). Consequently, all the refrigeration sub-projects were re-evaluated in line with this policy to assess the potential to adopt a technology with zero global warming potential. One commercial refrigeration sub-project, Dnipro-MTO, proposes to use a hydrocarbon blend. The domestic refrigerator manufacturer NORD, has determined that the time constraints imposed by the country program and the amount of technical development required for hydrocarbon conversion, make a two stage conversion (with the initial step being completion of an HFC-134a conversion) the best option. A justification for NORD's proposed approach is presented in Annex 3. Three commercial refrigeration sub-projects propose to use HFC-134a technology on the basis that the available lower GWP refrigerant technologies are not sufficiently developed for large scale application in this sector in Ukraine.

Technology Conversion Investment Sub-Projects

10. The nine investment sub-projects proposed as currently prepared and described in Annex 2 are summarized below according to their respective sectors. The GEF Grant requested for sub-projects in each sector is presented in parentheses (excluding an overall 3% sub-grant processing fee).

- (a) **Aerosols:** (US\$ 6.8 million): The two sub-projects would complete phaseout of all Ukrainian consumer aerosol producers (Simferopol Household Chemicals Plant (SHCP) and Donetsk Chemical Plant (DCP) with conversions from CFCs to hydrocarbon aerosol propellants (HAP). Based on 1992 consumption levels, (with 1992 being the last year prior to both enterprises' decision to make substantive conversion investments) consumption was 3212 tons. Based on a three-year average prior to the current year, consumption phase-out attributable to these two enterprises accounted for 505 tons/year. In 1996 consumption was 495 tons. Three remaining aerosol producers are small consumers involved in scientific or medical applications.
- (b) **Domestic Refrigeration:** (US\$ 9.8 million): The NORD sub-project represents the largest beneficiary under the project, and the phaseout investment covers two parts: i) conversion from CFC-12 refrigerants to HFC-134a, phaseout the use of CFC-113 solvent, and servicing capacity; and ii) replacement of CFC-11 with cyclopentane as a blowing agent for cabinet insulation. In addition, technical assistance for technology transfer for future conversion to low GWP, hydrocarbon based refrigerant technology is proposed. Based on 1994 consumption which was the last year before substantive investment in phaseout began, 514 tons/year of ODS (507 tons ODP) phaseout is attributable to this sub-project. 1996 ODS consumption was 444 tons (188 tons ODP), reflecting an initial phaseout investment and interim use of transitional substitutes. Two other domestic refrigerator manufacturers (DMZ and Orion) exist in Ukraine but both are operating at very low production levels.
- (c) **Commercial Refrigeration:** (US\$ 3.0 million): Four sub-projects would support conversion from the CFC-12 refrigerant to a non-ODS refrigerant in three enterprises (REFMA, Kharkov HolodMash, Odessa HolodMash) which manufacture large commercial refrigeration appliances and compressors; and one enterprise (Dnipro-MTO), which produces specialty low temperature equipment. Kharkov Holod Mash would also phase out the use of CFC-113 as a solvent. Based on a three year average prior to the start of conversion, 241 tons/year of ODS (225 tons ODP) would be phased out, accounting for all consumption in the sector. 1996 ODS consumption is estimated at 209 tons (193 tons ODP). One other commercial refrigeration enterprise (Vaslikov HolodMash) and a mobile air conditioner manufacturer (Orion) also operate in Ukraine; but production has dropped to very low levels.
- (d) **Refrigeration Servicing:** (US\$ 1.3 million): This sub-project supports infrastructure investments and related training to recover and recycle refrigerants from commercial and industrial refrigeration equipment for two service centers

(Kiev and Dnipropetrovsk). The sub-project is designed as a pilot scale demonstration project. The Odessa State Academy of Refrigeration would provide vocational training for the technician training component. In addition, the sub-project would provide technical assistance in technology selection and capacity development for the retrofitting of equipment with substitute refrigerants. This pilot project is projected to phase out 77 MT of ODS per year. It is estimated that once operational, a national servicing system would phaseout 437 tons/year of new ODS consumption through recovery and recycling and that the country would become self-sufficient for supplies of recovered refrigerant materials.

- (e) **Solvents (US\$ 134,200):** One sub-project at an electronic products manufacturer (Electronmash) is proposed. The sub-project would eliminate the use of CFC-113 in parts cleaning applications and replace it with an aqueous cleaning technology. Based on the three year averages prior to the start of conversion, ODS consumption of 8.3 tons/year (6.6 tons ODP) would be eliminated by implementing the project. A number of other potential consumers exist in the sector, but they are either too small or are not eligible for a GEF grant based on financial viability of technology choice. This one sub-project is estimated to phaseout 15% of the sector's consumption.

Technical Assistance and Training

11. The technical assistance and training components of the project will be directed to the fire protection sector, future application of low GWP refrigerant technologies, and the strengthening of institutional capacity as follows:

- (a) **Halon (Fire Protection) Sector (US\$203,500):** This sub-component would provide resources for workshop training of current operators of halon fire protection systems, particularly high priority infrastructure installations such as pipelines and power plants, in technology conversion options. The sub-project would also provide assistance to develop a national halon inventory to help better manage existing supplies.
- (b) **Nord Hydrocarbon Conversion Study (US\$550,000):** This sub-component will be directed at providing foreign assistance to NORD in product development and design engineering required to convert their various product lines to hydrocarbon refrigerant in the medium term, inclusive of assistance with certification and manufacturing facility modification. This will be matched by an enterprise contribution to this work.
- (c) **Institutional Strengthening (US\$797,500):** This sub-component supports the operation of the Ozone Office as the project implementation unit, and provides resources for consultant advisory services. Resources are also provided to cover safety audits for the four sub-projects that will utilize flammable substances and for a procurement consultant to support the enterprises in the preparation of bidding documents, evaluation of tenders and contracting for major goods purchases. Computer equipment for the halon subproject would be purchased under this sub-project.

12. The project, which received GEF Council endorsement in October 1996, would be processed as a framework project. The Danish Government has provided resources to assist Ukraine in preparing the project to a level acceptable for GEF approval. This has been supplemented by a GEF PPA to fund enterprise viability assessments, additional preparation, re-assessment of technology choices, early establishment of the Ozone Office, and upstream procurement and project management training for the Ozone Office and beneficiary enterprises. In addition, resources from the Canadian GEF Trust fund have been used to provide project preparation and appraisal expertise. Preparation to date includes detailed technology and institutional strengthening proposals, associated cost analyses, enterprise procurement and implementation plans, and financial viability assessments of the beneficiary enterprises. All sub-projects have been reviewed and approved by the Ozone Operations Resource Group (OORG), comprised of internationally-recognized experts in ODS technology and established to provide technical advice on Montreal Protocol projects. All ODS-consuming enterprises in Ukraine identified through the ODS Phaseout Country Program and by MEPNS, were given the opportunity to prepare project proposals for consideration for funding under this project. The project includes all enterprise proposals that met the GEF and Montreal Protocol eligibility criteria and which can be judged to be financially viable.

13. The continued participation of enterprises has been subject to their cooperation and to the satisfactory conclusions of enterprise viability assessments, which considered: income statements, balance sheets, presence of markets, business plans, prospects for maintaining a positive cash flow, organizational structure, and technical capabilities. The ability of an enterprise to meet counterpart funding requirements must also be demonstrated to continue participation in the project. Viability assessments focused on a short-term horizon of five years. Prediction of enterprise viability in Ukraine's rapidly changing and transitional economic environment is difficult at best. Given the objective of the project to phaseout ODS consumption by internationally agreed dates, the decision to support an enterprise ultimately relied on the question of whether it is expected to be operating within the targeted phaseout period. Six enterprises were dropped from the project based on the initial review of enterprise viability, however the transitional business environment in Ukraine will require ongoing monitoring of the financial conditions of each enterprise. An enterprise financial monitoring system has been developed for the project, and field testing of the system was recently completed. Both Ozone Office staff and enterprises are familiar with the data they will be required to report on a quarterly basis. *Biannual reviews of financial performance will be conducted during project supervision missions. In addition, a local consultant would periodically monitor developments in the business climate that may affect the beneficiary enterprises, and assist the enterprises in meeting reporting requirements as necessary (para. 35g).*

V. PROJECT COSTS AND FINANCING

14. The estimated total cost of the project is US \$32.7 million, which includes goods and services, technical assistance, training, physical and price contingencies, and a 3% sub-grant processing charge for local implementation. The project would be financed by a US\$23.2 million GEF grant (71%) and US \$9.5 million in contributions from the beneficiary enterprises (29%). All costs were confirmed at appraisal, to ensure that they are incremental in nature, and calculated in accordance with the "Indicative List of Eligible Incremental Costs" adopted by the Parties to the Montreal Protocol. Also consistent with GEF guidelines, the grant amount limits eligible assistance for enterprises with export markets to Organization for Economic Cooperation and Development (OECD) countries. Proceeds of the GEF grant would not be used for transfer payments such as duties and taxes. No retroactive financing is proposed.

Cost-effectiveness ratios are at or below the thresholds recommended under the Montreal Protocol².

15. The ability of enterprises to provide their counterpart funds was evaluated as part of the viability assessment, and was reassessed as part of project appraisal based on updated cost estimates. Concern remains primarily with three enterprises: REFMA (commercial refrigeration); Simferopol Household Chemical Plant; (aerosol) and Donetsk Chemical Household Plant. Sales projections and market information for the two aerosol enterprises indicate that their financial position is likely to improve in the near-term (by the end of the fourth quarter of 1997). REFMA's sales and marketing information are not as positive, but it was decided that they should also be given additional time to both demonstrate an improved cash flow and to develop a counterpart fund financing plan. *The Bank's no-objection on sub-grant agreements for these three sub-projects will be conditioned on preparation of a counterpart fund financing plan and demonstrated improvements in the cash flow by the end of the fourth quarter of 1997 (para. 37b).* All enterprises will be monitored closely by the Bank during project supervision as part of the ongoing review of enterprise financial viability. The cost of project feasibility and preparation studies, preparation of the Country Program, financial viability assessments, re-assessment of refrigeration technologies in line with GEF Operational Strategy, and establishment of the Ozone Office, has totaled US \$660,000, representing a US \$340,000 GEF PPA, US \$250,000 in bilateral assistance from the Government of Denmark, and US \$70,000 from the Canadian GEF Trust Fund.

VI. PROJECT IMPLEMENTATION ARRANGEMENTS

16. The Government has assigned MEPNS as the executing agency for the project and overall implementation of the ODS Phaseout Country Program. Within MEPNS, project implementation responsibility has been assigned to the Ozone Office which was established in November 1996. Financial support toward the establishment of the Ozone Office has been provided by MEPNS and through a GEF PPA. An international consultant was hired using the PPA funds to help establish the Ozone Office and to provide training in procurement, disbursement, project accounting, and administration. The consultant worked with both the beneficiary enterprises and the Ozone Office staff to prepare procurement packages, update sub-project implementation plans, and initiate procurement activities. The Ozone Office would receive subsequent support under the project grant. *The Office is staffed by four full-time personnel recruited from and paid for by MEPNS (para. 35j).* The Office has environmental inspectorate authority. An additional staff member, specializing in project accounts, will formally join the Ozone Office before project financial transactions begin. As a permanent structure, the Ozone Office has overall responsibility for ODS matters including: (a) coordinating implementation and updating the Country Program; (b) providing documentation for communications with the Executive Committee of the Montreal Protocol; (c) collecting and reporting consumption, trade and recycling information to the Government and international bodies; and (d) preparing drafts of legislative and regulatory initiatives such as ODS import licensing, sector specific bans and sanctions for non-compliance with phaseout schedules.

17. *Project-specific responsibilities of the Ozone Office as a project implementation unit include: (a) appointment of, communication with, and supervision of an international bank to hold the project accounts; (b) set-up and management of a project accounting system; (c) appointment and supervision of a procurement consultant to provide procurement guidance to beneficiary enterprises and the Ozone Office in accordance with World Bank guidelines; (d) making arrangements for annual audits; (e)*

² Sector and Subsector Cost Effective thresholds approved by the Executive Committee of the Multilateral Fund of the Montreal Protocol.

coordination of environmental approvals required for sub-project implementation; (f) monitoring of beneficiary enterprise financial performance on a quarterly basis; (g) submission of progress reports (initially monthly and to become quarterly at the direction of the Bank); and (h) a completion report to the Bank (para. 35d). An implementation plan for the project was discussed at appraisal and will be agreed to at negotiations (para. 34b).

18. A bank, acceptable to the World Bank, will hold a Special Account (SA) for project funds on behalf of the Ozone Office. The Ozone Office will have the primary responsibility for managing the Special Account within the World Bank guidelines (para. 35c). These management responsibilities include: (a) administering project disbursements through the World Bank and the SA, including payments under approved contracts, and (b) monitoring all sub-project expenditures. The Ozone Office will be responsible for paying any fees related to the financial agent's services from the sub-grant processing charges.

19. Procurement Plans for each sub-project and the technical assistance components were finalized at appraisal, and a consolidated plan is presented in Schedule B. The Ozone Office would have a full time local procurement specialist to process procurement requests and assist the beneficiary enterprises. To help expedite procurement processing, a budget has been established under the project to provide ongoing procurement support to individual enterprises, particularly those with larger international competitive bidding (LIB, ICB, QCBS) packages. A budget would be set aside to contract a procurement consultant as required throughout project implementation. The World Bank resident mission would also provide back-up procurement advice on request and inform project staff of any World Bank procurement training courses in the region (paras. 34a and 35a).

20. The project would be covered under a Grant Agreement between the Bank as GEF Implementing Agency and the Government, represented by MEPNS which defines the overall framework by which GEF grant funds can be disbursed to enterprise specific sub-projects. Individual sub-projects would be covered by Sub-grant Agreements between the MEPNS and the participating enterprises (para. 35e). Both the Grant Agreement and Sub-grant Agreements would be patterned after those utilized for the Ozone Project's Trust Fund and previous GEF ODS Phaseout projects in the region. The draft Grant Agreement and guidelines for preparing Sub-Grant Agreements were introduced at appraisal.

VII. PROJECT SUSTAINABILITY

21. The project would help the Government of Ukraine to phaseout ODS substances by compensating enterprises for incremental costs incurred during the process of technology conversion. Technology conversion would allow beneficiary enterprises to be competitive both in the domestic and export markets. Sustainability has been evaluated from an enterprise viability perspective. Enterprises have been informed from the outset of project preparation that support for project proposals would be dependent on positive results. Sustainability of specific sub-projects has been assured through the evaluation of proposed technologies and their cost effectiveness in relation to other alternatives, during the project preparation work and its review by OORG.

22. The Government has shown its commitment to the project by accepting the ODS Phaseout Country Program, and by committing funds for the operation of the Ozone Office under MEPNS (para. 35j). The Ozone Office has also recently begun drafting legislation to control the import, export, and re-sale of ODS materials. Adoption of this regulatory program will be made a condition of

disbursement on the refrigeration servicing sub-project, based on the strong linkages of such a program to the success of this sub-project (paras. 35i, 37c). Assistance under the project for the Ozone Office would enable the Government to provide a sound institutional and policy framework including finalizing and implementing ODS legislation. Several beneficiary enterprises have already converted some of their production lines to use non-ODS materials to remain competitive internationally. International market pressures to convert to non-ODS technologies, coupled with diminishing supplies of ODS materials, provide a sustainable framework for the enterprise investments.

VIII. LESSONS FROM PREVIOUS BANK EXPERIENCE

23. Although the proposed project will be the eighth GEF funded ODS phaseout project to be initiated in the transitional economies of Central and Eastern Europe (ECA), direct Bank experience and associated lessons are still limited because most have recently been initiated. Experience and lessons learned will be re-assessed and exchanged periodically during implementation through contact with other project teams. Close coordination with the Russia GEF ODS Phaseout project and the Bank's Special Initiative on ODS Production Phaseout are particularly important in addressing ODS supply issues. One lesson recently learned from two ECA projects in a similar economic environment is the need to counter the risk of supporting non-viable enterprises with up-front screening; adequate monitoring during project supervision; and clear courses of action stated in the legal agreements. The development of the refrigeration servicing sub-project has considered experience from servicing sub-projects in other ECA countries (the Czech Republic and Belarus). The inclusion of directed procurement support to enterprises with large international purchasing requirements reflects experience in Russia and other countries in the region. As one of the Multilateral Fund Implementing Agencies, the Bank is now implementing ODS phaseout projects in twenty six countries, from which a number of lessons have been learned, including: (a) the importance of a national phaseout policy or ODS Phaseout Country Program as a basis for assuring commitment and ownership by the client country; (b) the value of strong enterprise/government linkages to achieve phaseout objectives; and (c) the need for institutional strengthening and training for local implementation units. Additional lessons have been learned from World Bank and GEF projects in Ukraine and other FSU countries, including the importance of: (a) identifying a consistent committed counterpart team with sufficient authority and implementation experience to move the project forward; (b) coordination among key interested parties at the federal, regional and enterprise levels; (c) and early detailed attention to procurement and other implementation issues.

