

**GLOBAL
ENVIRONMENT
FACILITY**

15326

Russian Federation
Ozone Depleting Substance Consumption
Phase-out Project

Project Document
May 1996



THE WORLD BANK

GEF Documentation

The Global Environment Facility (GEF) assists developing countries to protect the global environment in four areas: global warming, pollution of international waters, destruction of biodiversity, and depletion of the ozone layer. The GEF is jointly implemented by the United Nations Development Programme, the United Nations Environment Programme, and the World Bank.

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Infrastructure, Energy and Environment Division
Country Department III
Europe and Central Asia Region

CURRENCY EQUIVALENT

(Figures are as of end of month)

Currency Unit = Ruble (RB)	Rubles US Dollar
December 1991	169
December 1992	415
December 1993	1,247
December 1994	3,550
December 1995	4,640

Grantee's Fiscal Year

January 1 - December 31

WEIGHTS AND MEASURES CONVERSIONS

<i>Metric System</i>	=	<i>US System</i>
1 meter (m)	=	3.2808 feet
1 kilometer (km)	=	0.6214 mile
1 square meter (m ²)	=	1.196 square yards
1 metric ton (ton)	=	1.102 short tons

ACRONYMS AND ABBREVIATIONS

CFC	Chlorofluorocarbon	MEPNR	Ministry of Environmental Protection and Natural Resources
CPPI	Center for Project Preparation and Implementation	MFMP	Multilateral Fund for the Implementation of the Montreal Protocol
CTC	Carbon Tetrachloride	MLN	Million
EA	Environmental Assessment	MP	Montreal Protocol on Substances that Deplete the Ozone Layer
EMP	Environmental Management Project	MT	Metric Ton
FSU	Former Soviet Union	NPAF	National Pollution Abatement Facility
HAP	Hydrocarbon Aerosol Propellant	ODP	Ozone Depleting Potential
HCFC	Hydrochlorofluorocarbon	ODS	Ozone Depleting Substances
HFC	Hydrofluorocarbon	ODS	Ozone Depleting Substances Phase-Out Implementation Unit
GEF	Global Environmental Facility	PIU	Phase-Out Implementation Unit
GET	Global Environmental Trust Fund	OORG	Ozone Operations Resource Group
ICB	International Competitive Bidding	OTF	Ozone Projects Trust Fund
IS	International Shopping	PPA	Project Preparation Advance
LPG	Liquefied Petroleum Gas	SA	Special Account
MCF	Methyl Chloroform	STAP	Scientific and Technical Advisory Panel
		TA	Technical Assistance

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT

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PART 1: PROJECT SUMMARY

RUSSIAN FEDERATION

OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

GRANT AND PROJECT SUMMARY

Recipient:	Russian Federation		
Executing Agency:	Ministry of Environmental Protection and Natural Resources (MEPNR)		
Beneficiaries:	MEPNR and Enterprises using Ozone Depleting Substances		
		<u>Project</u> (US\$ million)	<u>Tranche 1</u> (US\$ million)
Financing Plan:			
	Enterprise Contribution ¹	44.3	12.7
	GEF Grant	60.0	8.6
On lending Terms:	Grant		
Economic Rate of Return:	N/A		
Poverty Category:	N/A		

1 Incremental capital investments exclusive of incremental operating cost.

RUSSIAN FEDERATION

OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

I. COUNTRY SECTOR BACKGROUND

1. General recognition of upper atmosphere ozone depletion and its global impacts in the mid-1980's has led to a substantial international effort in phasing out various substances that deplete stratospheric ozone². This effort includes the Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) (MP). Ozone Depleting Substances (ODS) whose production and use is regulated by the MP include chlorofluorocarbons (CFCs), halons, several halogenated solvents, and a class of transitional chemicals known as hydrochlorofluorocarbons (HCFCs). The MP has been ratified by more than 150 countries accounting for over 95 per cent of global consumption of ODS. It initially set 2000 as the target phase-out date for developed countries and gave a 10-year grace period for developing countries. Further recognition that ozone depletion is occurring more rapidly than first anticipated has led to two protocol amendments which add regulated materials and accelerate phase-out. The London Amendment in June, 1990 added the two solvents, methyl chloroform (MCF) and carbon tetrachloride (CTC), as well as tightening the phase-out schedule. The Copenhagen Amendment in November, 1992 further accelerated phase-out and added transitional substitute materials (HCFCs) and methyl bromide as regulated substances. The current developed country phase-out date for CFCs, MCF, and CTC was January 1996 and January 1994 for halons. Production levels of HCFCs were frozen as of January 1996 with progressive reduction to phase-out in 2030.

2. Most developed countries have made good progress in eliminating ODS. New consumption phase-out should have been effectively completed by the January, 1996 deadline. Progress in developing countries is also progressing and many countries will likely be phased out by about 2000. Complete phase-out in India and China, the major developing country producers and consumers of ODS, will extend beyond this date, but should occur ahead of the current developing world deadline of 2010. The only major producers and consumers of ODS making slow progress toward ODS phase-out are the countries of the Former Soviet Union (FSU). The FSU ratified the MP in November, 1988 as a developed country. The Russian Federation continues the FSU membership in the Protocol and ratified the London Amendments in January, 1992. However, ratification of the Copenhagen Amendments has not occurred. Based on its ratification

² The ozone layer forms a thin shield in the stratosphere protecting flora and fauna from the sun's harmful ultra violet radiation. Ozone layer thinning can cause impacts such as increased skin cancer incidence, eye cataracts, decreased plant productivity, and deterioration of the marine food chain. CFCs and other similar chlorinated chemicals widely used in refrigeration, foam blowing, aerosol sprays, industrial solvents and fire protection were found to be causing ozone layer destruction. These chemicals also have significant global warming potential.

status as a developed country under the MP, Russia's obligations for ODS phase-out are in accordance with the accelerated developed country schedule (halons - January 1994, and CFC, CTC and MTC - January 1996). This status also carries a requirement for contributions to the Multilateral Fund for the Implementation of the Montreal Protocol (MFMP), which has been created to provide financial support to eligible developing countries in meeting their MP obligations. Furthermore, Russia is obligated to stop exports of ODS to countries which are not parties to the MP. Russia is the sole producer of ODS among the countries of the FSU, although feedstocks in the form of CTC is supplied to Russian CFC producers from Ukraine. In effect, the republics of the FSU are currently dependent on Russian supplies, such as essential coolants for refrigeration and air conditioning equipment. Of these countries, Belarus, Ukraine, Uzbekistan and Turkmenistan are the only ones to have ratified the MP and only Turkmenistan has ratified the London Amendment

3. Russia is one of the world's largest producers and consumers of ODS. In 1990 when production peaked, it was estimated that 198,000 MT was produced, accounting for between 15 - 20% of world production. In 1992, Russian ODS production had fallen by 26% to 146,500 MT (including 21,000 MT HCFC and 59,000 MT CTC). This production supplies 100% of the domestic market, as well as the requirements of the countries of the FSU, and other export markets that continue to exist. Russian domestic consumption also peaked in 1990 at approximately 70,000 MT and had fallen in 1992 by 40% to 48,365 MT (equivalent to 44,114 MT ozone depleting potential (ODP)) which amounts to an annual ODP weighted per capita consumption of 0.3 kg. Based on 1992 data, five sectors account for Russia's ODS use: aerosols (46%), refrigeration and air-conditioning (27%), fire protection (14%), foams (11%) and solvents (2%). Current data on ODS production and consumption are not compiled in a consolidated form, but it is apparent that reductions in ODS consumption and production continue to occur. This is primarily due to the current economic conditions and to voluntary conversions that are occurring in the aerosol and refrigeration sectors, where limited progress has been made in committing the investments in technological change necessary to sustain phase-out. However, it is also observed that ODS consumption is starting to increase among some consumers in the aerosol and refrigeration sectors. Uncontrolled exports of ODS materials originating in Russia is also becoming an issue of concern. In summary, the current developed country phase-out time table as mandated by the MP is unrealistic for Russia and it will not be able to meet its MP phase-out obligations.

II. ODS PHASE-OUT STRATEGY

5. Development of an ODS Phase-Out Country Program describing an achievable phase-out program was completed in August 1994 with Danish support and Bank input. Assuming international financial assistance is available, the Country Program targets ODS phase-out for 1999, somewhat ahead of the London Amendment schedule (January 2000), but slower than the Copenhagen Amendment schedule (January 1996). Production would be phased out consistent with domestic consumption phase-out schedules, and phase-out in countries of the FSU to which Russia is the sole supplier, particularly Ukraine and Belarus. GEF-funded Project preparation work in the aerosol and refrigeration sectors has identified a wide range of candidate sub-projects, from which those included in this Project have been selected. Bilaterally funded Project preparation work is underway in the solvent, foam and fire protection sectors, and is being considered in the refrigeration servicing sector. The Bank is also developing a production phase-out project directed at consolidation and closure of Russian ODS producing facilities, along with development of ODS substitute production.

6. A position paper summarizing the Russian Country Program and phase-out strategy has been prepared by the Ministry of Environmental Protection and Natural Resources (MEPNR) and was submitted to the May 1995 meeting of the Parties to the Montreal Protocol (the Parties). This Country Program has since been formally adopted by the government with the issuing of a Government Resolution that provides a legal basis for its implementation. While considered in compliance with the control measures of the MP in 1995, Russia has acknowledged that it will be in a non-compliance position beginning in 1996 and has conveyed its commitment to ODS phase-out as set out in the Country program to the Secretariat of the Vienna Convention and Montreal Protocol. It has also resumed formal reporting of ODS consumption, production and trade as required under its obligations to the MP. At the November 1995 meeting of the Parties, Russia agreed to provide additional information relating to the country's political commitment, implementation progress, and enforcement measures, particularly in regard to trade regulations. An agreement was also reached between Russia and the Parties on issues associated with exports. Russia's export of ODS to other supply dependent countries in the FSU after January, 1996 would be accommodated on a transitional basis, conditional on it also taking the necessary action to ensure no re-export takes place from these countries. Russia has agreed to comply fully with the overall export ban requirements of the MP to other countries.

7. Following the meeting of the parties to the MP in Vienna in November 1995, and pursuant to the letter dated January 5, 1996 from the Ozone Secretariat, Russia provided the following information:

- a) confirm the political commitment on the phase-out plan for ozone depleting substances by the Russian Federation;
- b) Define necessary linkages between the sectoral approach outlined by the Russian Federation in its submission and the specific requirements for the financial, institutional and administrative arrangements towards the implementation of such measures;
- c) Outline the gradual achievement of the proposed phase-out plan; and
- d) Define the proposed measures for the enforcement of the phase-out plan; in particular the enforcement of the trade regulations.

8. Russia is expected to be a developed country contributor to the Multilateral Fund for the Implementation of the Montreal Protocol (MFMP). While no contributions have been made to date, the Russian Government has undertaken to resolve its current arrears position and fully address its obligations when its economic conditions improve. Annex 3 contains the Country Program position paper, and Government Resolution confirming adoption of the country program phase-out strategy.