24. The design, preparation and structure of the project incorporates these lessons in a number of ways. *The draft project Grant Agreement seeks government responsibility for recovery of equipment allocated to an enterprise if the investment is lost through enterprise insolvency during the project implementation timeframe (para. 35k).* Also, *funds may be withdrawn from an enterprise sub-project with agreement between the Bank and the government at any time during implementation. Withdrawn funds would be eligible for reallocation to an alternative Ukraine ODS phaseout activity with the approval of the World Bank and GEF Council as necessary (para. 35l).* Project preparation work has involved the development of a well defined ODS Phaseout Country Program, identification of a range of key phaseout sub-projects, and provision of technical and procurement assistance to beneficiary enterprises during the preparation period. Technical assistance has been provided under the project to strengthen institutional capacity within the government implementing agency and the enterprises. Project processing procedures would parallel those used for Multilateral Fund projects, including the utilization of the technical review capability established for these projects.

IX. RATIONALE FOR BANK AND GEF INVOLVEMENT

25. Funding to Ukraine for this project on stratospheric ozone protection has been allocated by the GEF on the basis that Ukraine:

- (a) is eligible for GEF assistance;
- (b) is classified as a developed country and is not eligible for funding from the MFMP;
- (c) has accepted the FSU ratification of the Vienna Convention and Montreal Protocol;
- (d) has completed and is undertaking implementation of a Country Program;
- (e) has ratified the London Amendment; and
- (f) has regularly informed the Parties to the Montreal Protocol of progress toward achieving the phaseout schedule proposed in the ODS Phaseout Country Program.

26. The proposed project is consistent with the GEF Guidelines for ODS phaseout, which were carefully developed to reflect Montreal Protocol policies and procedures, thus ensuring consistency of approach between GEF and Montreal Protocol projects. These guidelines endorse working with a range of enterprise specific sub-projects that offer substantive ODS phaseout gains, for which the beneficiary enterprise would not be able to obtain sufficient financing from commercial sources. Within these sub-projects, grant funding is limited to eligible incremental investment costs, with the enterprises responsible for financing the balance from their own resources or loans. GEF support for ODS phaseout activities in the FSU is based on the recognition of a need to mitigate any additional economic burden which efforts to achieve phaseout would impose on economies in transition.

27. The project is consistent with the Bank's assistance to the environmental sector and with its Country Assistance Strategy for Ukraine. The project provides for the strengthening of much needed institutional capacity for environmental management and supports the development of a market oriented economy by focusing financial assistance on enterprises requiring technological change to remain competitive under international environmental standards. Finally, it fulfills a key role for the Bank in mobilizing multilateral grant funds in support of a key global environmental priority.

X. MONITORING AND EVALUATION

28. The completion date for the grant is December 31, 2000. *The Ozone Office would have overall responsibility for monitoring project progress. It would prepare monthly progress reports summarizing project implementation, procurement, and disbursement, and would highlight issues and follow-up actions to ensure that the project remains on schedule (para. 35g).* The reporting requirement may be revised to a quarterly basis when significant progress has been made, at the discretion of the Bank. *Ozone Office responsibilities would also include monitoring and enforcement of safety regulations and procedures as agreed prior to sub-project implementation (para. 35g). The Ozone Office would be responsible for arranging for an annual financial audit (in accordance with the Financial Reporting and Auditing Handbook, January 1995) and preparation of a Project Completion Report within six months of the end of project implementation. The Ozone Office would also be responsible for collecting financial data*

from beneficiary enterprises on a quarterly basis, by submitting the required financial data with World Bank progress reports, and alerting the Bank to other factors that might relate to enterprise performance. Sub-grant Agreements would require enterprises to submit annually audited financial statements, and to agree to periodic monitoring of financial performance (para. 35f). In the case of loss of financial viability of a beneficiary enterprise, the World Bank may determine in agreement with the Government to discontinue implementation of the sub-project (para. 35i). Supervision by a Bank team would take place on a semi-annual basis following submission of the first progress report of the Ozone Office. Supervision missions would include the Bank task manager (or an authorized representative), and a financial or ODS technical specialist as needed. Proposed project performance monitoring indicators would be included in the progress reports, and are presented in Annex 1 (para. 35g).

29. *Monitoring ODS phaseout and consumption in Ukraine as required for reporting to the Parties of the Montreal Protocol would continue to be carried out by the Ozone Office. The MEPNS would continue to be responsible for data reporting to the Vienna Convention/Montreal Protocol Ozone Secretariat in line with requirements of the Convention and the Protocol. The status of ODS consumption would be reported to the Bank and GEF when required (para. 35g). During appraisal, enterprises were informed of the need to develop a disposition plan for retiring ODS dedicated equipment, which would be included in the sub-grant agreement for each sub-project to help ensure that project objectives are met (para. 35e). A list of equipment to be designated in each sub-grant agreement was agreed with each enterprise, at appraisal (para. 34c). At least two sub-grant agreements satisfactory to the Bank would be prepared prior to grant effectiveness (paras. 35e and 36a).*

XI. PARTICIPATORY APPROACH

30. As part of the Country Program development, MEPNS undertook consultations with a broad spectrum of enterprises and interested parties: other ministries, including industry, economics, finance, NGOs, industry associations and others. Enterprises were given the opportunity to participate in the project as long as they could provide the necessary data for project staff to evaluate their financial viability, technological capabilities and eligibility for financial assistance. Sector representatives (specialists in their fields) have acted as liaisons between the MEPNS and enterprises on an ongoing basis.

XII. PROJECT BENEFITS

31. The project would contribute to global efforts to reduce damage to health and to the environment from increasing exposure to ultraviolet radiation by eliminating the use of 1205 tons/year of ODS (based on 1996 consumption levels). Phaseout of the consumption of ODS must be implemented in a timely and globally comprehensive manner to achieve a reduction in the rate of thinning of the earth's atmosphere. Although it is difficult to measure the impact the project would have on the earth's ozone layer, as Ukraine is just one of many consumers of ODS, its incremental contribution to this global effort is essential to the protection of the earth's environment. The provision of a GEF grant allows Ukraine to substantially meet its phaseout of ODS under the Montreal Protocol within a two year period, which would not be achievable in the absence of this grant. In the longer term, it allows the country to minimize the economic disruption that would occur when imported ODS is no longer available for industrial, commercial and other consumer applications. The technology conversion provided for under the project would contribute to the modernization of key industries and allow them to maintain domestic and export markets. Ukraine's institutional capacity for monitoring and regulatory enforcement of ODS phaseout

would also be strengthened under the project.



XIII. PROJECT RISKS AND MITIGATION MEASURES

32. Risks of the project can be divided as follows: (a) implementation risks; (b) risks associated with the enterprise specific sub-projects; and (c) risks associated with the technical assistance sub-projects.

IDENTIFIED RISKS	MEASURES TO MINIMIZE RISK
PROJECT IMPLEMENTATION	
A. Overall project implementation arrangements and management of the MEPNS Ozone Office are critical to the success of the project.	Project implementation arrangements were reviewed in detail during appraisal. Key staff of the Ozone Office have already been hired or appointed by MEPNS and participated in appraisal activities. Project management and computer training for staff has been part of project preparation.
B. MEPNS' lack of familiarity with Bank procedures, and project management.	The Ozone Office staff and beneficiary enterprises have received training in Bank procurement procedures prior to appraisal. Ozone Office staff have also received training in disbursement, and project accounting. Ongoing support would be provided through the resident mission, regional training courses, and through a procurement consultant during project implementation.
ENTERPRISE SUB-PROJECTS	
A. Risk of supporting potentially non-viable enterprises.	A financial viability assessment has been completed for each beneficiary enterprise and would be used as a baseline for monitoring enterprise performance. <i>Where financial viability is a concern, enterprises would be monitored closely to obtain early warning of difficulties prior to disbursement of grant funds. This risk would be shared with the government by seeking government responsibility for recovery of equipment if an enterprise becomes insolvent during the implementation period (para. 35k).</i>
B. Risk of an enterprise not meeting its counterpart funding requirement.	Ability to meet counterpart funding requirements has been part of the enterprise viability analysis. The grant generally meets costs the enterprise would eventually incur to remain competitive and retain markets, and therefore provides a strong incentive for cooperation. <i>Disbursement on a sub-project will be conditional to demonstrating it's ability to meet counterpart funds (para. 35l).</i>
C. Potential for supporting a technically unsound project proposal.	The OORG review required by the GEF project cycle focuses specifically on technical issues to minimize this risk.
D. Delays associated with enterprise activities and procurement document preparation.	Enterprise specific technical assistance is provided to critical design activities. Direct procurement support will be provided to the enterprises in the preparation of documentation and contracting.
TECHNICAL ASSISTANCE SUB-PROJECTS	
A. Risk of the Government not meeting its counterpart commitments.	Agreement on government counterpart funding commitments was reached at appraisal. <i>Three enterprises have been requested to submit updated plans before a no-objection on their sub-grant agreement is issued (para. 37b).</i>
B. Fragmented decision-making on environmental and investment matters at the national and regional levels.	An inter-agency commission for the fulfillment of the Montreal Protocol, formally established in 1994, would be used as a mechanism for better coordination. The Government has formally adopted the ODS Country Program in October 1996.

XIV. ENVIRONMENTAL ASPECTS

33. The project would provide significant global environmental benefits through the reduction in ODS consumption. There are no major environmental concerns and the project has been assigned a "B" rating under World Bank O.D. 4.01. The limited environmental risks associated with the project pertain to the conversion to cyclopentane in the domestic refrigeration foam blowing sub-project, the use of hydrocarbon based refrigerants in one commercial refrigeration sub-project, hydrocarbon propellant use in the two aerosol sub-projects, and a potential increase in wastewater generation where aqueous cleaning technologies are used in the solvent sector sub-projects. The inclusion of wastewater treatment and recirculation capability where applicable in the solvent sub-projects mitigates this potential impact. All sub-projects would follow the industrial safety guidelines recommended by suppliers, and the safety equipment proposed for the handling of cyclopentane has been approved by the OORG review process. In addition, a safety audit at the design and commissioning stages will be required for all sub-projects utilizing flammable substances. *All sub-projects will require completion of an environmental review acceptable to the bank as a condition of sub-project disbursement (paras. 35h and 37a). The review would include health and safety plans for each sub-project with potential industrial safety concerns associated with flammable substances such as cyclopentane, HAP or isobutane (paras. 35d and 37a).* Preparation of environmental reviews consistent with the World Bank's O.D. 4.01 were discussed at appraisal. *The satisfactory completion of at least two environmental reviews will be a condition of project effectiveness (para. 36b). MEPNS would monitor and enforce regulations on industrial safety and the environment during project implementation. The Ozone Office would conduct routine inspections to address any environmental or safety concerns, consistent with their environmental inspectorate function (para. 35d).*

XV. AGREEMENTS REACHED PRIOR TO NEGOTIATIONS

34. Agreements reached prior to negotiation include:

- (a) Finalization of detailed procurement plans, as described in **Schedule B and para. 19.**
- (b) Finalization of detailed project implementation plan, as described in **Annex I and para. 17.**
- (c) Designation of ODS consuming equipment required for dismantling and destruction, as described in **para. 29.**

XVI. AGREEMENTS TO BE REACHED AT NEGOTIATIONS

35. Agreements to be reached at negotiations include:

- (a) All procurement activities under the project would follow the procedures outlined in **Schedule B and para. 19.**
- (b) Disbursement arrangements will follow the procedures described in **Schedule B.**
- (c) Establishment of a special account will follow the procedure described in **Schedule B and para. 18.**
- (d) The functions of the Ozone Office and its management of the project activities would be as described in **paras. 17 and 33.**
- (e) Subgrant agreements with beneficiary enterprises would be established, including an agreed disposition plan for retiring ODS dedicated equipment. Two draft subgrant agreements would be prepared to the satisfaction of the Bank prior to grant effectiveness (**paras. 20 and 29**).
- (f) All project accounts would be audited (and beneficiary enterprises would consent to disclose financial information under the terms of a subgrant agreement) as described in **para. 28.**
- (g) Reporting and evaluation of project activities would be as described in **paras. 13, 28 and 29.**
- (h) Environmental review for investment subprojects will be completed to the satisfaction of the MEPNS and the Bank prior to sub-project disbursement, as described in **para. 33.**
- (i) The Government's proposed ODS licensing program would be adopted prior to disbursement on the refrigeration servicing sub-project, as described in **para. 22.**
- (j) Confirm government commitments to the project including on-going financial

support of the Ozone Office and its government staff, as described in **paras. 16 and 22.**

- (k) In the case of enterprise insolvency, the government would be responsible for recovering new non-ODS equipment purchased under the project and ensuring it is used for purposes consistent with the project, as described in **paras. 24 and 32.**
- (l) The Government and the Bank may agree on the discontinuation of the implementation of any subproject due to loss of financial viability of the enterprise, and to the substitution with another subproject as accepted by the GEF as described in **paras. 28 and 24.**

XVII. CONDITIONS OF GRANT EFFECTIVENESS

36. Conditions to be established as conditions of grant effectiveness are:

- (a) Preparation of two draft sub-grant agreements satisfactory to the Bank, as described in **para. 29.**
- (b) Completion of two sub-project environmental reviews satisfactory to the Bank, as described in **para. 33.**

XVIII. CONDITIONS OF DISBURSEMENT

37. For sub-project disbursement, the following conditions would apply:

- (a) Finalization of sub-project environmental reviews and health and safety plans, as described in **para. 33.**
- (b) Finalization of sub-grant agreements, including an agreed disposition plan for retiring ODS dedicated equipment. The World Bank's no objection on three sub-grant agreements (Simferopol Chemical, Donetsk Chemical, and REFMA) will be conditioned on improved cashflow through the last quarter of 1997, and an agreed upon counterpart funding financing plan, as described in **paras. 15 and 32.**
- (c) Adoption of the Government's proposed ODS licensing program would be a condition of disbursement on the refrigeration servicing sub-project, as described in **para. 22.**

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UKRAINE ODS PHASEOUT PROJECT												
SCHEDULE A: SUMMARY OF SUB-PROJECT DATA AND COSTS												
SUB-PROJECT/ ENTERPRISE	SECTOR	SUB-PROJECT DESCRIPTION	ANNUAL ODS (MT/YR)	ANNUAL ODP FOR GRANT CALCS. (MT/YR)	GRANT COST EFFECTIVENESS (\$/KG/YR ODP)	PRIOR ENTERPRISE INVESTMENT (PRE-APPRAISAL)	INCREMENTAL INVESTMENT COSTS (POST- APPRAISAL)	CONTINGENCY (10% ON REMAINING EXPENSES)	TOTAL SUB- PROJECT INVESTMENT COST	SUB-PROJECT COST (POST- APPRAISAL)	ENTERPRISE INVESTMENT FINANCING REQUIREMENT	PROPOSED GEF SUB-GRANT
REFMA, Melitopol	Commercial Refrigeration	Conversion from CFC-12 to HFC-134a and HFC-404a	59 MT CFC- 12	59 MT	\$15.21	\$ 107,500	\$ 2,613,409	\$ 261,341	\$ 2,982,250	\$ 2,874,750	\$ 1,977,360	\$ 897,390
Odessa HolodMash, Odessa	Commercial Refrigeration	Conversion from CFC-12 to HFC-407a and Ammonia	74.2 MT CFC 12	74.2 MT	\$12.81	\$ -	\$ 1,207,598	\$ 120,760	\$ 1,328,358	\$ 1,328,358	\$ 377,668	\$ 950,692
Dnipro-MTO, Kiev	Commercial Refrigeration	Conversion from CFC- 11,12,13,14 mix to HC/HFC- 134a mix; CFC- 113 to aqueous	4.2 MT CFC- 11, CFC-12, CFC-13; 1.37 MT CFC 113; .1 MT CFC-502	5.33 MT	\$12.00	\$ 280,000	\$ 80,140	\$ 9,014	\$ 378,154	\$ 99,154	\$ 35,200	\$63,954
Kharkov HolodMash, Kharkov	Commercial Refrigeration	Conversion from CFC-12 to HFC-134a	71.4 MT CFC 12; 5 MT CFC-113	75.4 MT	\$15.07	\$ -	\$ 1,321,974	\$ 132,197	\$ 1,454,171	\$ 1,454,171	\$ 318,197	\$1,135,974
NORD, Donetsk	Domestic Refrigeration	Conversion from CFC-12 to HFC-134a and CFC-11 to cyclopentane	155 MT CFC- 12; 31 MT CFC-113; 327.5 MT CFC-11	507.3 MT	\$13.64	\$ 933,520	\$ 12,860,943	\$ 1,286,094	\$ 15,080,557	\$ 14,147,037	\$ 4,356,438	\$9,790,599
Simferopol Household Chemical Plant, Simferopol	Aerosol	Conversion from CFC-12 and CFC-11/12 mix to hydrocarbon aerosol propellants (HAPs)	1475 MT of CFC-12 or CFC-11/12 mixture	1475 MT	\$4.40	\$ 2,440,000	\$ 4,513,636	\$ 451,364	\$ 7,405,000	\$ 4,965,000	\$ 1,071,000	\$3,894,000
Donetsk Household Chemical Plant, Donetsk	Aerosol	Conversion from CFC-12 and CFC-11/12 mix to hydrocarbon aerosol propellants (HAPs)	1737 MT CFC-12 or CFC-11/12 mixture	1737 MT	\$4.40	\$ 1,162,000	\$ 3,205,891	\$ 320,589	\$ 4,688,480	\$ 3,526,480	\$ 655,280	\$2,671,220