9. Russia has established the basic institutional structure to support the implementation of the proposed ODS phase-out program as defined in the Country Program. An Inter-Agency Commission for the phase-out of ODS has been created to coordinate ODS policy among all relevant government agencies utilizing specific subcommissions dealing with legal, technical, economic/institutional, and monitoring aspects. Responsibility for ODS phase-out activities has been assigned to the Ministry of Environmental Protection and Natural Protection (MEPNR). Initially an ODS Task Force was established by ministerial decree within the MEPNR, to act as Secretariat of the Commission. Subsequently this role along with overall implementation responsibility for both institutional and investment aspects of the Country Program have been assigned to the Center for Project Preparation and Implementation (CPPI).

10. In order to support the Country Program, substantial investment in replacement facilities and technology is required for conversion from ODS use and production of non-ODS substitutes. Additional costs and associated social impacts will be incurred with the shutdown of the country's substantial ODS production capability. Russia will require substantial external financial assistance to undertake investments for ODS phase-out as outlined in the Country Program. As a developed country signatory to the MP, it is not eligible for assistance from the MFMP. However, it is eligible for Global Environmental Facility (GEF) funding, for which the Bank acts as an implementing agency.

III. PROJECT OBJECTIVE

11. The overall objective of the Project is to assist Russia in the phase-out of ODS consumption, in a manner consistent with international efforts in the field, while ensuring that this is accomplished with the minimum of economic dislocation. The Project's more specific objectives are: i) to allow Russia to credibly initiate meeting its ODS consumption phase-out obligations under the MP within a realistic time frame; ii) to facilitate access to financial resources needed for ODS consumption phase-out from a range of international and domestic sources; iii) to provide necessary technical assistance and institutional strengthening; iv) to fund enterprise specific investments in critical high consumption sectors; and v) to ensure that ODS phase-out activities accommodate economic and social impacts that may result.

IV. PROJECT DESCRIPTION

12. This Project is the first GEF funding operation for ODS phase-out in Russia. It targets priority ODS consumption phase-out activities in the aerosol and refrigeration sectors, along with the provision of modest technical assistance at both the institutional and enterprise levels to facilitate and accelerate Country Program implementation. It is structured as a framework project for a total GEF grant amount of US\$60.0 million. The Project consist of: (i) an investment component to finance some 21 sub-projects for ODS phase-out in the aerosol and refrigeration sectors amounting to a total grant of US\$ 57 million; (ii) a technical assistance component to strengthen project implementation and institutional capacity (US\$ 1.3 million); and (iii) a sub-grant processing component (US\$ 1.7 million). The proposed investment sub-projects are summarized in Schedule A - Table A1, along with their cost estimates. The total capital investment for these sub-projects is US\$101.3 million. The individual sub-projects have been selected by the MEPNR with World Bank assistance from those candidate sub-projects in the aerosol and refrigeration sectors identified through work undertaken under a GEF Project Preparation Advance. The agreed criteria for their selection and prioritization is provided in Annex 4. The selected sub-projects have been reviewed and approved as suitable for appraisal by the Ozone Operations Resource Group (OORG) established under the MFMP to provide technical advice on technology selection.

13. The framework Project will be processed in three tranches as funds are approved by the GEF Council. The first tranche³ (US\$8.6 million) covers two investment sub-projects, one in each of the aerosol (US\$5.65 million) and refrigeration (US\$1.976 million) sectors, as well as a technical assistance (TA) component (US\$ 0.748 million) designed to strengthen Project implementation and institutional capability, and a sub-grant processing component (US\$0.226 million). The first

³ The first tranche was approved by the GEF Council in May 1995, on the basis of two aerosol sector sub-projects (JSC Arnest and JSC Halogen). However, prior to appraisal JSC Halogen indicated they were not ready for appraisal of their project. As a consequence, a well prepared refrigeration sector sub-project at JSC Krasnoyarsk Refrigerator Plant has been substituted.

tranche was approved by the GEF Council in May 1995. Appraisal of the first tranche investment sub-projects and the TA component was completed in November 1995. The second tranche (US\$35.0 million) covers six remaining aerosol and five representative refrigeration sub-projects. This tranche was approved by the GEF Council in April 1996. The third tranche (US\$16.4 million) will cover all remaining domestic refrigeration sub-projects and an initial refrigeration servicing sub-project. These will be proposed for GEF Council approval once implementation of the first two tranche sub-projects have been initiated. The Project addresses the two largest consuming sectors, aerosol and domestic refrigeration, plus one sub-project in the commercial refrigeration sector. It effectively provides for complete phase-out of ODS consumption in the commercial and industrial aerosol sector, and will complete phase-out in the major and most cosmetic viable domestic refrigeration manufacturers. Future GEF and donor funded projects may follow to address remaining ODS consumption in the industrial/commercial refrigeration, refrigeration servicing, solvent, foam and fire protection sectors. This will be dictated by the availability of financial resources and long term viability of enterprises in these sectors. The Bank is also assisting the Government on a parallel initiative related to ODS production phase-out, which involves the setting up of a separate funding facility to be financed through bilateral contributions.

14. **Aerosol Sector ODS consumption** in the form of CFC propellants in Russia likely represents the largest and most cost effective single consumption phase-out opportunity in the world today. The Russian Federation has an established aerosol industry that continues to consume large quantities of CFCs. The CFC aerosols (78% of total aerosols) are strongly favored by the cosmetic industry and are selling readily even in a suppressed economy. In 1992, consumption of CFCs by the aerosol industry totaled 18,150 MT, approximately 46% of the total ODS consumed in Russia. Of this total 17,908 MT were consumed in cosmetics and industrial applications with the remaining being used in pharmaceutical applications. Since that time, one major aerosol producer (Chilton) has undertaken conversion to non-ODS propellants using its own resources, resulting in an overall decline in consumption. However, those continuing to use CFCs have generally maintained consumption despite economic conditions, with the most recent trends indicating that consumption is again rising. Sub-projects are proposed within the overall Project framework to eliminate ODS consumption at all seven major current ODS users producing commercial and industrial aerosol products. The beneficiary enterprises accounted for 85% of the ODS used in the aerosol sector in 1992. Based on 1994 consumption figures, 13,121 MT will be phased out by the overall Project with 2,456 MT, and 10,665 MT being achieved through the first, and second tranches respectively. Phase-Out in the aerosol sector is efficient and cost effective with low unit abatement costs. With one exception, where mechanical pumps are proposed (Altaichimprom), all sub-projects utilize hydrocarbon aerosol propellant (HAP) as a replacement for CFC propellant in common aerosol sprays. HAP is a purified form of liquid petroleum gas (LPG). The technology for use of HAP propellants has developed globally since 1980 and is readily available.

While current Russian HAP production capacity is limited, investment projects to add capacity have been initiated in direct response to the demand created by these conversions. It is anticipated that additional supply will be added rapidly as further demand develops. Excess capacity also exists in several neighboring European countries.

15. The first tranche sub-project at JSC Arnest involves the elimination of 2,456 MT of CFC consumption in a 40 million can/year facility. The required investment involves replacement of its valve manufacturing facility, conversion of filling lines to HAP; provision for HAP purification facilities, and supporting infrastructure to store and handle highly flammable HAP. The enterprise's existing can-making facilities will not be replaced. A dedicated supply of HAP has been identified and contracted for at a refinery in the region that is installing the necessary production capability. The GEF sub-grant (US\$5.7 million) serves as a key stimulus for the enterprise to invest an additional US\$10.1 million in the plant conversion. The enterprise is able to undertake its portion of the investment out of internally generated funds, but would be unable to complete the overall investment without GEF support. Due to the extensive preparatory work that has been undertaken by the enterprise this phase-out can be achieved relatively quickly, with a targeted completion date of late 1998. Annex 2, Part 2 provides a detailed description of the enterprise and sub-project based on information obtained during appraisal.

16. **Refrigeration Sector ODS consumption** of refrigerant (CFC-12, HCFC-22), foam insulation blowing material (CFC-11) and solvents (CFC-113) was 3,594 MT/year in 1993 for the manufacture of domestic, commercial and industrial refrigeration products. In addition, the refrigeration servicing sector is estimated to account for an annual consumption of 4,500 MT/year. Twelve domestic refrigerator manufacturers, four stand-alone domestic compressor producers, six commercial refrigeration equipment manufacturers and eleven industrial refrigeration equipment manufacturers have been identified in the overall sector. Eleven investment sub-projects (five refrigerant and six foam) in six of the largest domestic refrigerator manufacturers have been selected for the Project. These manufacturers accounted for 77% of ODS consumption in the domestic refrigeration sector in 1993. In these enterprises 1,972 MT/year ODP will be phased out based on current consumption rates. In addition, two investment sub-projects in the major commercial refrigeration equipment manufacturer have been included in the Project. This accounts for 68 MT/year ODP phase-out. The remaining enterprises in the domestic, commercial and industrial refrigeration sectors have not established viable phase-out investment plans and are generally operating at low capacity. Many of these plants are expected to close down, as they are not commercially viable. The refrigerant sub-projects involve the replacement of CFC-12 refrigerant with HFC-134a or, in one case, a propane/butane mixture. Use of HFC-134a⁴ or

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The enterprise's decisions on technology are based on an in-depth analysis of commercially available technologies, prevailing local market conditions and export potential. Consideration of emerging technology such as hydrocarbon mixtures, was encouraged during Project preparation. A workshop was organized in Moscow to inform the enterprises of recent developments in natural fluid refrigeration and to encourage more in-depth consideration of the technology. At appraisal, those enterprises which are not too advanced in their engineering work for conversion will be again provided with the opportunity to evaluate their final choice of technology through the provision of specialized technical support. The practicality of selecting or changing to an alternative technology such as

hydrocarbons is a generally accepted choice for refrigerant replacement in many western countries. HFC-134a is not currently produced in Russia, although it can readily be imported and plans for its' production in place of CFCs are under consideration. The foam sub-projects involve the replacement of CFC-11 insulating foam blowing agents with cyclopentane, or in one case with HFC-134a. Cyclopentane is a globally accepted foam blowing agent substitute in refrigeration applications, and offers equivalent long term properties to CFC-11 foams.

17. The first tranche sub-project at JSC Krasnoyarsk Refrigerator Plant (KRP Biruyusa) involves the phase-out of 117 MT/year ODP through conversion of the existing facilities from CFC-12 refrigerant to a propane/butane hydrocarbon mixture. The investment covers the modification of testing and charging infrastructure, conversion of the charging line for flammable hydrocarbon use, and construction of hydrocarbon storage and handling facilities. The existing compressor design has been demonstrated as suitable for direct substitution of a butane/propane mixture. The GEF sub-grant (US\$1.976 million) serves as a key stimulus for enterprise contribution of a significantly larger portion of the investment (US\$4.74 million). The enterprise is able to undertake its portion of the investment out of internally generated funds, but would be unable to complete the overall investment without GEF support. This phase out can be achieved relatively quickly, with a targeted completion date of early 1998. Annex 2 Part 2 provides a detailed description of the enterprise and sub-project based on information obtained at appraisal.

18. **The Technical Assistance Component** will strengthen Russian institutional capacity for ODS Phase-Out, and provide implementation support for the Project's investment activities. This will supplement current resources available within the MEPNR, including those available through the World Bank's Environmental Management Project (EMP). The technical assistance component of the Project has been allocated a total funding of US\$1.3 million. The first tranche TA component of US\$748,000 has four sub-components covering the following key activities: i) development and implementation of the comprehensive policy and regulatory framework for ODS phase-out, including sector specific bans, licensing and tax measures (US\$200,000); ii) establishment of an effective system for monitoring of ODS production, consumption, recycling and phase-out investment in Russia (US\$190,000); iii) supplementary sub-project preparation support to respond to gaps in existing preparation information (US\$180,000); iv) strengthening of sub-project appraisal and implementation capacity within the CPPI and beneficiary enterprises through provision of training, and appraisal guidance documentation (US\$100,00); and v) development of a public awareness and information program (US\$78,000). The balance (US\$552,000) of the TA component has been allocated to the second tranche to assist the six major ODS producers to evaluate different technology options for production of ODS substitute materials. Having recently reached agreements with these producers on compensation packages for ODS production phase-out, this assistance is now an urgent priority. Annex 2, Part 4 provides a more detailed description of the TA component.

hydrocarbon will be assessed in relation to: (i.) the amount of preinvestment already committed to a particular technology, (ii.) the time and additional investment required to change technologies at that point, and, (iii.) safety and locational considerations.

19. **A Sub-grant Processing Component** of US\$1.7 million has been allocated for the Project consistent with other MP financed projects using a financial intermediary. Of this amount US\$226,000 will be available for processing the first tranche projects through to sub-project start up. The funds will be utilized by the ODS PIU for its own operating costs, as well as for the hiring of consultants to assist it in Project appraisal and supervision of procurement and Project implementation.

20. The cost of Project feasibility studies has totaled US\$1,250,000, which includes US\$950,000 provided by GEF Project Preparation Advances for the aerosol and refrigeration consumption sectors, as well as for ODS production phase-out, and US\$300,000 by the United States Trade and Development Agency for solvent, foam and fire fighting sector Project preparation now in progress.

V. PROJECT COSTS AND FINANCING

21. The criteria for determining the GEF grant component of each sub-project has been based on that utilized by the MFMP. This approach has been adopted by previous GEF ODS projects in the transition economies of Europe on the basis that GEF Participants approving funding for these projects are also Parties to the Montreal Protocol and for the most part contributors to the MFMP. It is also consistent with the requirement of the GEF Operational Strategy adopted in October, 1995. The GEF funding for this Project is restricted to incremental investment costs. Incremental operating costs, while eligible, have been excluded due to limitations on the availability of GEF funding. Eligibility for retroactive financing will be determined at sub-project appraisal in accordance with the requirements set out in the GEF ODS Operational Strategy and consistency with World Bank procurement practices. It was agreed at negotiations that the maximum amount of expenditures eligible for retroactive financing, under this Project, would be US\$6 million. Such expenditures would have to be incurred after July 31, 1995. Proceeds of the GEF grant will not be used for government duties or taxes, which have been included in the costs to be covered by the enterprises from their own internally generated funds.

22. The overall framework Project costs and anticipated financing are summarized in Table 1 and further detailed in Schedule A, Tables A1 and A2. The total Project cost is estimated to be US\$104.3 million, of which US\$101.3 million is for sub-project capital investments, US\$1.7 million is a sub-grant processing charge and US\$1.3 million is for technical assistance. The GEF grant of US\$60 million will contribute US\$57 million towards the cost of sub-project investments and the balance will fund the sub-grant processing and technical assistance components. The balance of sub-project investment costs (US\$44.3 million) will be financed by enterprise funds and commercial banking sources. It was agreed at negotiations that a clause would be inserted into the sub-grant agreements with the beneficiary enterprises that would commit them to providing the counterpart funds.

23. For the first tranche, including an aerosol sub-project and a domestic refrigeration refrigerant conversion sub-project, as well as a technical assistance and sub-grant processing component, the total Project cost is estimated to be US\$21.3 million, as shown in Table 1. Of this amount, US\$8.6 million will be provided by the GEF grant for GEF eligible costs, including US\$7.6 million for enterprise specific sub-projects, US\$0.226 million for sub-grant processing and US\$0.748 million for technical assistance. The balance of US\$12.7 million will be financed by enterprise funds and commercial banking sources. No retroactive financing is required for the first tranche investment sub-projects.

Category	Incremental Capital Costs ^{1/}		Project Finance Plan			
	Project	First Tranche	GEF		Enterprises	
			Project	First Tranche	Project	First Tranche
Aerosols	47.1	15.8	29.0	5.6	18.1	10.2
Refrigeration	54.2	4.5	28.0	2.0	26.2	2.5
TA/Institutional Strengthening	1.3	0.8	1.3	0.8		
Sub-grant Processing	1.7	0.2	1.7	0.2		
TOTAL	104.3	21.3	60.0	8.6	44.3	12.7

^{1/} Includes 10% physical contingencies on sub-project capital costs

24. Schedule A summarizes the Project's cost and financing plan by sub-project. Appraisal of the two sub-projects in the first tranche has verified these cost estimates. During appraisal it was confirmed that the beneficiary enterprises have the capacity to meet their portion of the required investment from internally generated funds and have agreed to give priority to financing these investments (see Annex 2). The cost estimates and financing plans for second and third tranche sub-projects are based on information developed during Project preparation. They are currently being updated in accordance with Ozone Operations Resource Group (OORG) reviewers' comments and will be further verified during the appraisal of these sub-projects.

VI. PROJECT IMPLEMENTATION ARRANGEMENTS

Implementation Arrangements

25. Existing institutions, which are now established, will be responsible for various aspects of Project implementation as agreed at appraisal (Annex 1). The Government has assigned the MEPNR responsibility as executing agency for the Project. Within the MEPNR, responsibility for implementation of the Project is assigned to the CPPI, which will coordinate its implementation within the framework of the Country Program and with other Government agencies through the Inter-Agency Commission for ODS phase-out. The CPPI operates under the MEPNR for implementation of the Russia Environmental Management Project (EMP) and other internationally financed projects. A Project Administration Agreement between the MEPNR and the CPPI was executed as agreed prior to Board presentation.

26. Within the CPPI, two ODS PIUs will manage the investment and institutional aspects of the Project. The ODS Investment Project Unit will manage sub-project appraisal and sub-grant approval, supplementary Project preparation activities related to ODS consumption and production phase-out and will supervise sub-project implementation. This unit will be associated with the National Pollution Abatement Facility (NPAF) within the CPPI. The second unit, named the ODS Country Program Unit, will be associated with the EMP institutional strengthening components of the CPPI. It will be responsible for managing the Project's technical assistance components related to strengthening of the regulatory and ODS phase-out monitoring capacity of the Government, enhancement of Project implementation capacity, and development of public awareness initiatives. In addition it will assist the the MEPNR in interfacing with international agencies including preparation and submission of ODS monitoring reports required by the Parties to the MP. The staffing requirements of these two units were discussed and agreed at negotiations.

27. The beneficiary enterprises will have direct responsibility for implementation of the investment sub-projects. They will be supported by the CPPI's procurement, administrative and financial management capacity developed for the EMP, in order to ensure that they meet Bank practices and procedures. The ODS Investment Project Unit will be responsible for providing support for sub-project appraisal, sub-project implementation supervision, procurement advice, disbursement approvals, financial and progress reporting, and ensuring compliance with GEF procedures. Where necessary, this unit will involve the National Pollution Abatement Facility⁵⁾ (NPAF) in assisting enterprises in the preparation of financing packages and facilitation of co-financing arrangements. Individual sub-projects will be covered by sub-grant agreements between the beneficiary enterprises and the CPPI acting on behalf of the MEPNR. Sub-projects will be approved in accordance with the Bank's trustee obligations to GEF and individual sub-project funding will be subject to prior approval by the GEF. Draft sub-grant agreements for the two sub-

⁵⁾ The NPAF has been set up under the EMP as an independent facility to finance commercially viable pollution control projects in Russia.

projects in the first tranche have been discussed at appraisal. Execution of sub-grant agreements between the CPPI and the beneficiary enterprises are conditions of disbursement of sub-grants. Sub-grant agreements include the following provisions: implementation of Project with due diligence and efficiency; maintenance of records and accounts; auditing of financial statements; procurement of goods, works and services, according to World Bank procedures; independent inspection of physical completion; insurance provisions; regular reporting on financial condition of the enterprise; suspension of grant for non-performance; refunding grant in case of misuse; and preparation of a completion report.

Procurement and Disbursement

28. Procurement of goods and services will be in accordance with Bank Guidelines as set out in Schedule B. For the first tranche, detailed procurement plans for the two enterprises were agreed at appraisal (Tables B3 and B4) with sub-grant funds being allocated primarily to imported equipment to be purchased using International Competitive Bidding (ICB) or International Shopping (IS) procedures. Projected summary procurement arrangements for the overall Project first and for the tranche are also included in Schedule B as Tables B1 and B2. The detailed procurement plans for the second and third tranches will be finalized upon appraisal of individual sub-projects included in these tranches. It is expected that the first tranche projects would start in June 1996 and be completed by December 1998. With approval of the second tranche the sub-projects in this tranche are expected to begin in January 1997 with completion expected in June 1999. The implementation schedule for the remaining sub-projects in tranche 3 will be dictated by the date of GEF Council approval, but can be anticipated to cover a two and one-half year implementation period. Disbursement arrangements and expected schedule of disbursement are given in Schedule B as Tables B5 and B6. The Project completion date is December 31, 2000.

Monitoring and Evaluation

29. The closing date for the grant is December 31, 2001. The CPPI will have overall responsibility for monitoring Project progress. It will prepare brief monthly, as well as quarterly progress reports summarizing progress on Project implementation, disbursement, and highlighting issues and follow up actions to ensure that the Project remains on schedule. An improved system of timely monitoring of ODS consumption and production will also be adopted and regularly reported. The CPPI will also be responsible for preparation of a Project Completion Report, to be completed within six months of the end of Project implementation. Specific Project performance indicators were developed and agreed at appraisal. These are provided in Table 2.

Accounts and Audits

30. A computerized Project accounting system has been set up in the CPPI to provide timely and accurate reporting of Project expenditures for the EMP. This system is already being used for financial reporting of expenditures and disbursements for the GEF ODS PPA account and will

continue to be used for the duration of the ODS Project. These accounts, as well as beneficiary enterprise accounts will also be subject to independent audit by an internationally recognized auditing firm acceptable to the Bank. The same firm that is selected to audit the EMP accounts will also be commissioned to audit the ODS Project accounts.