12/2/97												
UKRAINE ODS PHASEOUT PROJECT												
SCHEDULE A: SUMMARY OF SUB-PROJECT DATA AND COSTS												
SUB-PROJECT/ ENTERPRISE	SECTOR	SUB-PROJECT DESCRIPTION	ANNUAL ODS (MT/YR)	ANNUAL ODP FOR GRANT CALCS. (MT/YR)	GRANT COST EFFECTIVENESS (\$/KG/YR ODP)	PRIOR ENTERPRISE INVESTMENT (PRE-APPRAISAL)	INCREMENTAL INVESTMENT COSTS (POST- APPRAISAL)	CONTINGENCY (10% ON REMAINING EXPENSES)	TOTAL SUB- PROJECT INVESTMENT COST	SUB-PROJECT COST (POST- APPRAISAL)	ENTERPRISE INVESTMENT FINANCING REQUIREMENT	PROPOSED GEF SUB-GRANT
Electromash	Solvent	Conversion from CFC-113 to aqueous cleaning system	8.3 MT CFC- 113	6.64 MT	\$19.73	\$ -	\$ 279,100	\$ 27,910	\$ 307,010	\$ 307,010	\$ 172,810	\$134,200
Refrigeration Servicing	Commercial Refrigeration	Recovery, recycling and reclaim servicing pilot	77 MT CFC- 12	77 MT	\$16.38	\$ -	\$ 1,146,770	\$ 114,677	\$ 1,261,447	\$ 1,261,447	\$	\$1,261,447
TECHNICAL ASSISTANCE												
NORD, Donetsk	Technical Assistance	Isobutane Technology Transfer		Longer- term GWP reduction			\$ 1,000,000	\$ 100,000	\$ 1,100,000	\$ 1,100,000	\$ 550,000	\$550,000
Halon	Technical Assistance	Halon mgmt plan and demonstration					\$ 185,000.00	\$ 18,500	\$ 203,500	\$ 203,500	\$	\$203,500
Institutional Strengthening	Technical Assistance	Ozone Office set up (plus Computer for Halon Proj) & Services					\$ 725,000	\$ 72,500	\$ 797,500	\$ 797,500	\$ (0)	\$797,500
Sub-Total							\$29,149,461	\$2,914,946	\$32,064,407	\$32,064,407	\$9,513,931	\$22,550,476
Admin. Fee (3%)									\$678,514	\$678,514		\$678,514
TOTAL									\$32,740,921	\$32,740,921		\$23,228,990

SCHEDULE B

REPUBLIC OF UKRAINE GLOBAL ENVIRONMENTAL FACILITY OZONE DEPLETING SUBSTANCES PHASEOUT PROJECT

PROCUREMENT AND DISBURSEMENT ARRANGEMENTS

Procurement

1. *Procurement of goods and services would be made in accordance with "Guidelines for Procurement under IBRD Loans and IDA Credits" (January 1995, as amended January and August 1996). Procurement of consultants would be made in accordance with "Guidelines Selection and Employment of Consultants by World Bank Borrowers" (January 1997) (para. 35a).* As part of project preparation, the enterprises and Ozone Office staff received procurement training to assist them in implementing the Bank's procurement procedures. The beneficiary enterprises, with the assistance of a procurement specialist in the Ozone Office would have overall responsibility for procurement. An international procurement specialist would be contracted on an as-needed basis to provide further assistance as needed. To meet the Montreal Protocol requirement of ODS phaseout, enterprises would have to purchase and install equipment financed under the project as soon as possible. Thus, the procurement procedures have been designed with special attention to ensure expediency during project implementation. Three procurement packages for aerosol and foam blowing equipment would be purchased through Limited International Bidding (LIB). Based on experience of other ODS phaseout projects, a limited number of potential suppliers have been identified, who will be invited to bid on the packages. A summary of procurement arrangements are provided in Tables B1 - B3.

**Ukraine: ODS Phaseout Project
Procurement Information**

Section 1: Procurement Review					
Element (Goods/Work ^s)	ICB (2)	LIB (3)	IS (30)	NS (7)	Other methods
1. Procurement method thresholds	>\$400,000 (aggregate: \$1,584,000)	>\$400,000 (aggregate: \$11,765,000)	>\$50,000 (aggregate \$7,129,000)	<\$50,000 (aggregate \$167,000)	tuition costs \$11,000 and \$USD680,000 overhead fee
2. Prior Review	All.	All	First two every year.	None.	Based on approved schedule
Element (Consultant Services)	QCBS(3)	Consultant Qualifications (15)	Other methods		
3. Procurement method thresholds	(aggregate: \$1,320,000)	(aggregate: \$605,000) < 100,000	to be determined		
4. Prior Review	yes	First and TOR for all	yes		
5. Ex-post Review	Explain briefly the ex-post review mechanism: The Bank will monitor procurement activities, contract management and project record keeping during periodic supervision missions. 20% of contracts will be ex-post reviewed.				
Section 2. Capacity of the Implementing Agency in Procurement and Technical Assistance requirements					
6. Brief statement: Primary responsibility for overseeing implementation of procurement procedures will rest with the staff of the Ozone Office with the assistance of a procurement consultant. The Ozone Office will act as an intermediary between the enterprises and the World Bank for processing all procurement documentation. Each beneficiary enterprise would be responsible for preparing their own bidding documents and would be eligible for direct procurement advice from a procurement consultant contract administered by the Ozone Office.					
7. Country Procurement Assessment Report or Country Procurement Strategy Paper Status: Draft: June 23, 1997			8 Are the bidding documents for the procurement actions of the first year ready by negotiations? Yes		
Section 3. Training, Information and Development on Procurement					
9. Estimated date of Project Launch Workshop: May, 1998	10. Estimated date of General Procurement Notice publication: 12/97	11. Indicate if contracts are subject to mandatory SPN in Development Business: Yes for ICB		12. Domestic Preference for Goods/Works: Yes/NA	13. Domestic Preference for Consultant Services: No
14. Retroactive financing No			15. Advanced Procurement Yes		
16. Explain briefly the Procurement Monitoring System and Information System: TORs for all consultant service contracts will be submitted for no-objections by the Bank. In addition, the Ozone Office will develop an overall project					

TABLE B-1 (cont.)

monitoring/reporting system with the support of a procurement consultant. Ozone Office staff have already received initial procurement and project management training during the project preparation period.

Section 4. Procurement Staffing

17 Indicate name of Procurement Staff as part of Project Team:

Snezana Mitrovic, Procurement Analyst

Division:

ECSRE

Ext.

x32182

18. Explain briefly the expected role of the Field Office in Procurement:

Resident mission (Karina Mostipan) will provide back-up on procurement issues to the Ozone Office and beneficiary enterprises as requested, and will alert the Ozone Office of any training opportunities in the region.

Consolidated Procurement Schedules - Ukraine ODS Phase-out Project

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Donetsk Chemical									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE	AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD	DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
HAP Storage and Handling Facilities Equipment	1	G	\$373,120		IS	98/01/01	98/03/01	98/05/01	99/01/01
55,000 L HAP Tank Cars (2)	1	G	\$154,000		IS	98/01/01	98/05/01	98/11/01	99/02/01
Aerosol Filling Lines - 60 Can/Min. (2)	1	G	\$1,936,000		LIB	97/01/01	98/03/01	99/01/01	99/10/01
Explosion Proof Lift Trucks (4)	1	G	\$162,800		IS	97/01/01	98/03/01	98/09/01	99/01/01
Fire Suppression System	1	G	\$82,300		IS	98/01/01	98/03/01	98/09/01	99/01/01
HAP/Environmental O/C Equipment	1	G	\$66,000		IS	98/01/01	98/03/01	98/09/01	99/01/01
Valve Assembly Unit/Pressure Tester	1	G	\$77,000		IS	98/01/01	98/03/01	98/09/01	99/01/01
Stamps/Dies for Can Cover Machines	1	G	\$22,000		IS	98/01/01	98/03/01	98/09/01	99/01/01
Civil Construction/Utilities/Equipment Installation	1	CW	\$399,300		NBF	N/A	N/A	N/A	99/11/01
Detail Design Engineering	1	CF	\$82,000		NBF	N/A	N/A	N/A	99/07/01
Environmental Documentation	1	CF	\$33,000		NBF	N/A	N/A	N/A	98/03/01
Local Training	1	TR	\$27,000		NBF	N/A	N/A	N/A	99/11/01
VAT and Import Tax (enterprise financed)	-	-	\$111,960		Enterprise	-	-	-	-
SUB-PROJECT TOTAL			\$ 3,526,480						
Dnipro MTO									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD	DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
Refrigerant Production Charging/Testing Equipment	1	G	\$48,004		NS	97/12/01	98/02/01	98/07/01	98/10/01
Power Supply & Safety Modifications	1	G	\$6,050		NS	98/01/01	98/04/01	98/07/01	98/10/01
Aqueous Cleaning System	1	G	\$11,000		NS	97/12/01	98/02/01	98/07/01	98/10/01
Design and Product Testing	1	CS	\$15,950		NBF	N/A	N/A	N/A	98/03/01
Production Equipment Installation	1	CW	\$15,400		Enterprise	N/A	N/A	N/A	98/10/01
Environmental Permitting	1	CS	\$2,750		Enterprise	N/A	N/A	N/A	98/02/01
\$ 99,154									

Consolidated Procurement Schedules - Ukraine ODS Phase-out Project

Electronmash									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE (Note 1)	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD (Note 2)	PROCUREMENT SCHEDULE			
						DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
Production Cleaning Equipment	1	G	\$118,800	GEF	IS	97/12/01	98/01/01	98/05/01	98/08/01
Waste Water Treatment Facilities	1	G	\$71,500	Enterprise	NBF	97/12/01	98/01/01	98/05/01	98/08/01
Pumps & Residue Furnace	1	G	\$15,400	GEF	NS	97/12/01	98/01/01	98/05/01	98/08/01
Equipment Installation	1	CW	\$71,390	Enterprise	NBF	N/A	N/A	N/A	98/11/01
Engineering Project Management	1	CF	\$11,000	Enterprise	NBF	N/A	N/A	N/A	98/04/01
Environmental Documentation	1	CF	\$2,200	Enterprise	NBF	N/A	N/A	N/A	98/03/01
Local Training	1	TR	\$770	Enterprise	NBF	N/A	N/A	N/A	99/02/01
Commissioning Costs	1	CF	\$1,650	Enterprise	NBF	N/A	N/A	N/A	98/03/01
VAT and Import Tax (enterprise financed)	-	-	\$14,300	Enterprise	NBF	-	-	-	-
			\$ 307,010						
Kharkiv Holodmash									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE (Note 1)	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD (Note 2)	PROCUREMENT SCHEDULE			
						DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
Special Production Equipment	1	G	\$396,000	GEF	IS	98/01/01	98/04/01	98/11/01	99/04/01
Refrigerant Production Charging/Testing Equipment.	1	G	\$359,924	GEF	IS	98/01/01	98/04/01	98/09/01	99/01/01
Product Re-Design	1	CS	\$330,000	GEF	QCBS	97/11/01	98/02/01	98/04/01	99/01/01
Design and Manufacture Jigs & Fixtures	1	G	\$268,675	Enterprise	NBF	N/A	N/A	N/A	99/01/01
Product Testing & Batch Production	1	CS	\$47,322	Enterprise	NBF	N/A	N/A	N/A	99/10/01
Service Equipment	1	G	\$50,050	GEF	IS	98/01/01	98/04/01	98/09/01	99/01/01
Environmental Permitting	1	CS	\$2,200	Enterprise	NBF	N/A	N/A	N/A	98/03/01
			\$ 1,454,171						

Consolidated Procurement Schedules - Ukraine ODS Phase-out Project

NORD									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE (Note 1)	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD (Note 2)	PROCUREMENT SCHEDULE			
						DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
Central Pentane Storage	1	G	\$115,500	Enterprise	NBF	98/01/01	98/04/01	98/09/01	99/01/01
Foam Blowing Production Systems	1	G	\$7,892,500	GEF	LIB	98/01/01	98/03/01	98/12/01	99/06/01
Production Charging Facilities	1	G	\$384,736	GEF	IS	97/12/01	98/02/01	98/07/01	99/01/01
Production Carousels (3)	1	G	\$396,000	GEF	IS	97/12/01	98/02/01	98/07/01	99/01/01
Production Test Facilities	1	G	\$389,950	GEF	IS	97/12/01	98/02/01	98/07/01	99/01/01
Compressor Test Facilities	1	G	\$352,413	GEF	IS	97/12/01	98/02/01	98/07/01	99/01/01
Compressor Noise Test Units (3)	1	G	\$165,000	Enterprise	NBF	97/12/01	98/02/01	98/07/01	99/01/01
Compressor Parts Alkaline/Aqueous Cleaning Unit for Metal Parts (3)	1	G	\$312,500	GEF	IS	98/01/01	98/04/01	98/09/01	98/12/01
Compressor Parts Alkaline/Aqueous Cleaning Unit with Ultrasonic Equipment for Electrical Parts (2)	1	G	\$62,500	GEF	IS	98/01/01	98/04/01	98/09/01	98/12/01
Refrigerator Servicing Equipment	1	G	\$512,204	Enterprise	NBF	98/03/01	98/07/01	98/12/01	98/04/01
Foam Production System Installation	1	CW	\$1,111,000	Enterprise	NBF	N/A	N/A	N/A	99/12/31
Refrigerant Production Equipment Installation	1	CW	\$117,700	Enterprise	NBF	N/A	N/A	N/A	99/04/01
Foam Engineering/Project Management	1	CS	\$324,500	Enterprise	NBF	N/A	N/A	N/A	99/05/01
Refrigerant Engineering Development/Trials	1	CS	\$345,290	Enterprise	NBF	N/A	N/A	N/A	99/01/01
Environmental Permitting	1	CS	\$33,000	Enterprise	NBF	N/A	N/A	N/A	98/03/01
Shut Down Costs During Installation	1	CS	\$1,100,000	Enterprise	NBF	N/A	N/A	N/A	N/A
Local Training	1	TR	\$33,000	Enterprise	NBF	N/A	N/A	N/A	99/12/31
VAT and Import Tax (enterprise financed)	-	-	\$499,244						
			\$14,147,037						
Odessa Holodmash									
DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE (Note 1)	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD (Note 2)	PROCUREMENT SCHEDULE			
						DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION
Refrigerant Production Charging/Testing Equipment	1	G	\$47,922	GEF	NS	98/01/01	98/03/01	98/09/01	99/02/01
Jigs & Fixtures for Prototype HFC & NH3	1	G	\$398,970	GEF	IS	97/12/01	98/02/01	98/07/01	99/03/01
Customized HFC Production & Test Equipment	1	G	\$358,050	GEF	IS	98/01/01	98/04/01	98/09/01	99/03/01
Customized NH3 Production & Test Equipment	1	G	\$145,750	GEF	IS	98/01/01	98/04/01	98/09/01	99/03/01
Product Design & Development	1	CS	\$254,466	Enterprise	NBF	N/A	N/A	N/A	99/02/01
Environmental Permitting	1	CS	\$2,200	Enterprise	NBF	N/A	N/A	N/A	98/03/01
Management	1	CS	\$121,000	Enterprise	NBF	N/A	N/A	N/A	N/A
			\$ 1,328,358						

Consolidated Procurement Schedules - Ukraine ODS Phase-out Project

e B-2

REFMA	DESCRIPTION OF GOODS, SERVICES, OR WORKS	NO. of PACKAGES	PACKAGE TYPE	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD	DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION	PROCUREMENT SCHEDULE	
											CONTRACT SIGNED	CONTRACT COMPLETION
	Programmable All Purpose Machining Centers (2)	1	G	\$924,000	GEF/Enterprise	ICB	98/01/01	98/04/01	98/10/01	99/03/01		
	Tooling for Machining Centers	1	G	\$220,000	Enterprise	NBF	98/01/01	98/04/01	98/10/01	99/03/01		
	Machine Tools/Modification of Dedicated Machine	1	CF	\$286,000	Enterprise	NBF	98/01/01	98/04/01	98/10/01	99/03/01		
	Tools											
	Refrigerant Production Charging/Testing Equipment	1	G	\$66,000	Enterprise	NBF	98/01/01	98/04/01	98/09/01	99/10/01		
	Product Re-Design	1	CF	\$402,050	Enterprise	NBF	N/A	N/A	N/A	98/12/01		
	Production Test Facilities	1	CF	\$462,000	Enterprise	NBF	N/A	N/A	N/A	99/03/01		
	Production Equipment Installation	1	CW	\$140,800	Enterprise	NBF	N/A	N/A	N/A	99/03/01		
	Prototype Trials/Testing	1	CF	\$262,460	Enterprise	NBF	N/A	N/A	N/A	99/03/01		
	Environmental Permitting	1	CF	\$2,200	Enterprise	NBF	N/A	N/A	N/A	99/09/01		
	Local Training	1	TR	\$11,000	Enterprise	NBF	N/A	N/A	N/A	98/03/01		
	VAT and Import Tax (enterprise financed)	-	-	\$98,240	Enterprise	NBF	-	-	-	99/09/01		
				\$ 2,874,750								
	Stieropol Chemical											
	DESCRIPTION OF GOODS, SERVICES, OR WORKS <th>NO. of PACKAGES</th> <th>PACKAGE TYPE</th> <th>ESTIMATED PACKAGE AMOUNT (US\$)</th> <th>FINANCING</th> <th>PROCUREMENT METHOD</th> <th>DOC. PREPARATION</th> <th>INVITATION TO BID</th> <th>CONTRACT SIGNED</th> <th>CONTRACT COMPLETION</th> <th colspan="2">PROCUREMENT SCHEDULE</th>	NO. of PACKAGES	PACKAGE TYPE	ESTIMATED PACKAGE AMOUNT (US\$)	FINANCING	PROCUREMENT METHOD	DOC. PREPARATION	INVITATION TO BID	CONTRACT SIGNED	CONTRACT COMPLETION	PROCUREMENT SCHEDULE	
	HAP Storage and Handling Facilities Equipment	1	G	\$264,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	Equipment											
	Safeguard HAP Purification System (1)	1	G	\$187,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	55,000 L HAP Tank Cars (4)	1	G	\$297,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	Aerosol Filling Lines - 60 Can/Min. (2)	1	G	\$1,936,000	GEF	LIB	97/12/01	98/02/01	98/11/01	99/06/01		
	Explosion Proof Lift Trucks (3)	1	G	\$121,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	Fire Suppression System	1	G	\$264,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	HAP/Environmental O/C Equipment	1	G	\$110,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	CO2 Filling Unit/ Line Modifications	1	G	\$55,000	GEF	IS	97/12/01	98/02/01	98/07/01	98/12/01		
	Can Making Equipment	1	G	\$660,000	GEF	ICB	97/12/01	98/02/01	98/11/01	99/06/01		
	Custom made Staps/Molds/Dies	1	CS	\$27,500	Enterprise	NBF	N/A	N/A	N/A	99/09/01		
	Civil Construction/Utilities/Equipment Installation	1	CW	\$702,900	Enterprise	NBF	N/A	N/A	N/A	99/09/01		
	Detail Design Engineering	1	CF	\$88,000	Enterprise	NBF	N/A	N/A	N/A	99/07/01		
	Environmental Documentation	1	CF	\$55,000	Enterprise	NBF	N/A	N/A	N/A	98/03/01		
	Local Training	1	TR	\$27,500	Enterprise	NBF	N/A	N/A	N/A	99/07/01		
	Commissioning Costs	1	CS	\$55,000	Enterprise	NBF	N/A	N/A	N/A	99/07/01		
	VAT and Import Tax (enterprise financed)	-	-	\$115,100	Enterprise	NBF	-	-	-	99/07/01		
	SUB-PROJECT TOTAL			\$ 4,965,000								