Table 2	
Performance Monitoring Indicators	
1.	Counterpart funding for ODS Consumption phase-out of \$44.3 million.
2.	GEF Grant funding of ODS Consumption phase-out of \$60 million to be approved in three tranches.
3.	Complete ODS phase-out in : (i) seven aerosol producing facilities; (ii) six domestic refrigeration manufacturing facilities, including both refrigerant charging and foam blowing facilities; and (iii) one commercial refrigeration facility. Setup a pilot facility for refrigeration servicing for ODS recycle and recovery.
4.	Enact and enforce regulations for ODS phase-out and control of ODS exports.
5.	Develop and operate an effective system for monitoring ODS consumption, production, recycling, import and export.
6.	Fulfill international reporting requirements as specified by the parties to the MP.
7.	The Project will phaseout 15,354 MT/yr. ODP, representing 35% of 1992 consumption.

Supervision

31. Supervision by a Bank team will take place semi-annually following the submission of the progress reports by the CPPI through the MEPNR. The supervision missions will be composed of the task manager, supported by financial and technical specialists as needed, and will require about 15 staff weeks per year.

VII. PROJECT SUSTAINABILITY

32. The Project's sustainability is based on the Russian Federation's commitment to ultimately meeting the country's obligations under the MP, and to provide a sound institutional and policy framework for its overall ODS phase-out program, as documented in the Country Program and the formal commitments made to it by the Government (Annex 3). This institutional and policy framework will be supported indirectly by the EMP, and directly by the Project through provision of technical assistance to the MEPNR for strengthening its institutional capacity and ODS phase-out implementation capability. Sustainability of enterprise investments is based on the strict criteria used for sub-project selection. Project preparation work undertaken to date has identified and documented a wide range of individual sub-projects in critical consumption sectors with the assistance of local and foreign experts. A number of potential sub-projects have been excluded from the Project because of low product demand and/or outdated technology and equipment. Only the most promising sub-projects from a technical and commercial perspective have been included in the Project pipeline. In addition participating enterprises are being subject to a financial viability evaluation in preparation for sub-project appraisal and final selection. This evaluation determines the enterprise's financial position, ability to sustain its portion of the required investment, and its medium term business prospects. Project funding will make provision for on-going assistance to the beneficiary enterprises in their preparation of financial management and marketing plans.

VIII. LESSONS FROM PREVIOUS BANK EXPERIENCE.

33. The Project is the sixth GEF-funded ODS phase-out project to be recently initiated in the transition economies of Central and Eastern Europe and, therefore, direct Bank experience in these countries and associated lessons is limited. However, the Bank has implemented ODS phase-out projects in fifteen developing countries as the MFMP Implementing Agency. A number of lessons have been learned from experience with these projects including: a) the importance of a national phase-out policy or Country Program as a basis of assuring commitment and ownership by the client country; b) the value of strong enterprise/government linkages to achieve phase-out objectives; c) the need for institutional strengthening and training for local implementation units and financial intermediaries; d) the utility of using a framework project supported by a pipeline of sub-projects subject to individual appraisal and approval by a financial intermediary; and e) the importance of technical support in the preparation and review of sub-projects. Additional lessons have been learned from other the Bank projects in Russia, including the importance of: a) identifying a consistent committed counterpart team with sufficient authority to move the Project forward; b) coordinating among key interested parties at the federal, regional and enterprise levels; c) early detailed attention to procurement and other implementation issues; and d) involving local consultants and institutes in the process. Lessons from the EMP indicate the need for early appointment of project managers and implementation teams so that critical procurement activities can be initiated upon loan effectiveness. The design, preparation and structure of the Project

incorporates these lessons in a number of ways. Project preparation work has involved a well defined Country Program and identification of a wide selection of sub-projects. The MFMP framework Project model, including a pipeline of approved sub-projects, is being utilized. All of the sub-projects in the pipeline have been independently OORG reviewed. Technical assistance directed at strengthening institutional capacity within the government, implementing agencies and enterprises has also been provided. Sub-project processing procedures are similar to those used for MFMP projects, including the utilization of the technical review capability established for these sub-projects. Finally, both the ODS Task Force and the ODS PIU are already operational and are supported by a smoothly functioning procurement and disbursement capability established for the EMP.

IX. RATIONALE FOR BANK AND GEF INVOLVEMENT

34. Russia represents the second largest producer and consumer of ODS in the world, where substantive progress toward the phase-out of these materials is not well advanced. As such, it represents one of the most significant country specific opportunities available to reduce ODS use on a large scale and, as a consequence, to achieve major global environmental benefits through cost effective technological interventions.

35. The Project is consistent with the Bank's assistance strategy to the environmental sector and with its Country Assistance Strategy to Russia. It provides for the strengthening of institutional capacity and development of policies and regulatory actions required for implementation of the overall ODS phase-out program. This institutional strengthening is coupled with core investments at the enterprise level, both as demonstration of effective ODS phase-out and as significant contributors to the program. It will support the development of a market oriented economy by focusing direct financial assistance on viable enterprises requiring technological change to remain competitive under international environmental standards. It assists in redirecting public sector involvement in the economy through strengthening of institutional capacity for monitoring and regulation of ODS consumption, production and export. Finally, it establishes a key role for the Bank in mobilizing bilateral and multilateral grant funds in support of a key global environmental priority, where this would otherwise not be available.

36. The Project is complementary to the Bank's overall support to Russia in the environmental sector. The technical assistance components of the Environmental Management Project (EMP) will enhance the management, resource and institutional capability within the MEPNR, which in turn will be supportive of the administration of ODS phase-out activities. Additionally, enterprise-specific ODS phase-out sub-projects are expected to provide opportunities for utilization of the National Pollution Abatement Facility (NPAF) as a financial intermediary. Cooperation between and integration with various Bank initiatives is considered important, recognizing the scale of environmental problems that exist in Russia and limitations on resources available to address them.

37. The Bank's role to date has involved the provision of two GEF Project Preparation Advances (PPA) for the identification, technical definition and financial screening of sub-projects in the aerosol and refrigeration ODS consumption sectors, and for the facilitation of ODS production phase-out. In addition, the Bank has facilitated and assisted in donor funded studies supporting the development of the Country Program (Denmark) and Project preparation work in the solvent, foam and fire protection sectors (United States). The Project preparation work in the aerosol and refrigeration sectors has been completed. This work initially identified twenty-nine potential candidate sub-projects (seven in the aerosol sector and twenty-two in the refrigeration sector). The most advanced and cost effective of these sub-projects have been selected for the pipeline included in this Project. Some of those that were not selected, along those expected to be identified in the solvent, foam and fire protection sectors, are expected to provide a pipeline of sub-projects for a possible future GEF Project, or for other multilateral or bilateral initiatives. The work covering production phase-out requirements in the six major enterprises manufacturing ODS in Russia has formed the basis of a separate Bank initiative to provide donor funding of ODS production phase-out, which is now being arranged in parallel with and supported by technical assistance from this Project.

38. Consistent with the country eligibility requirements as set out in the GEF Operational Strategy, funding to the Russian Federation for the first project on stratospheric ozone protection has been allocated by the GEF on the basis that Russia:

- a) is not an Article 5 country in the MP and eligible for funding from the MFMP but has a demonstrated need for assistance in meeting its phase-out obligations under the MP;
- b) has succeeded to the FSU's ratification of the Vienna Convention and MP, and has ratified the London Amendments to the MP;
- c) has completed preparation and is undertaking implementation of a Country Program;
- d) has undertaken to complete submission of a formal justification of its 1996 non-compliance position to the Parties to the Montreal Protocol, inclusive of causes of non-compliance, assessment of delays in the implementation of control measures and a revised schedule of commitments;
- e) has undertaken to provide clarification of its arrears in contributions to the MLMP; and
- f) is fulfilling its obligations with respect to reporting to the Parties to the Montreal Protocol on ODS production, consumption and trade data.

39. This Project has been designed based on the requirements defined in the Country Program and the guidelines of the GEF Scientific and Technical Advisory Panel (STAP). It utilizes the framework Project model developed for investment operations financed by the MFMP. Individual sub-projects have been individually reviewed by the Ozone Operations Resource Group, approved in accordance with GEF procedures. It applies to a range of enterprise-specific sub-projects that offer substantive ODS phase-out gains, but require investments for which the

beneficiary enterprises would not be able to obtain sufficient financing from commercial sources. Within these sub-projects, grant funding is limited to eligible incremental investment costs, while the enterprises are responsible for financing the balance from their own resources, financial intermediaries such as the NPAF, or through loans from commercial banks.

X. PROJECT BENEFITS

40. The Project's primary benefit will be its contribution to ODS phase out in Russia, which is now one of the largest remaining consumers and producers of ODS in the world. The sub-projects identified for the Project are estimated to phase-out 15,354 MT/year ODP, based on 1994, or the last three year average consumption data. It effectively eliminates ODS use in the aerosol sector, which is the country's largest consuming sector. In addition, it phases out ODS use in the largest and most viable domestic refrigerator manufacturers, accounting for an estimated 77% of consumption in the second largest ODS consuming sector. Finally, it initiates phase-out in the commercial refrigeration sector. The framework provided by the Project facilitates access to other financial resources. This will enhance Russia's ability to initiate other ODS phase-out projects, either independently, through other Bank supported facilities such as the NPAF, or potentially as part of future GEF-funded projects. The substantial reduction in demand for ODS will add further incentive for the phase-out of ODS production in Russia. The successful implementation of the Project will demonstrate Russia's commitment to meet its ODS phase-out obligations with the international community. The Project will directly assist viable, market oriented enterprises in modernization of manufacturing capability and in the development of export ready products utilizing non-ODS technology. The institutional capacity for monitoring and regulatory enforcement of ODS phase out, increasing public awareness of the issue and assessing investment opportunities will also be strengthened under the Project.

XI. PROJECT RISKS AND MITIGATION MEASURES

41. Risks associated with the Project are generally comparable to other industrial and institutional development activities in Russia. These include: a) the fragmented decision making process on environmental and investment matters at the federal and regional levels; b) the limited enforcement capability to support environmental initiatives; c) conflicting mandates and lack of cooperation between government agencies; d) lack of familiarity with Bank procedures, investment planning, and project management; e) difficulties in arranging financing of local costs for environmental investments; and f) the general economic climate in the country. Project specific risks are primarily associated with the sustained financial viability of participating enterprises, and the need to support ODS consumption phase out with domestic supply of substitute materials and equipment. The conditionality of GEF funding on acceptance and approval of Russia's ODS phase-out commitment and strategy by the Parties to the Montreal Protocol also constitutes a project risk.

42. The Project has been designed to minimize these risks to the maximum degree possible. The general institutional risks associated with activities in Russia are mitigated by the overall institutional strengthening provided by the EMP, and the direct policy and regulatory assistance provided to the MEPNR for ODS phase-out. Administrative and Project management risks are reduced by focusing the Project's operational implementation responsibility within the CPPI, specifically with the addition of specialist technical and Project supervision resources within the ODS PIUs. Risks associated with financing local costs are addressed by provision of co-financing assistance through the NPAF. Sub-project specific risks associated with enterprise viability and technical capability are mitigated by undertaking Project preparation work to support the selection of the most cost effective and commercially viable sub-projects, the use of commercially proven ODS conversion approaches and technology, and the provision of procurement and financial planning assistance as part of Project implementation. The development of HAP and HFC-134a supply capability for the aerosol and refrigeration sectors respectively is expected to be commercially viable as a result of markets created by conversions initiated through this Project. The development of supply capability for both ODS substitute materials is also being facilitated by utilization of the NPAF as a vehicle to finance commercially viable investments in HAP and refrigerant substitute production. Beneficiary enterprise financial viability is being assessed as part of the appraisal process to ensure the enterprise's capacity to provide its share of sub-project financing. Risks associated with GEF funding linkages to Russia's phase-out commitment and strategy are being mitigated by Bank initiatives to mediate conflicts that have arisen between the Russian Government and the Parties to the Montreal Protocol. The establishment of the ODS Country Program Unit as a focal point to support of the Government's ODS reporting responsibilities under the MP should further serve to improve communication with the international community. This will be strengthened through the technical assistance component of the Project, which is designed to improve responsiveness of the country's ongoing monitoring and reporting obligations and strengthen the institutional basis for ODS phase-out.

XII. ENVIRONMENTAL ASPECTS

43. The Project has been assigned a "B" rating for environmental assessment (EA) purposes. Each sub-project will be subject to environmental assessment in accordance with the guidelines and procedures established by the NPAF to meet both Russian Government and World Bank EA requirements. Potential environmental impacts include those associated with the flammability and air emissions characteristic of hydrocarbon based non-ODS substitutes, and site specific impacts associated with manufacturing plant developments or modifications. Each sub-project requires approval by the World Bank and the GEF Council prior to the sub-grant disbursement.

XIII. AGREEMENTS AND RECOMMENDATIONS REACHED

44. The following action has been taken by the Recipient:

Signing of the Project Implementation Agreement between the MEPNR and the CPPI (para 25).

45. The following are conditions of sub-grant disbursements:

- a) Each sub-project to be approved by the Bank and the GEF Council (para 43); and
- b) A sub-grant agreement to be executed between the CPPI and the beneficiary enterprise. Sub-grant agreements will include the following provisions:
 - implementation of Project with due diligence and efficiency; maintenance of records and accounts; auditing of financial statements; procurement of goods, works and services, according to World Bank procedures; independent inspection of physical completion; insurance provisions; regular reporting on financial condition of the enterprise; suspension of grant for non-performance; refunding grant in case of misuse; and preparation of a completion report (para 27).

**RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT**

SCHEDULE A

TABLE A1: SUMMARY OF PROJECT COST DATA

UNL. PROJECT/ ENTERPRISE	SECTOR	SUB-PROJECT DESCRIPTION	ANNUAL ODP USE (MT/YR.) (Note 1)	COST EFFECTIVENESS (US\$/kg/YR.)	INCREMENTAL CAPITAL COST (US\$)	INCREMENTAL OPERATING COST (SAVINGS) (US\$)	TOTAL CAPITAL AND OPERATING COSTS (US\$)
JSC Armat (Nevinnomyssk)	Aerosol	CFC to HAP Propellant Conversion	2,456	\$2.30/kg ODP	15,786,000	(1,894,000)	13,892,000
KRP Bryansk (Krasnoyarsk)	Domestic Refrigeration	Replace CFC-12 with Propane/Butane mixture as Refrigerant	117	\$13.38/kg ODP	4,505,000	2,211,000	6,716,000
Sub-Grant Processing Charge							236,000
Technical Assistance	Institutional	Country Program Implementation,					748,000
FIRST TRANCHE SUB-TOTAL			2,573		20,291,000	217,000	20,508,000
NDCP (Novosibirsk)	Aerosol	CFC to HAP Propellant Conversion	3,568	\$2.38/kg ODP	10,907,000	(2,421,000)	8,486,000
Halogan (Perm)	Aerosol	CFC to HAP Propellant Conversion	1,435	\$1.40/kg ODP	2,026,000	(641,000)	2,185,000
Himpro (Volgograd)	Aerosol	CFC to HAP Propellant Conversion	1,769	\$1.65/kg ODP	4,342,000	(616,000)	3,726,000
Narvomoosovsk (Tula Oblast)	Aerosol	CFC to HAP Propellant Conversion	1,219	\$3.11/Kg ODP	4,876,000	(664,000)	4,212,000
Ahtschimprom (Sverdlovsk)	Aerosol	Mechanical Pump Conversion	591	\$3.61/kg. ODP	2,638,000	0	2,638,000
Mosbytschim (Moscow)	Aerosol	CFC to HAP Propellant Conversion	2,883	\$1.93/kg ODP	5,678,000	(663,000)	5,015,000
KRP Bryansk (Krasnoyarsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	382	\$9.00/kg ODP	17,578,000	5,576,000	23,154,000
SEPO (Saratov EPO)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	210	\$18.40/kg ODP	2,790,000	3,935,000	6,725,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use	228	\$7.65/kg ODP	1,579,000	6,834,000	8,413,000
Marikholodmarsh (Yoshkar-Ola)	Commercial Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	15	\$7.12/kg ODP	1,251,000	283,000	1,454,000
		Replace CFC-12 with HFC-134a as Refrigerant	18	\$8.50/kg ODP	503,000	2,508,000	3,011,000
Sub-Grant Processing Charge							1,004,000
Technical Assistance	Institutional	Country Program Implementation,					526,000
PROPOSED SECOND TRANCHE SUB-TOTAL			11,438		54,978,000	3,242,000	58,220,000
MLMK "Sivstal" (Lipetsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	260	\$9.93/kg ODP	4,216,000	7,559,000	11,775,000
Orsk (Orenburg)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	282	\$12.90/kg ODP	8,792,000	2,598,000	11,390,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use	158	\$6.9/KG ODP	1,618,000	1,239,000	2,847,000
POLUS (Zlatoust)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with HFC-134a	250	\$2.98/kg ODP	796,000	2,418,000	3,214,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use	123	\$6.84/kg ODP	1,192,000	2,901,000	4,093,000
Zavod (Zelenodolsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane	191	\$18.60/kg ODP	6,828,000	2,860,000	9,688,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use	159	\$7.94/kg ODP	1,947,000	4,215,000	6,162,000
Refrigeration Servicing	Refrigeration	Recovery equipment investments and Training			654,000		654,000
Sub-Grant Processing Charge							488,000
SUB-TOTAL FOR LATER TRANCHE			1,343		34,815,000	23,783,000	38,598,000
PROJECT TOTALS			15,354		101,384,000	25,142,000	126,526,000

**RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCES
CONSUMPTION PHASE-OUT PROJECT**

SCHEDULE A

**TABLE A2
PROJECT FINANCING PLAN**

ENTERPRISE/ SUB-PROJECT	SECTOR	SUB-PROJECT DESCRIPTION	LOCAL COSTS FINANCED BY CEF GRANT (US\$)	FOREIGN COSTS FINANCED BY CEF GRANT (US\$)	TOTAL CEF GRANT FINANCING (US\$)	ENTERPRISE FINANCING OF CAPITAL COST (US\$)	TOTAL PROJECT FINANCING (US\$) (Col. 6 + 7)
JSC Arnest (Nevinnomyssk)	Aerosol	CFC to HAP Propellant Conversion		5,650,000	5,650,000	10,136,000	15,786,000
KRP Biryusa (Krasnoyarsk)	Domestic Refrigeration	Replace CFC-12 with Propane/ Butane mixture as Refrigerant	440,000	1,536,000	1,976,000	2,529,000	4,505,000
		Sub-Grant Processing Charge (3%)	226,000		226,000		226,000
Technical Assistance	Institutional	Country Program Implementation, Institutional/Regulatory Strengthening Project Preparation, Training	148,000	600,000	748,000		748,000
FIRST TRANCHE SUB-TOTAL			814,000	7,786,000	8,600,000	12,665,000	21,265,000
NDCP (Novosibirsk)	Aerosol	CFC to HAP Propellant Conversion		8,488,000	8,488,000	2,421,000	10,909,000
Halogen (Perm)	Aerosol	CFC to HAP Propellant Conversion		1,976,000	1,976,000	850,000	2,826,000
Himprom (Volgograd)	Aerosol	CFC to HAP Propellant Conversion	504,000	2,421,000	2,925,000	1,417,000	4,342,000
Novomoscowsk (Tala Obiast)	Aerosol	CFC to HAP Propellant Conversion		3,791,000	3,791,000	1,085,000	4,876,000
Altaichimprom (Slavgorod)	Aerosol	Mechanical Pump Conversion	50,000	2,088,000	2,138,000	500,000	2,638,000
Mosbytchim (Moscow)	Aerosol	CFC to HAP Propellant Conversion	175,000	3,840,000	4,015,000	1,663,000	5,678,000
KRP Biryusa (Krasnoyarsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		5,497,000	5,497,000	12,081,000	17,578,000
SEPO (Saratov EPO)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		2,579,000	2,579,000	211,000	2,790,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use	167,000	1,355,000	1,522,000	27,000	1,579,000
Marikhododmarsh (Yeshkar-Ola)	Commercial Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		356,000	356,000	895,000	1,251,000
		Replace CFC-12 with HFC-134a as Refrigerant		153,000	153,000	350,000	503,000
		Sub-Grant Processing Charge (3%)	696,000		1,004,000		1,004,000
Technical Assistance	Institutional	Country Program Implementation,	218,000	400,000	526,000		526,000
PROPOSED SECOND TRANCHE SUB-TOTAL			1,818,000	12,544,000	14,362,000	21,580,000	35,942,000
NLMK "Stintol" (Lipetsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		3,070,000	3,070,000	1,146,000	4,216,000
G. S. (Orenburg)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		4,772,000	4,772,000	4,020,000	8,792,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC-113 use		1,138,000	1,138,000	480,000	1,618,000
POLUS (Zlatoust)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with HFC-134a	69,000	659,000	724,000	72,000	796,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use		719,000	719,000	473,000	1,192,000
Zavod (Zelenodolsk)	Domestic Refrigeration	Replace CFC-11 Foaming Agent with Cyclopentane		3,554,000	3,554,000	3,274,000	6,828,000
		Replace CFC-12 with HFC-134a as Refrigerant and eliminate CFC113 use		1,289,000	1,289,000	658,000	1,947,000
Refrigeration Servicing	Refrigeration	Recovery Equipment investments and training	254,000	400,000	654,000		654,000
		Sub-Grant Processing Charge (3%)	480,000		480,000		480,000
SUB-TOTAL FOR LATER TRANCHEES			983,000	15,641,000	16,624,000	10,123,000	26,747,000
PROJECT TOTALS			3,427,000	24,331,000	27,758,000	24,288,000	52,046,000

NOTE 1: Total Project Costs include incremental operating costs (Refrigeration sub-projects) but exclude incremental cost savings (Aerosol sub-projects)

NOTE 2: Costs contain a 10% physical contingency

RUSSIAN FEDERATION

OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

PROCUREMENT AND DISBURSEMENT ARRANGEMENTS

A. Procurement

1. A procurement plan applicable to each investment sub-project will be developed at appraisal of each tranche. During implementation, the ODS PIU will be responsible for ensuring that project procurement follows the Bank Guidelines and for providing assistance to enterprises for both international and local procurement as necessary. In all cases, procurement will be handled by qualified procurement specialists acceptable to the Bank.