TABLE B-3

UKRAINE ODS PHASEOUT PROJECT

Summary of Procurement Arrangements (US\$ Million equivalent)

Project		Procurement Methods			Non-GEF Financed	Total Cost
		ICB	LIB	Other		
Works						
1.1	Rehabilitation and Maintenance	0 (0.0)	0 (0.0)	0 (0.0)	2.6 (0.0)	2.6 (0.0)
Goods						
2.1	Equipment and Machinery	1.5 (1.5)	11.8 (11.8)	7.3 (7.3)	1.4 (0.0)	20.5 (20.6)
Consultancies						
3.1	Technical Assistance	0 (0.0)	0 (0.0)	1.9 (1.9)	4.6 (0.0)	6.5 (1.9)
3.2	Training	0 (0.0)	0 (0.0)	0.01 (0.01)	0.1 (0.0)	0.11 (0.01)
Miscellaneous						
4.1	Project Implementation	0 (0.0)	0 (0.0)	0.7 (0.7)	0 (0.0)	0.7 (0.7)
4.2	VAT and Import Duties	0 (0.0)	0 (0.0)	0 (0.0)	0.8 (0.0)	0.8 (0.0)
Totals		1.5 (1.5)	11.8 (11.8)	9.9 (9.9)	8.7 (0.0)	32.7 (23.2)

Note: Figures in parenthesis are respective amounts financed by GEF

Others Includes: US\$7.1 million for International Shopping (includes cleaning systems, charging equipment, servicing equipment)

US\$167 thousand for National Shopping (includes fire suppression and cleaning equipment)

US\$1.9 million for consultant services (includes technology transfer and support services)

US\$688 thousand for technical training services and sub-grant processing fee

Enterprise financed Import duties and VAT are estimated at \$834,844

SCHEDULE B

Disbursement

2. The project would be disbursed in less than three years, and the funds would be channeled through a special account established in a Bank-approved financial institution, or paid directly to a supplier by the World Bank. Funds would be disbursed against (a) 100% cost of foreign expenditure, ex-factory cost of domestically manufactured goods, technical assistance including service associated with supply of goods, and consulting services; and (b) 75% of expenditures on goods procured locally. Disbursements to the Ozone Office for sub-grant processing would be limited to 3% of disbursements. Allocations of funds to disbursement categories and an estimated schedule are provided in Tables B4 and B5 (para. 35b). Operating costs would provide tuition payments for 100 refrigeration servicing technicians on equipment procured under the project.

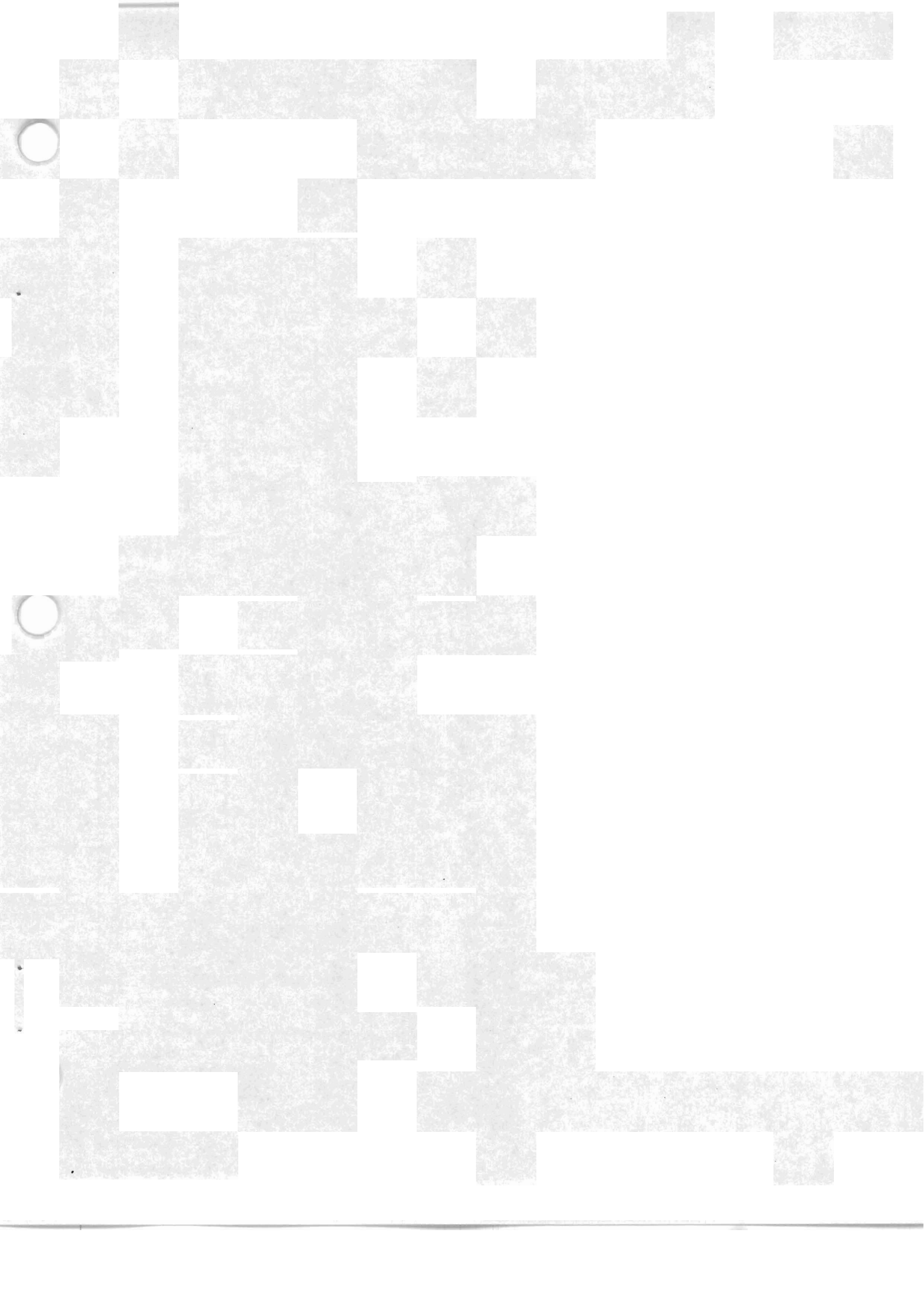
Category	Amount	Percent of Expenditure Eligible for Financing
Goods	20.6	100% of foreign expenditure 100% of local expenditure (ex-factory costs) 75% of goods procured locally
Consultant Services	1.9	100%
Operating Costs	0.01	100%
Sub-grant processing fee	0.7	100%
Total	23.2	

	FY 97	FY 98	FY 99	FY 00
Fiscal Year	0.5	5.0	10.7	7.0
Cumulative	0.5	5.5	16.2	23.2

3. Establishment of the SA would be under the terms and conditions satisfactory to the Bank. After effectiveness and upon the recipient's request, the Bank would make an initial deposit of US \$400 thousand which would be increased up to US \$690 thousand when disbursements reach US \$1.5 million (SDR equivalent __ million). Requests for replenishment of the SA would be made on a monthly basis, or when the balance of the SA is at one half of the deposit, whichever occurs first. In addition to the evidence of payments, each replenishment application would be supported by monthly statements of the SA and the account statements would be reconciled by the Ozone Office. Project expenditures would be monitored by the international Bank holding the special account, which would provide monthly statements to the Ozone Office. Payments would be made by the international bank following the submission of requests for payment by the Ozone Office on behalf of the beneficiary enterprises (para. 35c).

4. Except for contracts requiring prior review, disbursement would be made against certified statements of expenditure for which detailed documentation would be available for the required audits, and also for review by Bank supervision missions. The Bank would accept requests for direct payment to the supplier of goods or services for an amount not less than 20% of the SA Deposit (para. 35b). The statement of expenditures (SOE) threshold is set at: i) US \$400,000 for goods; and ii) US \$100,000 for

consulting firms. Prior review thresholds are set in procurement Table B-1



**REPUBLIC OF UKRAINE
GLOBAL ENVIRONMENTAL FACILITY OZONE DEPLETING SUBSTANCES PHASEOUT
PROJECT**

TIMETABLE OF KEY PROJECT PROCESSING EVENTS

1. Time to prepare: 32 months
2. Prepared by:

International Consultants: COWI-Consult (Danish EPA Funds); Arthur D. Little/Price Waterhouse (GEF PPA Funds)

Ukrainian Team: Vasyl Vasylenko, Vladimir Demkin, Alexander Shevchenko, Tatyana Dotsenko, Yuri Panasyuk, Tatyana Laguta.

Bank Team: Karin Shepardson, Kathleen Stephenson, Richard Cooke, Jennifer Allen, Barry Schaeffer, Alexei Slenzak, Thomas Waltz, David Gibson, Snezana Mitrovic, Art Jurrison, Paola Meta.
3. First Presentation to Bank (IPID): May 1996
4. Pre-Appraisal Mission Departure: May 1997
5. Final EPS to GEF Council: September 1996
6. GEF Council Approval: October 1996
7. Appraisal Mission Departure: October 1997
8. Negotiations: December 1997
9. Board Approval: February 1998
10. Planned Date of Effectiveness: April 1998
11. Expected Date of Completion: December 2000
12. Project Identification Number: UA-GE-447-28

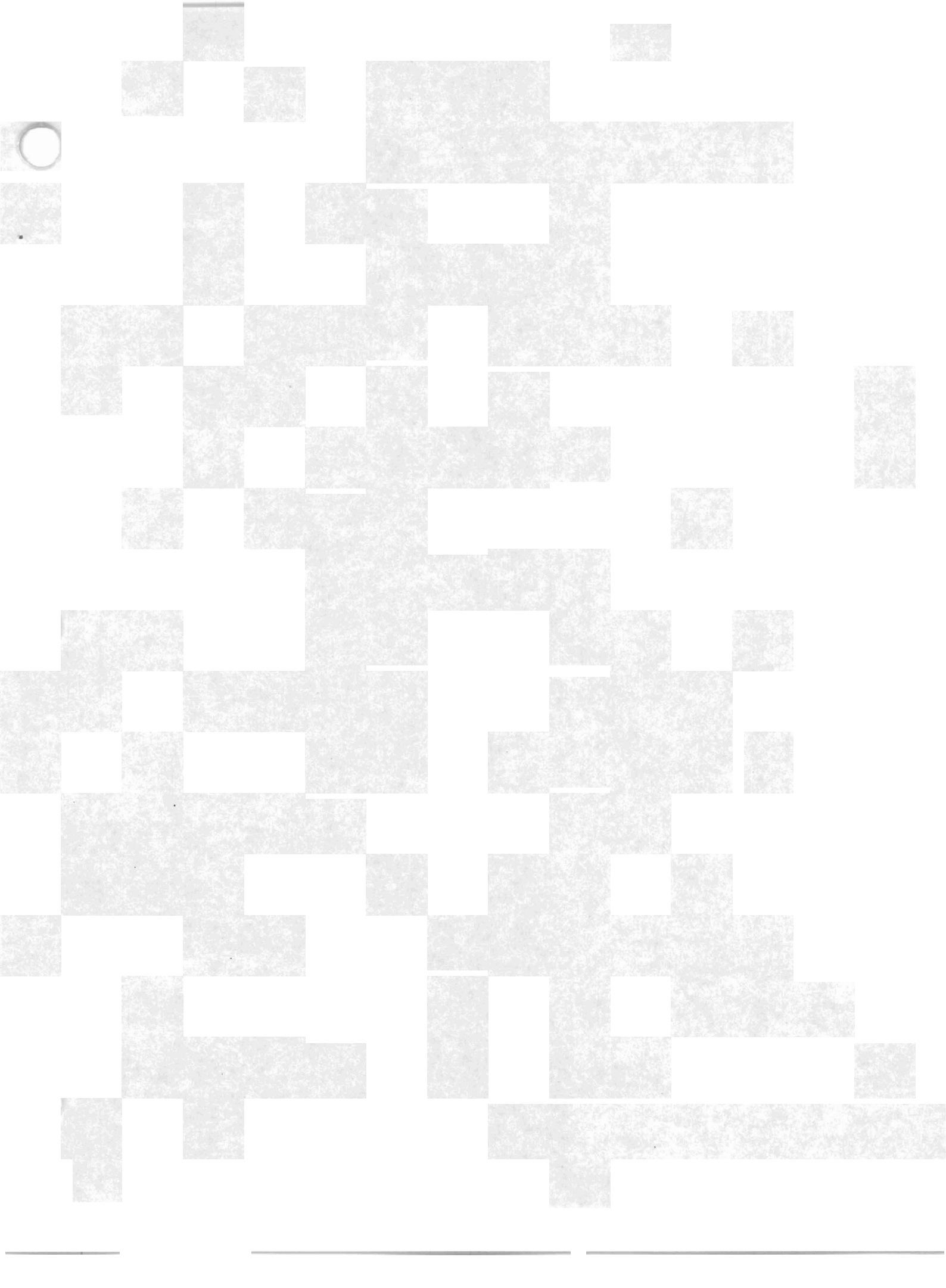


Republic of Ukraine
Statement of Loans as of October 31, 1997

Schedule D (MOP)
(in Millions of US Dollars)

Amount in US\$ million (less cancellations)

Fiscal Year	Borrower	Purpose	Bank	IDA	Undisbursed	Closing Date
Loan No.						
4 Loans(s) closed			720		220	
36140	1993 Ukraine	INSTITUTION BUILDING	27		12.37	12/31/97
38650	1995 Ukraine	HYDROPOWER REHAB.	114		103.71	12/31/00
38910	1995 Ukraine	AGRIC. SEED DEVELOPM	32		31.39	9/30/00
40570	1996 Ukraine	ENTER. DEV. ADJUST.	310		9.56	12/31/99
40160	1996 Ukraine	COAL PILOT	15.81		11.32	12/31/99
40980	1997 Ukraine	ELECTRICITY MARKET	245.4		180.28	12/31/99
40981	1997 Ukraine	ELECTRICITY MARKET	71.6		71.53	12/31/99
41030	1997 Ukraine	AGRICULTURE SECAL	300		150	12/31/97
41070	1997 Ukraine	EXPORT DEVELOPMENT	60		60	6/30/02
40970	1997 Ukraine	SOCIAL PROTECT. SUPP	2.6		2.6	6/30/99
41071	1997 Ukraine	EXPORT DEVELOPMENT	10		8.62	6/30/02
41180	1997 Ukraine	COAL SECAL	300		150	12/31/97
Total Number of Loans = 12			1,488.41		791.39	
Total***			2,208.41	0		
of which repaid			0	0		
Total held by Bank & IDA			2,208.41	0		
Amount sold			0			
of which repaid			0			
Total Undisbursed					1,011.39	