2. **Goods and Works.** Procurement of goods and works will be made in accordance with the "Guidelines for Procurement under IBRD Loans and IDA Credits," January, 1995. GEF grant funded procurement for the enterprise specific investment sub-projects will apply primarily to the purchase of imported equipment, with limited application to infrastructure works. To the extent possible, contracts for goods will be grouped to allow for the procurement under ICB procedures. In most cases these will involve turn key equipment and technical support packages for specialized production systems applicable to aerosol or refrigeration manufacturing. Each enterprise would make its own procurement arrangements with assistance and guidance of THE CPPI procurement specialists in accordance with World Bank Procedures stated herein. Typical equipment procurement packages for aerosol and refrigeration sub-projects would include such items as: (a) propellant filling lines; (b) hydrocarbon storage and handling facilities; (c) valve production equipment; (d) can manufacturing facilities; (e) safety and laboratory equipment; (f) refrigerant charging and production testing lines; and (g) insulating foam blowing systems. Training of equipment operators and maintenance personnel, transportation and technical support for installation will be included within the equipment supply packages to the maximum degree possible.

3. To be consistent with the thresholds agreed for procurement of goods under the NPAF, Table B1 shows that contracts for goods more than US\$2,000,000 (estimated to total US\$31.6 million) will be procured on the basis of the Bank's International Competitive Bidding (ICB) procedures and Bank Standard Bidding Documents. Domestic manufacturers competing under ICB would receive a preference in bid evaluation of 15% of the CIF price, or the prevailing customs duty applicable to non-exempt importers, whichever is less, provided the value added to the product exceeds 20% of the ex-factory bid price. To the extent possible, items will be packaged suitable for procurement under ICB. For contracts between US\$50,000 and US\$2,000,000 (estimated to total US\$32.3 million), procurement will be on the basis of International Shopping (IS) with at least three price quotations from at least two countries. National Shopping (NS) will be applied for goods contracts up to US\$50,000, up to an aggregate

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of US\$1.4 million, based on at least three price quotations from local suppliers. All civil works contracts under \$250,000 will be procured locally on a competitive basis, following procedures acceptable to the Bank to an aggregate total of US\$1.0 million. No contracts above this value are anticipated.

4. Table B2 provides a summary of the procurement arrangements agreed with the enterprises and the ODS PIU for the first tranche. The GEF grant will be used to procure equipment to a total of US\$6.0 million applying ICB procedures, US\$2.2 million in equipment purchases using IS procedures, and US\$1.0 million in NCB contracting, for civil works. The equipment for the production line conversion in KRP Biryusa is to be purchased from different suppliers and is not suitable for packaging as an ICB contract. Table B3 provides a detailed procurement plan for each of the two investment sub-projects in the first tranche. Procurement arrangements for the second and third tranches will be finalized at sub-project appraisal along with the development of procurement plans applicable to each sub-project.

5. **Services.** Consultant services will be required to assist the MEPNR, the CPPI, and ODS PIU in improving the system for monitoring and reporting of ODS consumption and production, and for studies related to strengthening regulations and enforcement capability for ODS phase-out. In addition, consultants will assist the ODS PIU in supplementary project preparation work, developing public information programs, technical and financial evaluations, and procurement support during appraisal and sub-project implementation. The hiring of consultant services (US\$3.0 million), both for individuals and consulting firms (see Table B1), will be in accordance with the "Guidelines for Use of Consultants by World Bank Borrowers and by the World Bank as Executing Agency" (August 1981). Proposals will be invited from shortlisted consulting firms for all assignments with an estimated value of not less than US\$100,000 each. Individual consultants will be selected from an evaluation of the CVs of at least three candidates. A Procurement Plan for the First tranche Technical Assistance components is given in Table B4.

6. **Prior Bank Review** is applicable to: (i) all ICB contracts for goods, the first NCB contract for works of each enterprise, and the first two contracts for goods procured under international shopping and national shopping procedures; (ii) consultant contracts in excess of US\$100,000 with firms, and above US\$50,000 in the case of individuals; (iii) all sole source consulting contracts with firms; and (iv) TORs for contracts below the thresholds in (ii) above.

Table B1 - Summary of Procurement Arrangements

Overall Project
(in US\$ MLN)

Project Element	Procurement Method		Not Financed by GEF	Total
	ICB	Other		
Goods	31.6 (27.9)	33.7 ^(a) (28.6)	5.7	71.0 (56.5)
Works		1.0 ^(b) (0.5)	29.3	30.3 (0.5)
Consulting Services: ^(c)				
i. Institutional Strengthening		1.0 (1.0)		1.0 (1.0)
ii. Training		0.3 (0.3)		0.3 (0.3)
iii. Project Implementation		1.7 (1.7)		1.7 (1.7)
TOTAL	31.6 (27.9)	37.7 (32.1)	35.0^(d)	104.3 (60.0)

a) Includes: US\$32.3 MLN for International Shopping
US\$1.4 MLN for National Shopping

b) Includes: US\$1.0 MLN for National Competitive Bidding

c) According to IBRD Guidelines on Consultant Selection

d) To be financed by the enterprises

Figures in parenthesis are respective amounts financed by the GEF

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Table B2 - Summary of Procurement Arrangements				
First Tranche (in US\$ MLN)				
Project Element	Procurement Method		Not Financed by GEF	Total
	ICB	Other		
Goods	6.0 (5.4)	2.2 ^(a) (1.7)	1.8	10.0 (7.1)
Works		1.0 ^(b) (0.5)	9.2	10.2 (0.5)
Consulting Services: ^(c)				
i. Institutional Strengthening		0.7 (0.7)		0.7 (0.7)
ii. Training		0.1 (0.1)		0.1 (0.1)
iii. Project Implementation		0.2 (0.2)		0.2 (0.2)
TOTAL	6.0 (5.4)	4.2 (3.2)	11.0^(d)	21.2 (8.6)

(a) Includes: US\$2.2 MLN for International Shopping
 (b) Includes US\$1.0 MLN for National Competitive Bidding
 (c) According to IBRD Guidelines on Consultant Selection
 (d) To be financed by the enterprises

Figures in parenthesis are respective amounts financed by the GEF

**TABLE B3
PROCUREMENT PLAN
FIRST TRANCHE INVESTMENT SUB-PROJECTS**

DESCRIPTION OF GOODS, WORKS OR SERVICES	ESTIMATED PACKAGED AMOUNT (US\$)	PROPOSED PROCUREMENT PROCEDURE	PROCUREMENT SCHEDULE			REMARKS	
			TENDER	CONTRACT AWARD	COMPLETE		
JSC Arneet Aerosol Conversion Sub-Project							
HAP Storage & Handling Facilities							
- Preliminary Equipment Supply/Installation	104,500	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
- Electrical, Controls, Fire Protection Systems	401,810	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
- Tankage and Pumps	274,870	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
- Pipe, Valves and Fittings	222,200	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
- Installation	1,094,500	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
HAP Tank Cars (8)	330,000	IS	April/96	Nov./96	Aug./97	Contingency Item for GEF Funding	
HAP Filling Lines (2)							
- Building	1,705,880	Local Shopping	N/A	In Progress	July/97	Enterprise Financed	
- Filling Line Equipment	3,891,800	ICB	April/96	Jan./97	Jan./96	GEF Funded	
- Installation	735,900	Local Shopping	Oct./97	Dec./97	April/96	Enterprise Financed	
Finished Goods Warehouse							
- Lift Truck Equipment (Elevators)	275,000	IS	April/96	Nov./96	July/97	Contingency Item for GEF Funding	
- Equipment/Furnishings	338,880	Local Shopping	N/A	In Progress	Jan./97	Enterprise Financed	
- Installation/Building	282,150	Local Shopping	N/A	In Progress	Jan./97	Enterprise Financed	
Valve Making Production Line							
- Valve Production Equipment	2,200,000	ICB	April/96	Nov./96	Dec./97	GEF Funded	
- Valve Making Equipment							
- Molds							
- Installation	330,000	Local Shopping	Sept./97	Nov./97	April/96	Enterprise Financed	
HAP Molecular Sieve	215,600	IS	April/96	Nov./96	Nov./97	Partially GEF Funded (US\$112,000)	
HAP QC Equipment	48,070	MS / IS	April/96	Nov./96	Dec./97	Contingency Item for GEF Funding	
Defective Can Destruction Unit	66,000	Local Shopping	Mar./97	July/97	May/96	Enterprise Financed	
Infrastructure Improvements							
- Equipment	218,900	Local Shopping	N/A	In Progress	June/97	Enterprise Financed	
- Installation	1,459,810	Local Shopping	N/A	In Progress	April/96	Enterprise Financed	
Engineering	165,000	Sole Source	Feb./96	Mar./96	April/97	Enterprise Financed	
Environmental Impact Assessment	107,800	Sole Source	Feb./96	Mar./96	July/96	Enterprise Financed	
14,468,080		TOTAL GEF FUNDED PROCUREMENT:					
			ICB: US\$5,538,000				
			IS: US\$112,000				
KRP "Sirius" Hydrocarbon Refineret Conversion Sub-Project							
Preliminary Works							
- Charging Equipment	264,000	IS	N/A	N/A	Complete	Enterprise Financed	
- Conveyor Modifications	44,000	Force Account	N/A	N/A	Complete	Enterprise Financed	
- Charging Ventilation Enclosure	5,500	Force Account	N/A	N/A	Complete	Enterprise Financed	
- Installation/Civil Works	11,000	Force Account	N/A	N/A	Complete	Enterprise Financed	
Test Facilities Equipment							
- Refrigerant Charging System	33,000	IS	April/96	July/96	Oct./96	GEF Funded	
- Calorimeter	242,000	IS	April/96	July/96	Oct./96	GEF Funded	
- Noise and Vibration Tester	99,000	IS	April/96	July/96	Oct./96	GEF Funded	
Trial Production	4,400	Force Account	N/A	N/A	Dec./96	Enterprise Financed	
Local Training	10,120	Sole Source	June/96	July/96	Oct./96	Enterprise Financed	
Production Line Conversion							
- Helium Leak Detection Equipment	269,000	IS	April/96	Oct./96	July/97	GEF Funded	
- Refrigerant Charging Equipment	897,000	IS	April/96	Oct./96	July/97	GEF Funded	
- Sealing System	33,000	IS	April/96	Oct./96	July/97	GEF Funded	
- Hydrocarbon Transfer Pumps	57,000	IS	April/96	Oct./96	July/97	GEF Funded	
- Vacuum Pumps	198,000	IS	April/96	Oct./96	July/97	GEF Funded	
- Foreign Training/Technical Support	81,000	IS	April/96	Oct./96	July/97	GEF Funded	
Equipment Installation/Infrastructure Upgrading							
- Dismantling of CFC-12 Equipment	680,000	Force Account	N/A	N/A	Oct./97	Enterprise Financed	
- Installation of Charging Equipment	495,000	Force Account	N/A	N/A	Jan./98	Enterprise Financed	
- Gas Tight Enclosure Construction/Installation	103,950	Force Account	N/A	N/A	Nov./97	Enterprise Financed	
- Hydrocarbon Storage Facilities Installation	979,000	NCB	N/A	N/A	Oct./97	Partially GEF Funded (US\$440,000)	
Engineering	55,000	Sole Source	Feb./96	Mar./96	Oct./96	Enterprise Financed	
Environmental Impact Assessment	44,000	Sole Source	Feb./96	Mar./96	July/96	Enterprise Financed	
4,364,970							

Note: JSC Arneet will make an addition US\$686,000 using IS procedures in order to allow redirection of grant funding should presently proposed ICB and IS grant funded purchases be less than estimated.