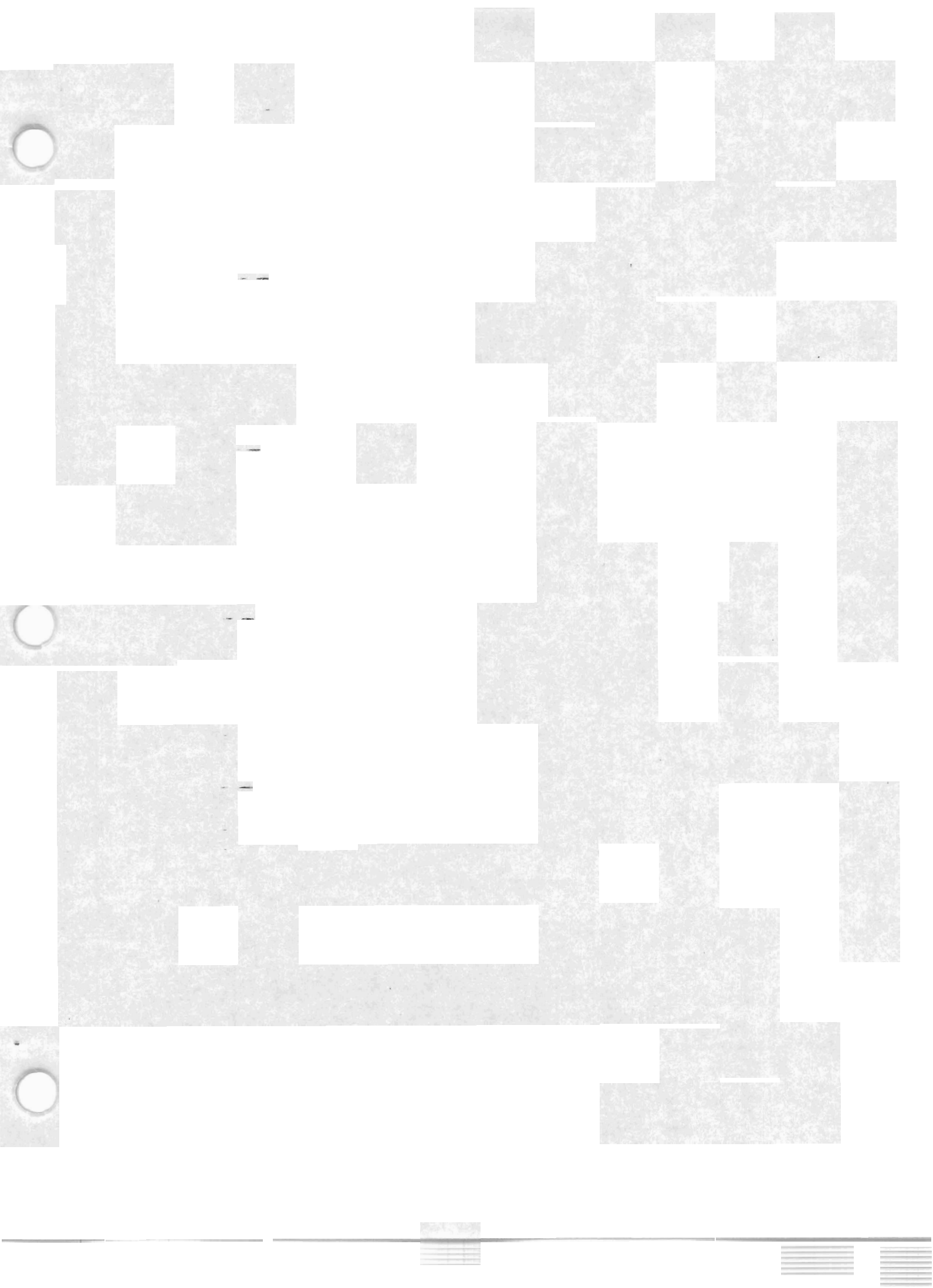


PART II: TECHNICAL ANNEXES



ANNEX I

PROJECT IMPLEMENTATION PLAN



Project Implementation Plan

The Project

1. The project's main objective is to assist Ukraine with the rapid phaseout of ODS consumption in a manner consistent with international efforts and within internationally agreed timeframes. The project targets priority consumption phaseout activities in the refrigeration, aerosol, and solvent sectors. It also provides technical assistance at both the institutional and enterprise levels to facilitate implementation of the ODS Phaseout Country Program, and technology transfer for phaseout in the fire protection sector, and for future applications of low GWP refrigerant technologies. It is structured as a framework project consisting of a series of 9 enterprise-specific technology conversion investment sub-projects and three technical assistance sub-components. The technology conversion component consists of five sub-projects in the refrigeration manufacturing sector, two subprojects in the aerosol sector, one sub-project in the industrial/commercial refrigeration servicing sector, and one sub-project in the solvent sector. The technical assistance component consists of three sub-components which address the transfer of technology and training for conversion in the fire protection sector, technology transfer for isobutane applications in domestic refrigeration, and institutional strengthening.

Implementation Arrangements

2. The Government has assigned the Ministry of Environmental Protection and Nuclear Safety (MEPNS) as the executing agency for the project and overall implementation of the ODS Phaseout Country Program. Within MEPNS, project implementation responsibility has been assigned to the Ozone Office. Financial support towards its establishment has been given through a GEF PPA, and the Ozone Office would receive subsequent support through the project grant. The Ozone Office is staffed by four full-time personnel recruited from and paid for by MEPNS and has environmental inspectorate authority. An additional staff member, specializing in project accounts, will formally join the Ozone Office before project financial transactions begin. This person is an already identified staff member of MEPNS, and would be able to participate in project appraisal. As a permanent structure, the Ozone Office has overall responsibility for ODS matters including: (a) coordinating implementation and updating the Country Program; (b) providing documentation for communications with the Executive Committee of the Montreal Protocol; (d) collecting and reporting consumption, trade and recycling information to the Government and international bodies; and (e) preparing drafts of legislative and regulatory initiatives such as ODS import licensing, sector specific bans and sanctions for non-compliance with phaseout schedules.

3. Project-specific responsibilities of the Ozone Office as a project implementation unit include: (a) appointment of, communication with, and supervision of an international bank to hold the project accounts; (b) set-up and management of a project accounting system; (c) appointment and supervision of a procurement consultant to provide procurement guidance to beneficiary enterprises and the Ozone Office in accordance with World Bank guidelines; (d) making arrangements for annual audits; (e) coordination of environmental approvals required for sub-project implementation; (f) monitoring of beneficiary enterprise financial performance on a quarterly basis; (g) submission of progress reports (initially monthly and to become quarterly at the direction of the Bank); and h) a completion report to the Bank.

4. An international consultant was hired using the PPA funds to help establish the Ozone Office

and to provide training in procurement, disbursement, project accounting, and administration. The consultant worked with both the beneficiary enterprises and Ozone Office staff to update sub-project implementation plans, and initiate procurement activities. A procurement plan is presented in Schedule B and this was finalized and agreed to at appraisal.

5. A foreign bank, acceptable to the World Bank, would be appointed to: (a) hold and manage a Special Account (SA) for project funds on behalf of the Ozone Office; (b) administer project disbursements through the World Bank and the SA, including payments under approved contracts, and funding allocation to technical assistance components; and (c) monitor all sub-project expenditures. The Ozone Office will be responsible for paying any fees related to the financial agent's services from the sub-grant processing charges.

6. The Ozone Office would have a full-time local procurement specialist to process procurement requests and assist the beneficiary enterprises. To help expedite procurement processing, a budget has been established under the project to provide ongoing procurement support to individual enterprises, particularly those with larger limited international competitive bidding (LIB) packages. A budget would be set aside to contract a procurement consultant, as required throughout project implementation. The World Bank resident mission would also provide back-up procurement advice on request and inform project staff of any World Bank procurement training courses in the region.

7. The project would be covered under a Grant Agreement between the Bank as GEF Implementing Agency and the Government, represented by MEPNS which defines the overall framework by which GEF grant funds can be disbursed to enterprise-specific sub-projects. Individual sub-projects would be covered by Sub-grant Agreements between the MEPNS and the participating enterprises. Both the Grant Agreement and Sub-grant Agreements would be patterned after those utilized for the Ozone Project's Trust Fund and previous GEF ODS Phaseout projects in the region. The draft grant agreement and guidelines for preparing sub-grant agreements were introduced at appraisal.

8. The project grant agreement establishes government responsibility for recovery of equipment allocated to an enterprise if the investment is lost through enterprise insolvency during the project implementation timeframe. Also, funds may be withdrawn from an enterprise sub-project at the Bank's discretion at any time during implementation. Withdrawn funds would be eligible for reallocation to an alternative eligible Ukraine ODS phaseout activity with approval of the World Bank and GEF Council, as necessary. Project processing procedures would parallel those used for Multilateral Fund projects, including the utilization of the technical review capability established for these projects.

9. As part of the development of the Country Program for ODS Phaseout, MEPNS undertook consultations with a broad spectrum of enterprises and interested parties: other ministries, including industry, economics, finance, NGOs, industry associations and others. Enterprises were given the opportunity to participate in the project as long as they could provide the necessary data for project staff to evaluate their financial viability, technological capabilities and eligibility for financial assistance.

Procurement

10. Procurement of goods and services would be made in accordance with "Guidelines for Procurement under IBRD Loans and IDA Credits" (January 1995, as amended January and August, 1996). The beneficiary enterprises, with the assistance of a full time local procurement specialist in the Ozone Office, would have overall responsibility for coordination of procurement documentation with the Bank. A procurement consultant will be contracted by the Ozone office to provide direct assistance

to the individual enterprises in preparing procurement documentation, evaluating tenders, negotiation of contracts and their administration.. To meet the Montreal Protocol requirement of ODS phaseout, enterprises would have to purchase and install equipment financed under the project as soon as possible. Thus, the procurement procedures have been designed with special attention to ensure expediency during project implementation.

Disbursement

11. The project would be disbursed in less than three years, and the funds would be channelled through a special account established in a Bank-approved financial institution, or paid directly to a supplier by the World Bank. **Funds would be disbursed against:** (a) 100% cost of foreign expenditure, ex-factory cost of domestically manufactured goods, technical assistance including service associated with the supply of goods, and consulting services; and (b) 75% of expenditures on goods procured locally. Disbursements to the Ozone Office for sub-grant processing would be limited to 3% of eligible disbursements for each invoice. A more detailed description of disbursement procedures to be followed is described in Schedule B of the project document.

Monitoring and evaluation

12. The completion date for the grant is December 31, 2000. The Ozone Office would have overall responsibility for monitoring project progress. It would prepare monthly progress reports summarizing project implementation, procurement, and disbursement, and would highlight issues and follow up actions to ensure that the project remains on schedule. The reporting requirement may be revised to a quarterly basis as significant progress has been made, at the discretion of the Bank. Ozone Office responsibilities would also include monitoring and enforcement of safety regulations and procedures as agreed prior to sub-project implementation. Table A1.4 provides performance indicators for the project.

13. The Ozone Office would be responsible for arranging for an annual financial audit (in accordance with the Financial Reporting and Auditing Handbook, January 1995) and preparation of a Project Completion Report within six months prior to the end of project implementation. The Ozone Office would also be responsible for monitoring the financial performance of beneficiary enterprises on a quarterly basis, including updates of balance sheets and income statements, input data requested for the financial monitoring system already developed and tested, and other factors relating to enterprise performance in World Bank progress reports. Sub-grant agreements would require enterprises to submit annually audited financial statements, and agree to periodic monitoring of financial performance. The World Bank would maintain the right to stop disbursements or drop any enterprise sub-project during project implementation if viability becomes uncertain. Supervision by a Bank team would take place on a semi-annual basis following submission of the first progress report of the Ozone Office. Supervision missions would include the Bank task manager (or an authorized representative), and a financial or ODS technical specialist as needed. Proposed project performance monitoring indicators for the project would be included in the progress reports, and are presented in Table A1.4.

14. Monitoring ODS phaseout and consumption in Ukraine as required for reporting to the Parties of the Montreal Protocol would also be carried out by the Ozone Office in cooperation with the International Affairs Office of MEPNS. The status of ODS consumption would be reported to the Bank and GEF when required. A disposition plan for retiring ODS dedicated equipment will be included in each sub-project subgrant agreement to help ensure that project objectives are met.

Table A1.4
Ukraine ODS Phaseout Project
Environmental Performance Indicator

Objectives	Input (Resources Provided for the Project Activities)	Output (Goods & Services produced by project)	Outcome (Direct Outcome)	Risks (The outcome is dependent on)	Development Impact
To reduce the consumption of Ozone Depleting Substances.	<p>GEF Grant (\$US 23.2 million)</p> <p>Beneficiary enterprises (\$US 9.5 million)</p> <p>Government staff (MEPNS) and office accommodations.</p>	<p>Training/policy support for implementation of the ODS Phaseout Country Program.</p> <p>Retrofitting/substitution of technologies that consume ODS.</p> <p>Training refrigerant servicing technicians in recycling and materials handling. (Number of people trained)</p> <p>Accurate estimation of national halon inventory and halon recovery potential</p>	<p>Reduced ODS consumption in various sectors (based on 1996 consumption).</p> <p>(a) Refrigeration: 702 tons/yr ODS</p> <p>(b) Solvent: 8 tons/yr</p> <p>(c) Aerosols: 495 tons/yr</p> <p>Train 100 refrigeration servicing technicians</p>	<p>Adequate long-term support for new technologies.</p> <p>Low increase in incremental operating costs.</p>	<p>Reduce the rate of thinning of the atmosphere's ozone layer.</p> <p>Reduce health impacts from exposure to ultraviolet radiation.</p>
To reduce the economic impact to enterprises dependent on ozone depleting substances, when an international phaseout of ODS production occurs.		<p>Training for fire protection sector in use of non-ODS technologies.</p>	<p>Conversion of industry to the use of non-ODS materials.</p>	<p>Investing in enterprises operating in a transitional economy with a higher risk of insolvency.</p>	<p>Increase international competitiveness of beneficiary enterprises.</p>
To assist the Government of Ukraine in meeting its international obligations.		<p>Technology transfer of low global warming potential refrigerant applications.</p>	<p>Fulfill International obligations to phaseout consumption of ODS materials.</p>	<p>Continued support of international agreements by the Government of Ukraine.</p>	<p>Increased cooperation on achieving international environmental objectives.</p>

ANNEX II

SUB-PROJECT DESCRIPTIONS

11

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SUB-PROJECT SUMMARY

COUNTRY: Ukraine

SUB-PROJECT TITLE: Commercial/Industrial Refrigerating Appliances - Conversion from CFC-12 into HFC-134a and HFC-404a

SECTOR: Commercial Refrigeration

ODS USE IN SECTOR: 243 MT CFC-12, 24 MT CFC-502 and 67 MT CFC-113 (1996)

PROJECT IMPACT: Phaseout of ODP of 59 MT CFC-12 Per Year (average of 1994-96)

PROJECT DURATION: 2 Years

PROJECT ECONOMIC LIFE: 10 Years

SUB-PROJECT COST:

Prior Enterprise Investment	US \$ 107,500
Incremental Investment Costs	US \$2,613,409
Contingency (10%) on remaining investment expenditures	US \$ 261,341
Total Project Cost	US \$2,982,250

FINANCING:

Global Environment Facility	US \$ 897,390
REFMA contribution	US \$1,977,360
REFMA 1st yr IOC	US \$ 635,500

GRANT EFFECTIVENESS: US \$15.21/kg ODP

IMPLEMENTING ENTERPRISE: REFMA, in Melitopol

GEF IMPLEMENTING AGENCY: The World Bank

COORDINATING NATIONAL BODY: The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine

STAP/OORG REVIEW: Dr. Lambert Kuijpers

Enterprise Background

REFMA was formerly a 100% Ukrainian state owned company. It has been privatized (privatization completed early in 1997), with approximately 75% of the company's shares held by outside investors. REFMA is located in Melitopol in the south east of Ukraine.

REFMA was founded in 1936. The production of refrigerating appliances started in 1950 and in 1958 a large range of refrigerating appliances were manufactured at REFMA. REFMA currently employs 2,180 persons. REFMA is the main manufacturer in the former Soviet Union of commercial and industrial refrigerating appliances. REFMA manufactures 120 different models of these, such as milk coolers, air conditioners, refrigerating appliances for the food and agricultural industry, water chillers with either air- or water cooled condenser, industrial condensers, low temperature refrigeration systems, air conditioning for trains, heat pumps as well as marine refrigerating appliances. In addition semihermetic and open type compressors are manufactured at REFMA. (not sure this is true any more. They talked about having to re-hire staff to do engineering)

Project Description

This project will accomplish the phase-out of the use of CFC-12 in the production of commercial/industrial refrigerating appliances at REFMA. The project will be carried out in two phases as described below.

Phase I

Phase 1 of the project comprises the following main components:

- Design study for adaptation of the open type and the semihermetic compressor to run with HFC-134a or HFC-404A and ester based lubricant.
- Secure availability of electromotor and sealing materials.
- Establish calorimeter test stand.
- Production test stands for checking of leakage, capacity, power consumption and electrical parameters.
- Machine tools for high tolerance compressor case and component production to operate with HFC-134a and HFC-404a.
- Production line charging and testing equipment;
- Modification of production area to house new equipment.
- Manufacture and testing of prototypes.
- Batch production of compressors and complete appliances .

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$ 2,982,250. A GEF grant of US\$ 897,390 has been allocated to this sub-project, with the remaining US\$ 1,977,360 investment contribution and US \$635,500 in estimated annual incremental operating costs (IOC) to be financed by the enterprise.

SUB-PROJECT SUMMARY

COUNTRY:	Ukraine
SUB-PROJECT TITLE:	Commercial//Industrial Refrigerating Appliances - Conversion from CFC-12 into HFC-407A and Ammonia
LOCATION:	Odessa
SECTOR:	Commercial Refrigeration
ODS USE IN SECTOR:	243 MT CFC-12, 24 MT CFC-502 and 67 MT CFC-113 (1996)
PROJECT IMPACT:	Phaseout of ODP of 74.2 MT CFC-12 Per Year (1996)
PROJECT DURATION:	2 Years
PROJECT ECONOMIC LIFE:	10 Years
SUB-PROJECT COSTS:	Investment Capital Costs US \$1,207,598 Contingencies (10%) US \$ 120,760 Total Project Cost US \$1,328,358
FINANCING:	Global Environment Facility US \$950,692 Odessa contribution US \$377,666 Odessa, 1st year IOC US \$268,750
GRANT EFFECTIVENESS:	US \$12.81/kg ODP
IMPLEMENTING ENTERPRISE:	Odessa Holod Mash, in Odessa
GEF IMPLEMENTING AGENCY:	The World Bank
COORDINATING NATIONAL BODY:	The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine
STAP/OORG REVIEW:	Dr. Lambert Kuijpers

Enterprise Background

Odessa Holod Mash was privatized during 1997. The government retained about 30% of ownership, while 20 % of the shares was sold off in voucher auction, and 50% distributed among employees. Founded in 1941, Odessa Holod Mash is located in Odessa in the south of Ukraine and employs currently 1,100 persons, of which 350 are engineers.

The enterprise consists of a production factory, a scientific research center, a well equipped test center , and a factory for the manufacture of small appliances. It is specialized in

the development and production of industrial refrigerating machines for agriculture, processing and storage of meat and fish products, vegetables and fruits, air conditioning in mines and metallurgical enterprises. The product range consists of refrigerating equipment for dairies and cold stores, industrial air conditioners, and compressors for industrial refrigerating appliances.

Project Description

This project will accomplish the phase-out of the use of CFC-12 in the production of commercial / industrial refrigerating appliances at Odessa Holod Mash as well as the potential use of CFC-12 at the customers of Odessa Holod Mash compressors. The project will be carried out in two phases as described below.

Phase I

- Design study for adaptation of the compressor to HFC-407C.
- Design study for adaptation of the compressor to run with NH₃.
- Investment in equipment to operate with HFC-407C and ester based lubricant.
- Specification and procurement of oil and HFC-407C charging equipment.
Specification and procurement of test rig for HFC-407C and NH₃.
- Specification and procurement of cleaning and drying equipment for compressors and units.
- Manufacture of prototypes of compressors and units and the testing of these.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US \$1,328,358. A GEF grant of US \$950,692 has been allocated to this sub-project, with the remaining US \$377,666 investment contribution and US \$268,750 in estimated annual incremental operating costs (IOC) to be financed by the enterprise.

ODESSA COMPRESSOR
 REFRIGERANT CONVERSION SUB-PROJECT
 SUB-PROJECT IDENTIFICATION SCHEDULE

ACTIVITY	1997				1998				1999				2000			
	Q1 J F	Q2 M A M J	Q3 J A S	Q4 O N D	Q1 J F M A	Q2 M J J A	Q3 M J J A	Q4 S O N D	Q1 J F M A	Q2 M J J A	Q3 M J J A	Q4 S O N D	Q1 J F M A	Q2 M J J A	Q3 M J J A	Q4 S O N D
Sub-Project Appraisal																
GEF Approval																
Grant Agreement Negotiations																
Grant Agreement Ratification																
Grant Effectiveness																
Sub-Grant Agreement																
Procurement Notices																
Environmental Documentation																
Regulatory Approvals																
Compressor Design/Development																
Jigs & Fixtures (batch #1)																
- Compressor/Equipment Design (Batch #1)																
- Tender																
- Supply Equipment (Batch #1)																
- Make Prototype Compressor																
- Test Prototype																
- Compressor/Equipment Design (Batch #2)																
- Supply Equipment (Batch #2)																
- Document Jigs & Fixtures																
- Revise Technical Documentation																
- Batch Production																
- Test Batch Production																
Refrigerant Production Charging/ Testing Equipment																
- Specifications																
- Tender																
- Supply Equipment																
Customized Production/Test Equipment																
- Specify Custom Equipment																
- Tender/Procurement																
- Supply Equipment																
Civil Works/Equipment Installation																
Test Production																
Full Production																

SUB-PROJECT SUMMARY

COUNTRY: Ukraine

SUB-PROJECT TITLE: Commercial/Industrial Refrigerating Appliances - Conversion from mix of CFC-11, CFC-12, CFC-13, CFC-14 into HC/HFC-134a mix; conversion from CFC-113 to aqueous cleaning

SECTOR: Commercial Refrigeration

ODS USE IN SECTOR: 243 MT CFC-12, 24 MT CFC-502, and 67 MT CFC-113 (1996)

PROJECT IMPACT: Phaseout of ODP of 5.33 MT of CFC-11, CFC-12, CFC-13, FC-14, CFC-113, and CFC-502 per year (ave. 1994-96)

PROJECT DURATION: 2 Years

PROJECT ECONOMIC LIFE: 10 Years

SUB-PROJECT COST:

Prior Enterprise Investment	US \$ 280,000
Incremental Investment Costs	US \$ 90,140
Contingency (10%) on remaining investment expenditures	US \$ 9,014
Total Project Cost	US \$ 379,154

FINANCING:

Global Environment Facility	US \$ 63,954
Dnipro, MTO contribution	US \$ 35,200
Dnipro, MTO 1st yr. IOC	US \$ 2,580

GRANT EFFECTIVENESS: US \$12.00/kg ODP

IMPLEMENTING ENTERPRISE: Dnipro, MTO in Kiev

GEF IMPLEMENTING AGENCY: The World Bank

COORDINATING NATIONAL BODY: The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine

STAP/OORG REVIEW: Dr. Lambert Kuijpers

Enterprise Background

Dnipro, MTO was spun off from Institute Saturn in late 1996, as a small private partnership owned by 5 managing partners, to carry on commercial production of ultra low temperature refrigeration equipment.

Project Description

This project will accomplish the phase-out of the CFC-mixtures in the production of low temperature commercial refrigerating appliances at Dnipro. The project will be carried out in two phases as described below:

Phase I

Phase 1 of the project comprises the following main components:

- Design study for adaptation of the freezers to operate with the new working substances.
- Equipment for handling hydrocarbons and HFC-134a, including safety.
- Testing and trials.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$ 379,154. A GEF grant of US\$ 63,954 has been allocated to this sub-project, with the remaining US\$ 35,200 investment contribution and US\$ 2,580 in estimated annual incremental operating costs (IOC) to be financed by the enterprise.

SUB-PROJECT SUMMARY

COUNTRY:	Ukraine						
SUB-PROJECT TITLE:	Conversion from CFC-12 to HFC-134a and from CFC-502 to HFC-404a						
SECTOR:	Commercial Refrigeration						
ODS USE IN SECTOR:	243 MT CFC-12, 24 MT CFC-502 and 67 MT CFC-113 (1996)						
PROJECT IMPACT:	Phaseout of 75.4 MT ODP (71.4 MT CFC-12, 5 MT CFC-113)						
PROJECT DURATION:	2 Years						
PROJECT ECONOMIC LIFE:	10 Years						
SUB-PROJECT COST:	<table><tr><td>Incremental Investment Costs</td><td>US \$1,321,974</td></tr><tr><td>Contingency (10%) on remaining investment expenditures</td><td>US \$ 132,197</td></tr><tr><td>Total Project Cost</td><td>US \$1,454,171</td></tr></table>	Incremental Investment Costs	US \$1,321,974	Contingency (10%) on remaining investment expenditures	US \$ 132,197	Total Project Cost	US \$1,454,171
Incremental Investment Costs	US \$1,321,974						
Contingency (10%) on remaining investment expenditures	US \$ 132,197						
Total Project Cost	US \$1,454,171						
FINANCING:	<table><tr><td>Global Environment Facility</td><td>US \$1,135,974</td></tr><tr><td>Kharkov contribution</td><td>US \$ 318,197</td></tr><tr><td>Kharkov 1st yr. IOC</td><td>US \$ 612,500</td></tr></table>	Global Environment Facility	US \$1,135,974	Kharkov contribution	US \$ 318,197	Kharkov 1st yr. IOC	US \$ 612,500
Global Environment Facility	US \$1,135,974						
Kharkov contribution	US \$ 318,197						
Kharkov 1st yr. IOC	US \$ 612,500						
GRANT EFFECTIVENESS:	US \$15.07/kg ODP						
IMPLEMENTING ENTERPRISE:	Kharkov Holod Mash, in Kharkov						
GEF IMPLEMENTING AGENCY:	The World Bank						
COORDINATING NATIONAL BODY:	The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine						
STAP/OORG REVIEW:	Dr. Lambert Kuijpers						

Enterprise Background

Kharkov Holod Mash was fully privatized in 1997. The government still retains 26% of shares; 30% of shares are held by employees and 44% have been sold off to outside investors. Kharkov Holod Mash was founded in 1924 and began the manufacture of commercial refrigerating appliances in 1945. Kharkov Holod Mash currently employs 1500 persons and manufactures a variety of commercial refrigerating appliances such as hermetic compressors, evaporators, condensing units, cold water dispensers, water chillers, air conditioning units for transport, milk coolers and icecream freezers. The

company also manufactures pumps, kettles and non-standard equipment such as equipment for production.

Project Description

This project will accomplish the phase-out of the use of CFC-12/CFC-502 in the production of commercial refrigerating appliances at Kharkov Holod Mash through conversion to HFC-134a and HFC-404a. The project will be carried out in two phases as described below.

Phase I

Phase 1 of the project comprises the following main components:

- Design study for adaptation of the compressor and the related applications to run with HFC-134a/HFC-404a and ester-based lubricant.
- Elaboration of the necessary technical documentation..
- Design of a compressor test stand and drying chamber for stators.
- Manufacture of above special equipment.
- Equipment for operation with HFC-134a/HFC-404a and ester-based lubricant.
- Reconstruction of degreasing equipment into a water/alkaline cleaning apparatus.
- Manufacture and testing of prototype models.
- Equipment for the service department.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$ 1,454,171. A GEF grant of US\$ 1,135,974 has been allocated to this sub-project, with the remaining US\$ 318,197 investment contribution and US\$612,500 in annual incremental operating costs (IOC) to be financed by the enterprise.

**THE MONTREAL PROTOCOL ON SUBSTANCES
THAT DEplete THE OZONE LAYER**

PROJECT COVER SHEET

COUNTRY	Ukraine
PROJECT TITLE	Domestic Refrigerators - Conversion of CFC-12 used as Refrigerant to HFC-134a; conversion of CFC-113 used as cleaning solvent to Aqueous Cleaning Process; and Conversion of CFC-11 used as Foam Blowing Agent into Cyclopentane
SECTOR COVERED	Domestic Refrigeration
ODS USE IN SECTOR	238.8 MT CFC-12, 157.1 MT CFC-113, 33.1 MT CFC-11, and 318.9 MT HCFC-141b (1995)
PROJECT IMPACT	Phase out of 155 MT CFC-12 per year and 31 MT CFC-113 per year in the refrigeration circuit, and 327.5 MT CFC-11 per year in foam-blown insulation (1994).
PROJECT DURATION	2 Years
PROJECT ECONOMIC LIFE	10 years
TOTAL PROJECT COST	Prior Enterprise Investment US \$933,520 Incremental Investment Costs US \$13,360,943 Contingencies (10%) US \$1,336,094 Total Project Cost US \$15,630,557
COST EFFECTIVENESS	US \$13.64/kg ODP
PROPOSED FINANCING	US \$9,790,599 GEF Grant including 10% contingency US \$4,906,438 by NORD including 10% contingency
IMPLEMENTING ENTERPRISE	NORD, in Donetsk
IMPLEMENTING AGENCY	The World Bank
COORDINATING NATIONAL BODY	The Ozone Office of the Ministry of Environmental Protection and Nuclear safety of Ukraine
STAP/OORG REVIEW	Dr. Lambert Kuijpers

Enterprise Background

NORD is a major manufacturer of domestic refrigeration products and one of the few remaining operational enterprises in this sector within the FSU. NORD is a fully privatized joint stock company run by a Board of Directors. It was founded in 1964 and has developed to an operation with a nominal capacity of between 500,000 and 600,000 units per year, along with supporting hermetic compressor manufacturing facilities, and

currently employs 8,000 persons. It manufactures approximately 14 models of refrigerators and freezers as well as gas cookers, although refrigerators and freezers account for over 95% of its sales volumes. NORD was privatized in 1989 before Ukrainian independence. NORD is ranked as one of the most successful enterprises in Ukraine, and has maintained and expanded production since 1992 despite the country's poor economic conditions. It is currently operating at capacity on a three shift basis and its 1997 production is projected to approach 600,000 units.

It should be noted that NORD's preferred refrigerant conversion option would be to hydrocarbons. However, NORD has elected to proceed with a two step conversion, first to HFC-134a largely on the basis of the delay that the required product development work would impose on conversion and the resultant inability to meet the Country Program phase-out deadline in 2000.

Project Description

The project covered in this document was originally proposed and reviewed as two separate sub-projects covering the refrigerant and foam aspects of the proposed phase out investment. The current project document has combined these into a single project of two components corresponding to the original two projects.

Phase I

Refrigerant Component -

The refrigerant circuit conversion component of the project will accomplish the phase-out of CFC-113 in the production of hermetic compressors at NORD as well as the use of CFC-12 for the manufacture of NORD's refrigerators. The refrigerant conversion is comprised of the following main sub-components:

- Design study for adaptation of the compressor and the refrigerating circuit to run with HFC-134a and ester based lubricant to be undertaken internally with NORD..
- Reconstruction of the cleaning facilities in the compressor plant based on alkaline/aqueous technology being applied to metal parts and combined alkaline/aqueous and ultrasonic technology for electrical components
- Investment in equipment to handle HFC-134a and the ester based lubricant.
- Installation and testing of new equipment.
- Reconstruction of test stands.
- Manufacture of prototypes and the testing of these.
- Trial production.
- Investment in necessary equipment for the service organization.

Foam Component -

This component of the proposed project will complete the phase-out of the use of CFC-11 used as foam blowing agent for insulation of refrigerators and freezers. The project will be carried out in two phases as described below. An initial investment in 1995 began the conversion process and converted temporarily from CFC-11 to transitional alternative HCFC-141b. The foam conversion comprises the following main components:

- Central pentane storage at the two production facilities;
- Foam dispensing equipment for cabinets, molds and other parts;
- Molds for cabinets, doors and other parts;
- Safety equipment for above mentioned foam installations, i.e., enclosures, ventilation, vapor monitoring, nitrogen flushing and grounding of all equipment.
- Product development work including cabinet redesign and product trials (inclusive of consumables).
- Facilities redesign and implementation for new equipment installation and associated safety/fire protection measures in order to minimize production disruption.
- Training

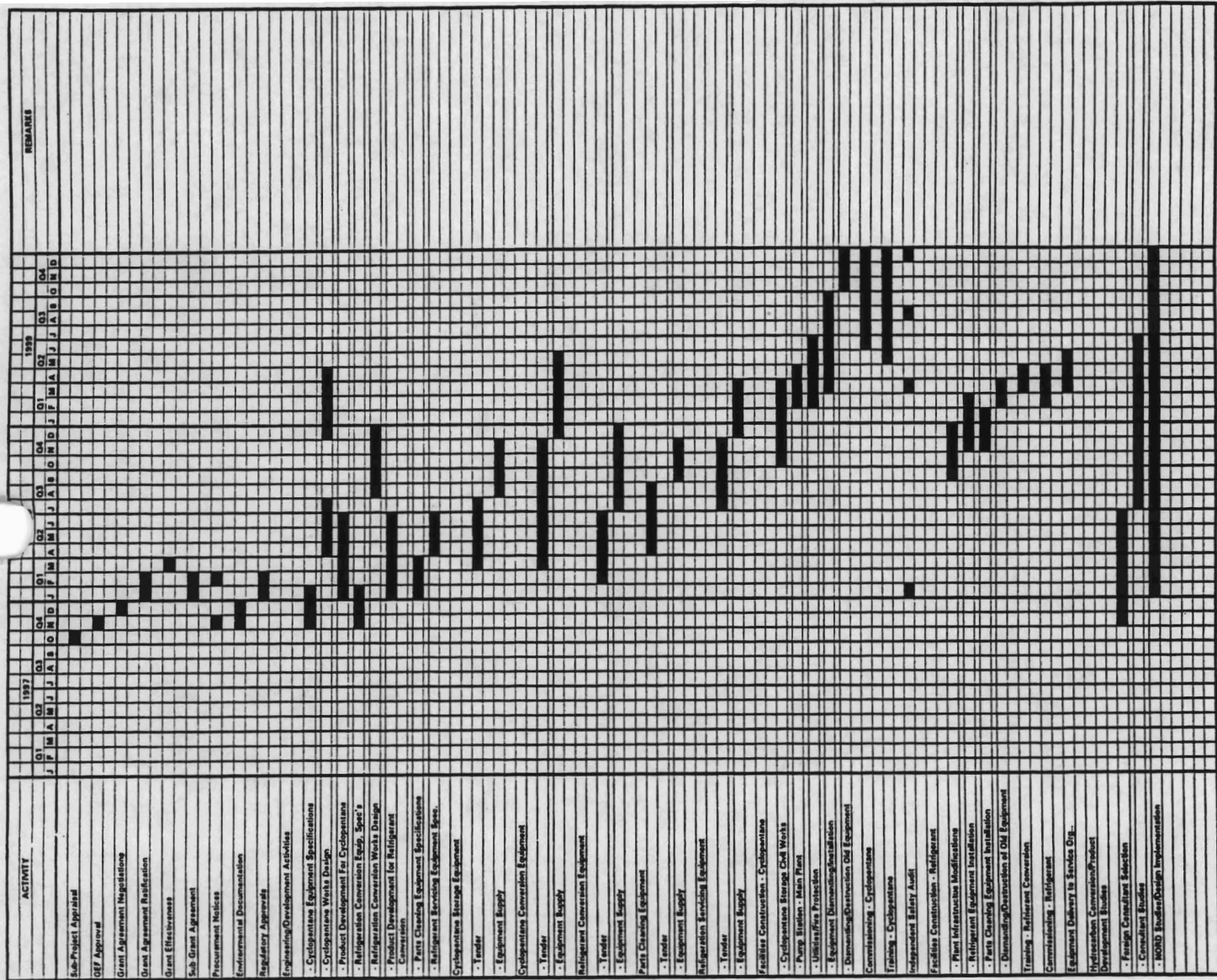
Phase II

Phase 2 will be regular production

Financing Plan

The total sub-project cost is US\$ 15,630,557. A GEF grant of US\$ 9,790,599 has been allocated to this sub-project, and US\$ 4,906,438 is to be financed by the enterprise.