TABLE B4
PROCUREMENT PLAN
FIRST TRANCHE TECHNICAL ASSISTANCE COMPONENT

DESCRIPTION OF GOODS, WORKS OR SERVICES	ESTIMATED PACKAGED AMOUNT (US\$)	PROPOSED PROCUREMENT PROCEDURE	PROCUREMENT SCHEDULE		
			TENDER	CONTRACT AWARD	COMPLETE
A) Regulatory Framework Development					
Package A1 - Regulatory practice review, option selection, and training - International Regulatory Practice - Option Selection and Draft Regulations - Implementation Support and Training	180,000	Short List of Forms	May-96	Sep-96	Nov-97
B) Monitoring and Reporting System					
Package B1 - Monitoring system development, implementation support and training - Monitoring System Development - Implementation Support - Training	170,000	Short List of Forms	May-96	Sep-96	Dec-96
C) Investment Sub-Project Preparation and Implementation Support					
Package C1 - Enterprise Financial Evaluations - Tranche 2	125,000	Short List of Forms	May-96	Sep-96	Oct-96
Package C2 - Supplementary sub-project preparation - Solvent Sector	30,000	Sole Source	Sept.-96	Oct.-96	Mar.97
Package C3 - Supplementary sub-project preparation - Fire Protection Sector	25,000	Sole Source	Sept.-96	Oct.-96	Mar.97
Package C4 - Supplementary Sub-project preparation - Refrigeration Recycle Sector	30,000	Sole Source	Jun-96	Sep-96	Jan.-97
Package C5 - Co-financing/BI-lateral funding Study	20,000	Sole Source	Jul-96	Aug.-96	Nov.96
D) Project Implementation Support					
Package D1 - Training in technical & financial appraisal	30,000	Sole Source	Jul-96	Sep-96	Oct.-96
Package D2 - Appraisal Manual	20,000	Sole Source	Mar-96	Sep-96	Oct-96
E) Public Awareness and Information					
Package E1 - Information Material/Program Development	30,000	Sole Source	Jul-96	Sept.-96	Nov.-96
Package E2 - Phaseout Workshop	48,000	Sole Source	Oct.-96	Nov.-96	Mar.-97
F) Technology Options for ODS Production Phase Out					
Package F1 - Evaluation of GIPH Technologies for ODS substitutes	250,000	Short List of Forms	May-96	Sep-96	Dec-96
Package F2 - Evaluation of Competing Technologies for ODS substitutes	302,000	Short List of Forms	May-96	Sep-96	Feb-96
G) Computer and Communications Equipment					
Package G1 - Equipment for Regulatory Implementing Agency	40,000	NS	Sept.-96	Oct.-96	Dec.-96
TOTALS	1,300,000				

B. Disbursement

7. The project is expected to be disbursed within a period of 6 years with the funds being be channeled through the CPPI as a financial intermediary. Funds would be disbursed against: (a) for goods: 100% of foreign expenditures, and ex-factory cost of domestically manufactured goods, and of expenditures procured locally; (b) for works: 80% of local expenditures; (c) for consultant services: 100% of expenditures; and (d) financial agent fee to THE CPPI: 100% of expenditures. These disbursement categories are defined in Table B5 and the projected disbursement schedule is given in Table B6.

Table B5			
Disbursement Categories (US\$ MLN)			
Category	GEF Grant Amount		Percent of Expenditure Eligible for Financing
	Tranche 1	Tranche 2&3	
Goods	7.1	48.7	100% of foreign expenditure 100% of local expenditures (ex-factory cost) 80% of local expenditures procured locally
Works	0.5	0.7	80% of expenditures
Consultant Services for TA/Institutional Strengthening	0.8	0.5	100% of expenditures
Sub-grant processing charge	0.2	1.5	100% of expenditures
Total	8.6	51.4	

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\$	FY96	FY97	FY98	FY99	FY00	FY01
Fiscal Year	0	6	14.4	16.8	14.4	8.4
Cumulative	0	6	20.4	37.2	51.6	60.0

Note: Assumes second tranche approval in April 1996 and third tranche approval in September 1996.

8. Withdrawal applications will be fully documented for expenditures against contracts for goods and works valued above \$300,000 and consulting contracts valued above \$50,000. Below these amounts, disbursement will be made on the basis of certified statements of expenditures (SOEs) detailing the individual transactions. In order to facilitate disbursement, a Special Account (SA) will be established by the CPPI under terms and conditions satisfactory to the Bank. After effectiveness and upon the Recipient's request, the Bank will make an initial deposit of \$0.5 million, which will be increased to \$1.0 million when cumulative disbursements reach a level of \$10 million. Requests for replenishment of the SA will be made on a quarterly basis, or when the balance in the SA is one half of the deposit, whichever occurs first. In addition to the evidence of payments, each replenishment application will be supported by monthly statements of the SA, which will be reconciled by the CPPI. Project expenditures will be recorded by the CPPI using a computerized project accounting system that has been developed for the EMP. Payments would be made by THE CPPI following submission of requests for payment by the enterprise or consultants that have been approved by the ODS PIU in the CPPI. The closing date for the grant is December 31, 2001.

RUSSIAN FEDERATION**OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT**

KEY PROJECT PROCESSING EVENTS**a) Project preparation:**

- | | |
|--|--|
| 1. Time Taken to Prepare: | 36 months |
| 2. Prepared By: | R. Batstone, R. Cooke, EC3IV
D. Brown, C. Catanach, IENIM |
| 3. First Presentation to Bank (Updated IEPS): | August, 1992 |
| 4. GEF Council approval of framework
Project and first tranche: | May, 1995 |

b) First Tranche Processing:

- | | |
|-----------------------------------|-----------------|
| 1. Appraisal Mission Departure: | October, 1995 |
| 2. Negotiations: | March, 1996 |
| 3. Board Approval: | May, 1996 |
| 4. Planned Date of Effectiveness: | September, 1996 |

c) Second Tranche Processing:

- | | |
|-----------------------------------|-------------------------|
| 1. Expected GEF Council approval: | April, 1996 |
| 2. Sub-project Appraisals | September-October, 1996 |
| 3. Sub-grant Agreements | January, 1997 |

d) Third Tranche Processing:

- | | |
|-----------------------------------|-------------------------|
| 1. Expected GEF Council approval: | September, 1996 |
| 2. Sub-project Appraisals | November-December, 1996 |
| 3. Sub-grant Agreements | May, 1997 |
| 4. Expected Date of Completion: | January, 2000 |

STATUS OF BANK GROUP OPERATIONS IN RUSSIA

A. STATEMENT OF BANK LOANS ^{a/}
(as of April 30, 1996)

Loan No.	Fiscal Year	Borrower	Project	US\$ Million	
				Loan	Undisbursed
Two fully disbursed loan				1200.00	0.0
<u>Loans Under Disbursement:</u>					
35320	1993	Russia	Employment services and Social Protection	60.00	48.99
35460	1993	Russia	Privatization	90.00	67.24
36230	1993	Russia	Oil Rehabilitation	604.77	424.41
37060	1994	Russia	Highway Rehabilitation and Maintenance	300.00	251.22
37340	1994	Russia	Financial Institutional Development	200.00	197.45
37560	1994	Russia	Land Reform Implementation Support	80.00	79.34
37570	1994	Russia	Agriculture Reform Implementation Support	240.00	239.06
37630	1994	Russia	Enterprise Restructuring	200.00	200.00
37680	1994	Russia	Oil Rehabilitation II	500.00	480.35
38060	1995	Russia	Environment Management	110.00	106.83
38240	1995	Russia	Management and Finance	40.00	37.50
38440	1995	Russia	Portfolio Development	40.00	39.47
38500	1995	Russia	Housing	400.00	397.06
38530	1995	Russia	Tax Administration	16.80	16.47
38720	1995	Russia	Emerg. Oil Spill. Mit	99.00	42.99
38760**	1995	Russia	Gas Distribution and Energy	106.50	106.50
38850	1995	Russia	Urban Transport	329.00	329.00
39610 *	1996	Russia	Standards Development	24.00	24.00
39900 **	1996	Russia	Bridge Rehabilitation	350.00	350.00
40090 **	1996	Russia	Community Social Infra	200.00	200.00
Total				3990.07	3637.58
Of Which: Repaid				0.00	
Total Now Held by the Bank				5190.07	
Total Amount Sold				0.00	
Of Which: Repaid				0.00	
Total Undisbursed					3637.58

a/ The status of these projects is described in a separate report on all Bank/IDA financed projects in execution, which is updated twice yearly and circulated to the Executive Directors on April 30 and October 31.

* Not yet effective.

** Not yet signed.

SCHEDULE D

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B. STATEMENT OF IFC INVESTMENTS

(As of April 30, 1996)

FY Apr.	FY Committed	Description	Sector	Loan	Equity	Other /a-	Total	Undisb
A. Approved and Committed (Signed) Projects								
93	94	International Moscow Bank	Financial Services	15.0	0.0		15.0	12.0
93	94	Polar Lights	Mining & Extraction	60.0	0.0		60.0	0.0
94	94	Framlington Russ. Inv. Fund	Financial Services *	0.0	8.0		8.0	0.0
95	95	First NIS Regional Fund	Financial Services	0.0	15.0		15.0	4.5
94	95	Russian Telecom Dev. Corp.	Infrastructure	0.0	7.5		7.5	0.0
95	95	Nizhniy Newsprint Holding	Timber, Pulp and Paper	30.0	11.0	45.0	86.0	20.2
95	95	National Registry Com	Financial Services	0.0	1.5		1.5	0.6
95	95	Vasyugan Services	Mining & Extraction	9.0	0.0		9.0	0.0
96	96	Alpha Cement Oepn Jt. Stock	Cement & Construction		13.33		13.33	0.0
95	96	Dapsona	Food & Agribusiness	6.8	0.0		6.8	5.3
95	96	Sector Capital Development	Financial Services	0.0	0.47		0.47	0.13
95	96	Sector Capital Fund	Financial Services	0.0	4.53		4.53	4.22
96	96	Russian Technology Fund	Financial Services	0.0	2.00		2.00	1.50
96	96	Savvinskaya-Seiyo Company	Indus & Cons Svcs	7.7	0.00		7.70	7.70
Total gross commitments				128.5	63.33	45.0	236.83	56.15
Less cancellations, terminations, repayment & sales				19.8	-	-	19.80	--
Total commitments now held				108.7	63.33	45.0	217.03	56.15
B. Approved Projects Pending Commitment								
		CTC Foods	Food & Agribusiness	0.0	7.0		7.0	
		Volga Fund	Financial Services	0.0	20.0		20.0	
		ICF/UNEXIM	Financial Services	15.0	0.0		15.0	
		Svyasinvest	Telecommunications	0.0	50.0		50.0	
Total pending commitments				15.0	77.0		92.0	
Total commitments held and pending				123.7	140.33	45.0	309.03	
Total undisbursed commitments held and pending				29.0	10.95	16.2	56.15	

/a Participants' portion.