NORD FOAM AND REFRIGERANT CONVERSION SUB-PROJECT
 1 SUB-PROJECT IMPLEMENTATION SCHEDULE



SUB-PROJECT SUMMARY

COUNTRY: Ukraine

SUB-PROJECT TITLE: Conversion of aerosols production hydrocarbon aerosol propellants (HAPs)

SECTOR: Aerosols

ODS USE IN SECTOR: Approximately 3212 CFC-12 or 11/12 mixture (1992), 328 MT CFC-12 or 11/12 mixture (1996)

PROJECT IMPACT: Phaseout of ODP of 190 MT of CFC-12 or 11/12 mixture (190 of ODP) based on 1996 production. In the last full year prior to initiating investment in phase out ODS consumption was 1,475 MT (1,475 MT ODP) of CFC-12 or 11/12 mixture

PROJECT DURATION: 2 Years

PROJECT ECONOMIC LIFE: 10 Years

SUB-PROJECT COSTS:

Prior Enterprise Investment	US\$ 2,440,000
Investment Capital Costs	US\$ 4,513,636
Contingencies (10%)	US\$ 451,364
Total Project Cost	US\$ 7,405,000

FINANCING:

Global Environment Facility	US \$3,894,000
Simferopol contribution	US \$1,071,000
Simferopol 1st yr. IOC (Savings)	US \$ (74,652)

GRANT EFFECTIVENESS: US \$4.40 per kg. ODP

IMPLEMENTING ENTERPRISE: Joint Open Stock Company Simferopol Household Chemicals Plant, in Simferopol

GEF IMPLEMENTING AGENCY: The World Bank

COORDINATING NATIONAL BODY: The Ministry of Environmental Protection and Nuclear Safety

STAP/OORG REVIEW: Harry B. McCain

Enterprise Background

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The Joint Open Stock Company Simferopol Household Chemicals Plant (JSC Simferopol) is located in the city of Simferopol, a major industrial center in Crimea. Workers own 23% of the stock, 50% is owned by the Ukrainian Government, and the remaining 27% was sold off to investors in the stock market through certificate auction. It began as a producer of household bleaching products and in 1967 its production expanded into aerosols. It is an integrated plant, with manufacture of both cans and valves, as well as filling operations, and cardboard boxes for packaging. Besides, aerosols, detergents, shampoo and small amounts of bleach are manufactured. Simferopol currently employs 280 employees (1997), however during peak production employment can reach up to 750. The enterprise initiated phase out in 1993 with the introduction of CO₂ as a CFC replacement for some lines as well as conversion of some products to pumps. The latter substantial investment in molding equipment and modification of a filling line have been made as a permanent phase out investment.

Project Description

This project will complete conversion of aerosol production at JSC Simferopol to hydrocarbons by eliminating the use of CFC as propellant in remaining aerosol products. The project consists of installation of safe filling capacity for HAPs propellant, along with necessary upgrading of finished goods warehouse, upgrading of can production equipment, and development of HAP delivery, storage and handling infrastructure. The project will consist of the following:

Phase I

Phase I of the project comprises the purchase and installation of following main components:

- Can body and cone forming presses for two aluminum can making lines.
- Two new pneumatic 60 can per minute aerosol filling lines including test water bath, all conveyors, charging units, filling rooms, and assembly units.
- Explosion proof lift trucks for the finished goods warehouse.
- HAP tankfarm, complete with pumps, compressors and all new piping, including a "safe guard" molecular sieve purification system for the HAPs. Pipes, pumps and compressors must be replaced and installed in a small pump and compressor building, which must be constructed.
- Four tank cars for HAP transportation.
- Fire fighting and safety systems.
- Personnel re-training to use flammable propellants.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$ 7,405,000. A GEF grant of US\$ 3,894,000 has been allocated to this sub-project, with the remaining US\$ 1,071,000 investment contribution to be financed by the enterprise. The proposed grant and the stated cost effectiveness are based on the enterprise's 1992 consumption before initiating phase out investments.

HCP HAP AEROSOL CONVERSION SUB-PROJECT
SUB-PROJECT IDENTIFICATION SCHEDULE

ACTIVITY	1997			1998			1999			REMARKS														
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4																
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Sub-Project Appraisal																								
GEF CEO Endorsement																								
Grant Agreement Negotiations																								
World Bank Board Approval																								
Grant Agreement Ratification																								
Grant Effectiveness																								
Sub-Grant Agreement																								
Procurement Notices																								
Detailed Engineering																								
• Procurement Specifications - Major Equip.																								
• Construction Spec. & Drawings																								
Environmental Documentation																								
Regulatory Approvals																								
HAP Storage and Handling Facilities																								
• Tender Equipment																								
• Equipment Supply																								
• Installation/Civil Work																								
HAP Rail Cars																								
• Tender																								
• Equipment Supply																								
HAP Filling Line Equipment																								
• Tender Equipment																								
• Equipment Supply																								
• Installation																								
• Training and Commissioning																								
HAP O/A Equipment																								
• Tender																								
• Equipment Supply																								
Finished Goods Warehouse																								
• Lift Truck Equipment Tender																								
• Lift Truck Supply																								
Can Making Equipment																								
• Tender																								
• Equipment Supply																								
Independent Safety Audit																								

SUB-PROJECT SUMMARY

COUNTRY:	Ukraine								
SUB-PROJECT TITLE:	Conversion of Aerosols Production at Joint Stock Society Donetsk								
SECTOR:	Aerosols								
ODS USE IN SECTOR:	Approximately 3212 CFC-12 or 11/12 mixture (1992), 328 MT CFC-12 or 11/12 mixture (1996)								
PROJECT IMPACT:	Phaseout of 305 MT of CFC-12 or 11/12 mixture (305 MT of ODS and 305 MT of ODP) based on 1996 production. In the last full year prior to initiating investment in phase out ODS consumption was 1,737 MT (1,737 MT ODP) of CFC-12 or 11/12 mixture								
PROJECT DURATION:	2 Years								
PROJECT ECONOMIC LIFE:	10 Years								
SUB-PROJECT COST:	<table><tr><td>Prior Enterprise Investment</td><td>US \$1,162,000</td></tr><tr><td>Incremental Investment Costs</td><td>US \$3,205,891</td></tr><tr><td>Contingency (10%) on remaining investment expenditures</td><td>US \$ 320,589</td></tr><tr><td>Total Project Cost</td><td>US \$4,688,480</td></tr></table>	Prior Enterprise Investment	US \$1,162,000	Incremental Investment Costs	US \$3,205,891	Contingency (10%) on remaining investment expenditures	US \$ 320,589	Total Project Cost	US \$4,688,480
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FINANCING:	<table><tr><td>Global Environment Facility</td><td>US \$2,871,220</td></tr><tr><td>Donetsk contribution</td><td>US \$ 655,260</td></tr><tr><td>Donetsk 1st yr. IOC (Savings)</td><td>US \$ (127,650)</td></tr></table>	Global Environment Facility	US \$2,871,220	Donetsk contribution	US \$ 655,260	Donetsk 1st yr. IOC (Savings)	US \$ (127,650)		
Global Environment Facility	US \$2,871,220								
Donetsk contribution	US \$ 655,260								
Donetsk 1st yr. IOC (Savings)	US \$ (127,650)								
GRANT EFFECTIVENESS:	US \$4.40/kg ODP								
IMPLEMENTING ENTERPRISE:	Joint Stock Society Donetsk Chemical Plant, in Donetsk								
GEF IMPLEMENTING AGENCY:	The World Bank								
COORDINATING NATIONAL BODY:	The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine								
STAP/OORG REVIEW:	Harry B. McCain								

Enterprise Background

The Joint Stock Society Donetsk Household Chemical Plant (JSS Donetsk) is located in the city of Donetsk, a major industrial center in eastern Ukraine. JSS Donetsk was privatized in 1994. No shares were retained by the government. It was founded in 1959, and began as a producer of polyvinyl compounds. The company has been

privatized as a worker cooperative, with 100% of the shares in Ukrainian hands. In 1961, its production was expanded into other plastics, and in 1964, the plant began producing chemicals for household use such as bleach. Besides aerosols, detergents, paints and other chemical products are made. Personnel in the aerosol portion of the plant is about 80 people, but 250 were employed at full production. This is an integrated plant, with aluminum cans and valves being made and aerosols filled, cardboard boxes made, and all printing done on site. The enterprise initiated ODS phase out in 1992 with the introduction of HAP/CFC blends in a number of its products. Prior investment in support of phase out include the construction of a HAP tank farm and distribution facilities, basic safety systems and tank cars.

Project Description

This project will complete the conversion of aerosol production at JSS Donetsk to hydrocarbons by eliminating the use of CFC as propellant in aerosols. The project consists of converting the current aerosol production capacity of 20,000,000 cans per year to safe filling with HAPs propellant, along with necessary upgrading of a finished goods warehouse, can cover production equipment, and present HAP delivery, storage and handling infrastructure. The project will consist of the following::

Phase I

Phase 1 of the project comprises the purchase and installation of the following main components:

- Two new pneumatic 60 can per minute aerosol filling lines including test water bath, all conveyors, charging units, filling rooms, and assembly units.
- Can cover production equipment. .
- Explosion proof lift trucks for the finished goods warehouse.
- Hap handling equipment including pumps, compressors and a “safe guard” HAP molecular sieve purification system.
- Two rail tank cars.
- Additional fire fighting and safety systems.
- Personnel re-training to use flammable propellants.
- Independant safety audit during implementation and commissioning.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$ 4,688,480. A GEF grant of US\$ 2,871,220 has been allocated to this sub-project, with the remaining US\$ 655,260 to be financed by the

enterprise. The proposed grant and the stated cost effectiveness are based on the enterprise's 1992 consumption before initiating phase out investments.

NETZK HCP HAP AEROSOL CONVERSION SUB-PROJECT
 SUB-PROJECT IMPLEMENTATION SCHEDULE

ACTIVITY	1997												1998												1999												REMARKS
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4																	
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Sub-Project Appraisal																																					
GEF CEO Endorsement																																					
Grant Agreement Negotiations																																					
World Bank Board Approval																																					
Grant Agreement Ratification																																					
Grant Effectiveness																																					
Sub-Grant Agreement																																					
Procurement Notices																																					
Detailed Engineering																																					
- Procurement Specifications - Major Equip.																																					
- Construction Spec.'s/Drawings																																					
Final Environmental Documentation																																					
Regulatory Approvals																																					
HAP Storage and Handling Facilities																																					
- Tender Equipment																																					
- Equipment Supply																																					
- Installation/Civil Work																																					
HAP Rail Cars																																					
- Tender																																					
- Equipment Supply																																					
HAP Filling Line Equipment																																					
- Tender Equipment																																					
- Equipment Supply																																					
- Installation																																					
- Training and Commissioning																																					
HAP O/A Equipment																																					
- Tender																																					
- Equipment Supply																																					
Finished Goods Warehouse																																					
- Lift Truck Equipment Tender																																					
- Lift Truck Supply																																					
Waive /Can Making Equipment Modifications																																					
- Tender																																					
- Equipment Supply																																					
Independent Safety Audit																																					

SUB-PROJECT SUMMARY

COUNTRY:	Ukraine
SUB-PROJECT TITLE:	Conversion of solvents used in production at Electromash to non-ODS substances
SECTOR:	Solvents
ODS USE IN SECTOR:	Approximately 110 MT of ODS in 1996
PROJECT IMPACT:	Phaseout of 8.3 MT of CFC-113 (8.3 MT of ODS and 6.64 MT of ODP)
PROJECT DURATION:	1 Phase, 2 Years
PROJECT ECONOMIC LIFE:	10 Years
SUB-PROJECT COST:	Incremental Investment Costs US \$279,100 Contingency (10%) on remaining investment expenditures US \$ 27,910 Total Project Cost US \$307,010
FINANCING:	Global Environment Facility US \$134,200 Electronmash contribution US \$172,810 Electronmash 1st yr. IOC US \$ 27,200
GRANT EFFECTIVENESS:	US \$19.73 per kg. ODP
IMPLEMENTING ENTERPRISE:	Electronmash, in Kiev
GEF IMPLEMENTING AGENCY:	The World Bank
COORDINATING NATIONAL BODY:	The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine
STAP/OORG REVIEW:	Brian Baxter

Enterprise Background

Electronmash is a state-owned enterprise that is an amalgamation of scientific research in electronics and of production of electronic equipment. Plans for privatization of Electronmash are underway. It was founded shortly after the end of the Second World War as a producer largely of electronics for the military. In the 1970s and 1980s, it produced **mainframe computers, tape drives and printers that were similar to those of IBM** at that time. With the collapse of the Soviet Union, it lost most of its market for main frame computers and started producing personal computers and cash registers that were based on personal computers. About 70 percent of its market is now cash registers,

and this product accounts for the vast majority of the printed circuit boards that are presently cleaned with ODS. Other products include manufacturing floppy disks, lighting fixtures, consumer electronics, and office accessories. This is an integrated plant with most necessary parts for the products manufactured at the site. In 1997, the number of employees has fallen to about 5,000 from a peak of 12,000 in earlier years. Sales are slow as the Russian market has been lost, but there have been good sales recently to China.

Project Description

Electronmash will eliminate its use of CFC-113 for the cleaning of assembled printed circuit boards after repair with an aqueous system. The project will be carried out in two phases as described below:

Phase I

Phase 1 of the project comprises the following main components:

- Process development and material compatibility testing.
- Installation of water recycling and purification system equipment.
- Installation of one high-volume in-line aqueous cleaning machine consisting of two stages (rinse and dry) to replace Electronmash's existing in-line cleaners and one CFC-113 vapor defluxer.
- Wastewater treatment equipment to treat contaminated solution prior to disposal.
- Improvements to the existing exhaust and ventilation system will be made in the aqueous cleaning operations. Hoods, fans and ductwork will be modified or added.
- Changes in Electronmash's operating practices to accommodate the new technologies, including changes in: labor, material cost, electricity consumption, and water treatment costs.
- Modifications and new installations to redraw electrical wiring, warm and cold water, etc.

Phase II

Phase 2 will be regular production.

Financing Plan

The total sub-project cost is US\$307,010. A GEF grant of US\$134,200 has been allocated to this sub-project, with the remaining US\$172,810 investment contribution and US\$27,200 in estimated annual incremental operating costs (IOC) to be financed by the enterprise.

**THE MONTREAL PROTOCOL ON SUBSTANCES
THAT DEplete THE OZONE LAYER**

PROJECT COVER SHEET

COUNTRY	Ukraine
PROJECT TITLE	Commercial Refrigeration Recovery, Recycling and Reclaim Servicing Pilot and non-ODS Refrigerant Alternatives Study
SECTOR COVERED	Commercial Refrigeration
ODS USE IN SECTOR	1593 MT CFC-12 (estimate for 1996)
PROJECT IMPACT	Phase out of ODP of 77 MT CFC-12
PROJECT DURATION	2 Years
PROJECT ECONOMIC LIFE	10 years
TOTAL PROJECT COST	Incremental Investment Costs US \$1,146,770 Contingencies (10%) US \$114,677 Total Project Cost US \$1,261,447
COST EFFECTIVENESS	US \$13.08/kg ODP
PROPOSED FINANCING	US \$1,146,770 GEF Grant including 10% contingency
IMPLEMENTING ENTERPRISES	Kiev Trade Service Co., Dneprtechbytservis Vesta & Odessa Refrigeration Institutes
IMPLEMENTING AGENCY	The World Bank
COORDINATING NATIONAL BODY	The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine
STAP/OORG REVIEW	Dr. Lambert Kuijpers

Enterprise Background

Two privatized refrigeration service enterprises are proposed for this pilot servicing initiative, namely the Trade Service Company (Kiev), and Dneprtechbytservis (Dneprpetrovsk). Both service densely populated industrial areas (Dneprpetrovsk itself, Kharkov and Donetsk will all be covered by the latter) as well as agricultural regions. The initiatives are well placed to test introduction of recovery, reclaim and recycling activities, as well as retrofit opportunities in the different commercial refrigerant usage sub-sectors such as Mines, River Transportation, Agricultural and Railroad refrigeration.

The two enterprises represent two types of organizations that are anticipated to replace the former centralized state servicing depot network as it undergoes changes from the former command style economy structure to a new market-oriented type. The Trade Service Company is the former Kiev refrigeration service depot which has privatized. Dneprtechbytservis on the other hand is a new organization formed as a private sector initiative to fill the gap left with the disintegration of the former system.

The Vesta Refrigeration Institute in Kiev is the countrys leading technical support institution in the refrigeration field and is active in the development and assessment of refrigeration technology. The Odessa Refrigeration Institute is an internationally known refrigeration training institution.

Project Description

The project involves the following:

Phase I

- i) Establishing two regional pilot initiatives at the Kiev Trade Service Company and Dneprtechbytservis, respectively, in which equipment necessary to support the recovery and recycling of ODS based refrigerants will be supplied;
- ii) Conducting a survey of the current situation of the refrigeration service sector of Ukraine and preparing recommendations on how a countrywide service system can best be organized in Ukraine.
- iii) A study of non-ODS CFC-12 refrigerant retrofit alternatives with recommendations regarding the most suitable substances for use in the Ukraine.
- iv) Preparation of training course material and the organization of pilot training courses delivered to the technicians at the enterprises in (i) above.

Phase 2

Phase 2 will be regular operation.

Financing Plan

The total sub-project investment cost is US\$ 1,146,770. A GEF grant of US\$ 1,146,770 has been allocated to this sub-project.

SUB-PROJECT SUMMARY

COUNTRY: Ukraine

SUB-PROJECT TITLE: Halon Use Reduction, Recycling and Halon Bank Management

SECTOR: Halons

ODS USE IN SECTOR: 130 - 140 MT Halon 1301 and 552 - 602 MT Halon 2402; 60 % assumed installed; 40% in reserve for recharge purposes

PROJECT IMPACT: N/A

PROJECT DURATION: 2 - 3 Years

PROJECT ECONOMIC LIFE: 10 Years

SUB-PROJECT COST:

Incremental Investment Costs	US \$200,000
Contingency (10%) on remaining investment expenditures	US \$ 20,000
Total Project Cost	US \$220,000

FINANCING: Global Environment Facility US \$220,000

GRANT EFFECTIVENESS: N/A

IMPLEMENTING ENTERPRISE: Ukrainian Fire Safety Research Institute/Ozone Office

GEF IMPLEMENTING AGENCY: The World Bank

COORDINATING NATIONAL BODY: The Ozone Office of the Ministry of Environmental Protection and Nuclear Safety of Ukraine

STAP/OORG REVIEW: Michael Wilson

Enterprise Background

Prior to the dissolution of the USSR, policy, regulations and standards for fire protection systems were directed from Moscow for the entire union. In addition, the responsibility for the design and development of systems used in Ukraine was almost exclusively directed and dictated by Russian government organizations, or bureaus, which usually developed equipment for engineering, industrial and military applications. With the dissolution of the USSR, these guidelines and standards are still applied in Ukraine, but without formal Ukrainian regulatory legislation.

To implement an effective halon management program, it is important that a central co-ordination center be established, and that country standards and regulations, etc., for fire protection be enacted. In the Ukrainian context, the most appropriate place to locate such as center is at the Ukrainian Fire Safety and Research Institute, under the Ministry of Internal Affairs. In addition, an advisory group would be created which would include the Ukrainian Fire Safety and Research Institute, government regulatory authorities, fire protection contractor/supplier groups, fire protection associations, critical users, etc. within the Ukraine. This sub-project would not have a sub-grant agreement, as the contracting of consultants and purchasing of equipment would be done through the Ozone Office.

Project Description

Within the sectors using halons for fire protection purposes in the Ukraine, there is a great need for information, public education, training, etc., regarding the replacement of those halons with ozone-safe substitutes, and the establishment of a halon banking scheme to effectively satisfy the future needs of essential users within the country. In addition, training in effective care and maintenance of existing halon systems must be carried out to curtail halon losses.

Phase I

Phase I of the sub-project will include the following components:

- Update of halon inventory and consumption estimates
- Conduct of an initial technical options study tailored to Ukraine
- Provision of international reference codes and standards
- Definition of user requirements
- Establishment of certification standards and training for service personnel
- Identification of sources of halons for recovery and banking
- Identification of stakeholders and formation of advisory group
- Preparation of a halon management implementation plan
- Acquisition of fire safety personnel training and demonstration equipment

Phase II

Phase II will be regular operation of the pilot demonstration project.

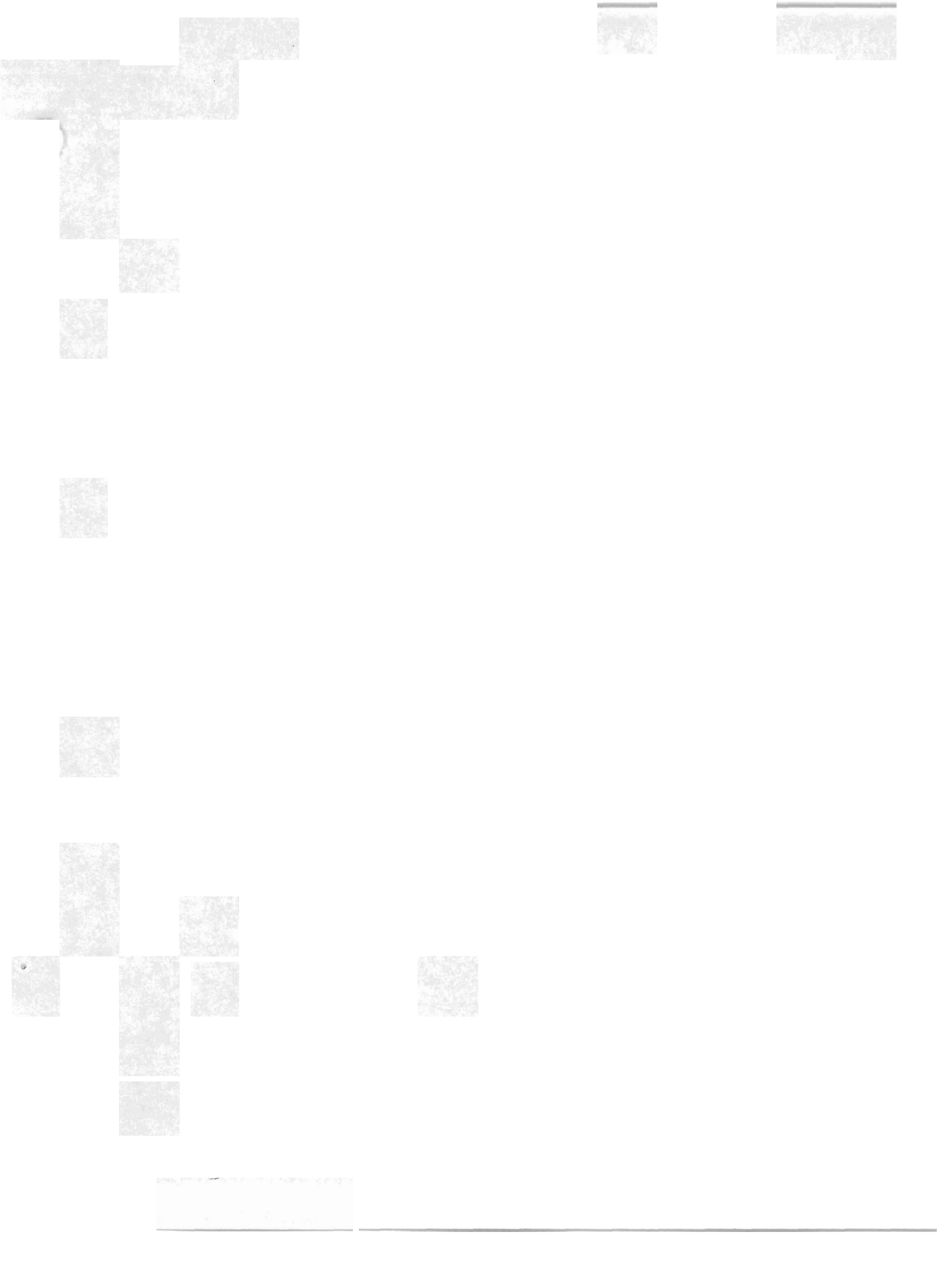
Financing Plan

The total sub-project cost is US\$220,000. A GEF grant of US\$220,000 has been allocated to this sub-project.



ANNEX III

TECHNOLOGY ALTERNATIVES EVALUATED FOR
NORD SUB-PROJECT



Annex 3

NORD's Consideration of the Hydrocarbon Technology Option

Purpose

The purpose of this Annex is to highlight the considerations which resulted in NORD's decision to embark on a two-phased approach to the conversion of the refrigerant CFC-12 in domestic refrigerator production. Phase I (under this project) will be partially GEF financed, and includes an immediate completion of conversion to the zero-Ozone Depleting Potential (ODP) HFC-134a technology with a parallel technical assistance design package for a later conversion to a zero GWP hydrocarbon refrigerant¹. Phase II would be enterprise financed and would implement an ultimate conversion to hydrocarbon refrigerant. NORD's matching contribution (approximately \$500,000 equivalent) to the re-design effort for the ultimate hydrocarbon technology conversion demonstrates their serious commitment to this end-technology.

This Annex contains four sections: (1) background issues affecting the decision making process in the NORD case; (2) key considerations relevant to meeting the GEF "Zero Global Warming Potential" (GWP) policy guidelines; (3) a tabular depiction of NORD's chosen two-phased approach as the one which is closest to a win-win solution for both NORD and the GEF; and (4) a letter from the NORD enterprise.

Background Issues

The GEF operational strategy for taking account of "Global Warming Potential" (GWP) mandates that GEF-funded ODS phase-out projects must insure that efforts have been made to consider, whenever applicable, the utilization of zero GWP technologies. Enterprises operating in the domestic refrigeration sector are especially affected by these guidelines, due to recently developed zero GWP technology for domestic refrigeration based on the use of hydrocarbon refrigerants. Zero GWP, zero ODP hydrocarbons are being used by an increasing number of manufacturers of domestic refrigeration in the West as it has begun to gain international acceptance as a best practice green technology. Germany and the Scandinavian countries have led the efforts to introduce the hydrocarbon technology for domestic refrigeration, and several pilot projects for hydrocarbon conversion have recently been initiated in other parts of the world.

The major viability issue underlying the use of hydrocarbon technology is one of conversion investment cost to the enterprise at a time when their market for the hydrocarbon-based product is either nonexistent or weak at best. Some Western manufacturers have been able to afford this investment. Most FSU enterprises would find it difficult to earn a satisfactory profit margin were they to employ a technology which still faces many market and regulatory barriers largely beyond their control.

¹ Hydrocarbons actually have a negligible GWP of 3 relative to HFC-134a which has a GWP of 1300 integrated over 100 years, hence, for all practical purposes, hydrocarbons are commonly referred to as having "zero GWP".

Finally, NORD must consider the Government of Ukraine's formal commitment under the Montreal Protocol to phaseout its consumption of CFCs entirely by the year 2000. This timeframe is a key factor in determining the feasibility of financing any option selected by NORD.

Ultimately, therefore, the choice involves selecting a commercially realistic technology option which is: (1) in line with NORD's present technical and financial capabilities; (2) responsive to real commercial product demand within its traditional market areas; (3) takes account of Ukraine's official treaty obligation to meet its year 2000 Montreal Protocol ODS phaseout commitment - even within a very difficult economic environment; and (4) updates the enterprise with technological and environmental trends.

Key Considerations Confronting NORD

- A HFC-134a conversion is a lower investment cost zero ODP refrigerant than hydrocarbons but has a residual GWP factor which would prolong a zero GWP phase-out schedule for NORD.
- Product certification and consumer safety standards for hydrocarbon-based domestic refrigeration appliances have not yet been established in Ukraine or the rest of its CIS market.
- The HFC-134a choice is economically and financially feasible today and consistent with GEF and Montreal Protocol guidelines for Ozone Depleting Substance (ODS) phase-out (CFC phase-out by 2000).
- The TA package associated with the HFC-134a option would help NORD maintain its financial viability and market momentum while remaining on track towards meeting the goals of both the Montreal Protocol ODS phase-out timetable and the GEF GWP policy requirement.
- NORD is the second largest domestic refrigeration manufacturer in the FSU, and it has considerable export potential within the CIS.
- NORD had already committed substantial investment in the HFC-134a option for phasing out CFC-12.
- GEF confirmed to NORD management that while the GEF could conceivably finance either a HFC-134a conversion (in conjunction with a suitable TA package for a subsequent conversion to hydrocarbon), or a direct hydrocarbon conversion, it could not finance both.

A Win-Win Solution for NORD and the GEF

TECHNOLOGY ALTERNATIVES

HC-600a (isobutane) is the primary zero GWP alternative considered:

HFC-134a	HC-600a
Technically feasible	Technically feasible
Non-flammable	Flammable
84% less GWP than CFC-12	100% less GWP than CFC-12
Minimal redesign, moderate effort already completed	Requires extensive product re-design effort (>15 models)
Minimal infrastructure and production disturbance	Substantial infrastructure development and production disturbance
More moderately increased charge from CFC-12	Double the charge of CFC-12
Proceed directly to conversion of production facilities	Re-design lead time needed before conversion can begin
Development of product certification/ consumer safety standards not required	Requires approx. 1.5 year product certification period/consumer safety program
Incremental safety requirements are minimal	More substantial incremental safety features required
Lower cost to GEF	Higher cost to GEF
Lower investment cost to enterprise	Higher investment cost to enterprise
Enterprise has already made investments toward this technology	No investments made to date
2-year conversion cycle	4-year conversion cycle

GLOBAL ENVIRONMENTAL IMPACTS OF ALTERNATIVES

OPTIONS	SCENARIO	Post Year 2000 Impacts
1. Continued Use of CFC-12	Dependency on illegal supplies/ black market- or NORD put out of business by MP	Ongoing contribution to global warming and ozone depletion
2. Conversion directly to hydrocarbons	Long lead time- will continue to consume CFC-12 in interim 2-year period and sustain short term demand for illegal supplies	2 years of contribution to global warming and ozone depletion; after 2002, zero contribution.
3. Long-term conversion to HFC-134a	No consideration of hydrocarbons	No contribution to ozone depletion. Equivalent of 2 year contribution to global warming for first 6 years. After 6 th year, global warming contribution continues at this slower rate.
4. Conversion to HFC-134a and hydrocarbons within 6 years on their own	Combination of HFC-134a and hydrocarbons (TA package)	No contribution to ozone depletion; equivalent of 2 years contribution to global warming for first 6 years. After 6 th year-zero contribution.

OPTION 1 is a lose-lose solution
 OPTIONS 2 and 3 have various trade-offs to consider
 OPTION 4 is the closest to a win-win solution

АКЦИОНЕРНОЕ ОБЩЕСТВО
"НОРД"

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"NORD"

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9.10.97 № 60

Representatives of the World
Bank of Reconstruction and
Development
Mrs. Carin Shepardson
252070 Kiev
Pochaininskaya st., 38/44
2 floor

Dear Mrs. Carin Shepardson!

We appreciate your work and the work of your colleagues - experts, directed to the final modification for the presenting of the GEF transmitting projects SC «Nord» to ODS refrigerants and foam penopoliuritan heat insulation.

SC «Nord» unconditionally tends to fulfill requirements of the Montreal Agreement Protocol, that will be possible with project realization in accordance with jointly designed plans, schedules, lists of equipment and other activities with the World Bank experts.

We consider advantageous to unite the transmitting sub-projects to the CFC-134a-R 600a and cyclopentan (foam) in one project.

In the project part of transition to isobutan R 600a we confirm that SC «Nord» will finance its local works in accordance with project total amount 500 000 \$.

At the same time in the purpose of transmitting project implementation to R 600a we need an aid (financing) of the World Bank in total amount of 500 000 \$ to finance of the work of the foreign consulting organizations, contractors, as it drawn in the project agreed with your experts.

In accordance with your expert recommendations, during the project implementation SC «Nord» will establish a special Committee of technical safety with participation of the leading specialists and workers on the base of existing safety engineering.

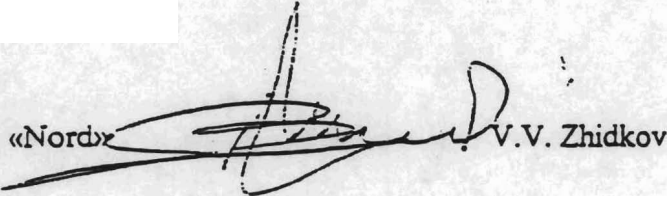
This Committee will at once commit to the SC «Nord» Management and have authorities to stop the production in conditions of extreme explosion and fire situations.

We'd like to inform you that SC «Nord» already started engineering works on preparation of necessary documentation of the equipment, covered in the project with purpose of following purchase.

In conclusion we'd like to impress a hope that confirmation of the agreed transmitting project of SC «Nord» transition to the ODS refrigerants and foams will be successfully finished in October - November, 1997.

Best regards.

General director of SC «Nord»


V.V. Zhidkov

ANNEX IV

RATIFICATION OF LONDON AMMENDMENT





ЗАКОН УКРАЇНИ

Про ратифікацію Поправок до Монреальського протоколу про речовини, що руйнують озоновий шар

Верховна Рада України постановляє:

Поправки до Монреальського протоколу про речовини, що руйнують озоновий шар, підписані від імені України 29 червня 1990 року в м. Лондоні, ратифікувати.

Голова Верховної Ради
України

М. К. И-У в

22 листопада 1996 року

№ 545/96-ВР

О. МОРОЗ