PART 2: TECHNICAL ANNEXES

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

PROJECT IMPLEMENTATION RESPONSIBILITIES

1. The Government has assigned Ministry of Environmental Protection and Natural Resources (MEPNR) responsibility as executing agency for the Project. Within the MEPNR, the Project's overall implementation has been assigned to the Center for Project Preparation and Implementation for International Projects on Technical Assistance (CPPI) which operates under the MEPNR for implementation of the Russian Federation Environmental Management Project (EMP) and other internationally financed projects. The CPPI will coordinate the Project's implementation within the framework of the overall Country Program and with other Government agencies through the Inter-Agency Commission established under the Country Program. Within the CPPI, project implementation capacity has been established within two implementation units with separate responsibility for investment related activities and institutional strengthening activities respectively. The ODS Investment Project Unit is associated with the National Pollution Abatement Facility (NPAF) and is responsible for investment sub-projects. The ODS Country Program Implementation Unit is associated with the EMP technical assistance components undertaking institutional strengthening related to environmental policy and regulation generally. The CPPI also provides administrative, procurement and financial support to these implementation units.

2. The specific responsibilities of the MEPNR, the CPPI and the beneficiary enterprises have been formalized in a Project Implementation Agreement between the MEPNR and the CPPI. Project implementation is expected to be completed by December 31, 2000. An overall project schedule is provided in Table A1.1.

3. The MEPNR will have overall responsibility for the Government's obligations under Project Grant Agreement with the World Bank (the GEF Implementing Agency). Its specific responsibilities are:

- i) Negotiation and execution of the Project Grant Agreement on behalf of the Government;
- ii) Supervision and monitoring of the Project's implementation as undertaken by the CPPI, and beneficiary enterprises;

- iii) Introduction of legislative and regulatory proposals developed through the Project and which cover such actions as: a) establishment of a monitoring and reporting system for ODS production, consumption, recycling, trade and phase-out investment; b) instituting and enforcing control measures for the export of ODS in accordance with international obligations and undertakings; c) licensing of ODS production, sale, distribution, and consumption; d) application of sector specific bans on ODS use; and e) imposition of economic instruments related to ODS production and consumption;
- iv) Ensuring compliance of sub-project implementation within this Project, with applicable Russian laws and regulations from the aspect of environmental protection; and
- v) Provision of information to the general public respecting the ODS issue and the phase-out actions being undertaken.

4. The CPPI has overall implementation responsibility for the Project, including specific responsibility for:

- i) Coordination of Project implementation within the overall framework of the Country Program and with other Government agencies through the Inter-Agency Commission established under the MEPNR;
- ii) Represent the MEPNR in international bodies involved with ozone depleting issues and phaseout of ODS;
- iii) Provision of regular reports on the Project to Ministry of Finance and Ministry of Economy;
- iv) Establishment and supervision of the ODS PIUs and provision of administrative support to these units;
- v) Acting in the capacity of financial intermediary with respect to the disbursement of the grant funds in accordance with the Project Grant Agreement;
- vi) Establishment and operation of the Special Account for the Project;
- vii) Submission of an overall Project Work Plan for the World Bank's approval, inclusive of budgets and resource allocation applicable to the ODS PIUs;
- viii) Negotiation and execution of Sub-Grant Agreements with the beneficiary enterprises;
- ix) Recruitment and appointment of an authorized procurement agent for the Project;
- x) Providing monthly statements of sub-grant expenditures to the beneficiary enterprises, the MEPNR and the World Bank;

- xi) Arranging for annual audits of Project accounts;
 - xii) Reporting project progress through dissemination of monthly and quarterly progress reports prepared by the ODS PIUs; and
 - xiii) Preparation and dissemination of the Project Completion Report.
5. The ODS Investment Project Unit associated with the NPAF shall have project management responsibility respecting investment sub-projects as follows:
- i) Providing procurement advice and assistance to beneficiary enterprises in the preparation of bidders lists and bidding documents in accordance with World Bank procedures, and in coordinating "no objection" submission requirements;
 - ii) Issuing payment orders from the special account and preparing the requirements for disbursement of payments for the approved investment sub-project expenditures;
 - iii) Preparation of a Project Work Plan, including budgets and resource allocation applicable to this unit;
 - iv) Administering GEF project preparation advance funding, including preparation of Terms of Reference for such work and acquisition of resources for its execution all in accordance with World Bank Procedures;
 - v) Implementing the Project's investment related technical assistance activities including: a) finalizing the Terms of Reference; b) identifying and contracting with foreign and local consulting resources necessary to undertake the required studies; and c) supervising the execution of the work;
 - vi) Initiation and supervision of supplementary technical assistance related to project preparation and procurement planning as may be required by beneficiary enterprises;
 - vii) Arranging for and supervision of the overall financial viability assessment of beneficiary enterprises for which investment sub-projects will be appraised;
 - viii) Participation with World Bank Missions in the appraisal of investment sub-projects, and in the preparation of sub-project appraisal reports and sub-project implementation plans respecting procurement and disbursement;
 - ix) Coordination of enterprise co-financing initiatives through the National Pollution Abatement Facility;
 - x) Development and support of a reporting system on the progress of sub-projects by the beneficiary enterprises;
 - xi) Monitoring and reporting of sub-project implementation;
 - xii) Monitoring financial performance of beneficiary enterprises; and

- xiii) Preparation of monthly and quarterly project progress reports summarizing implementation activities, schedule milestones achieved, disbursements, issues, and follow up actions, all with reference to agreed to performance indicators.

6. The ODS Country Program Unit established within the CPPI has direct responsibility for the institutional and regulatory technical assistance provided by the Project and initiation of associated regulatory activities, including specific responsibility for:

- i) Assembling information related to ODS consumption, production, recycling, and trade as required to be reported under the Montreal Protocol;
- ii) Continuing development of the Country Program;
- iii) Regular reporting to the Secretariat of the Montreal Protocol respecting Country Program implementation status, and ODS production, consumption, trade and recycling;
- iv) Development and administration of a system of licensing for ODS consumption and production;
- v) Providing assistance to the State Customs Committee of the Russian Federation and other Ministries and agencies having jurisdiction respecting controls applied to the import and export of ODS and ODS containing goods, including imports and exports within the countries of the Former Soviet Union;
- vi) Providing support to the MEPNR in the implementation of legislative and regulatory actions required for ODS phase-out;
- vii) Preparation of an overall Project Work Plan, including budgets and resource allocation applicable to this unit.
- viii) Implementing the Project's institutional strengthening technical assistance component, including: a) finalizing the Terms of Reference applicable its sub-components and studies required for them; b) identifying and contracting with foreign and local consulting resources necessary to undertake the required studies; and c) supervising its execution and assembling the results in a form that can be adopted as effective regulatory, monitoring, control and administrative measures by the MEPNR; and

Preparation of monthly and quarterly project progress reports summarizing implementation activities, schedule milestones achieved, disbursements, issues, and follow up actions, all with reference to agreed to performance indicators.

8. The beneficiary enterprises will be responsible for implementing the approved investment sub-projects, including

- i) preparation of procurement documents including technical specifications, equipment lists, cost estimates and qualification of potential suppliers in conformance with World Bank procedures for sub-grant eligible expenditures;
- ii) submission to the ODS Investment Project Unit of procurement documentation applicable to sub-grant eligible expenditures;
- iii) maintenance of records of all requests for offers, cost comparisons, actual purchases, including receipts applicable to sub-grant eligible expenditures;
- iv) submission of quarterly expenditure statements and project implementation reports to the ODS Investment Project Unit; and
- v) Provision of independently audited financial statements respecting overall enterprise performance on an annual basis to the ODS Investment Project Unit.

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

TECHNICAL ANNEX

1. This technical Annex is divided into four parts. Part 1 provides profiles of the aerosol and refrigeration sectors. Part 2 contains detailed descriptions and appraisal results of the two investment sub-projects. Part 3 contains summary descriptions of investment sub-projects proposed for the second and third tranches (Schedule A, Table AI). Part 4 describes the technical assistance component of the project which will be financed under the first two tranches.

PART 1: AEROSOL AND REFRIGERATION SECTOR BACKGROUND

I. AEROSOL SECTOR BACKGROUND

2. In 1992, the eight major manufacturers¹ of aerosols in Russia, produced 150 million aerosol cans and consumed 18,150 MT CFC, making aerosols the largest ODS consuming sector in the country (46% of total ODS consumption). An estimated 17,908 MT CFC were consumed for commercial and industrial applications with a market estimated to be made up of 65% cosmetic products, such as hair spray and 35% technical products, particularly insecticides. The remaining aerosol production is for pharmaceutical products. Market demand is estimated to be approximately 0.75 cans per capita on an annual basis. This has declined from 2 cans per capita prior to 1990, due to economic conditions and competition from imports. However, recent production and consumption data suggests that this trend is reversing with several producers reporting increased production and associated ODS consumption.

3. Most aerosol enterprises are fully integrated operations, making their own cans, tops, valves, and even cardboard packaging. Three of the manufacturing plants (Chimprom, Halogen and Altaichimprom) are part of, or affiliated with larger chemical complexes which are also producers of CFCs used a propellants. As such, these three enterprises are also required to phase-out production consistent with the national phase-out strategy and are to be participants in the parallel production phase-out initiative being undertaken by the Russian Federation.

¹ The eight major aerosol producers operating in the Russian Federation are NDCP (Novosibirsk), Arnest (Nevinnomoyssk), Halogen (Perm), Altiachimpom (Salvgorod), Chimprom (Volgograd), Novomoscowsk (Tula Oblast), Mosbychim (Moscow), and Chilton (Kazan).

4. decisions were made centrally. Similarly, the industry was dependent on a single research establishment in Riga, Latvia for the supply of technology with additional technical support being supplied by a design and project management institute in Kiev, Ukraine. However, all plants are now in various stages of privatization, following conversion to joint stock companies. Each exerts local control over investment, production and marketing decisions. Likewise, central technical support is no longer available on the same basis as previously. This capability is either being developed by individual plants, or is contracted on a competitive basis from foreign firms or the successors to former central technical institutes.

5. There are seven (7) technologies available for replacement of CFCs in aerosols, each with specific advantages and disadvantages: i) HAP is the lowest cost technology, but requires major modification of facilities in order to assure safe operation and storage of finished products due to its flammability and may require some formulation redevelopment; ii) HCFCs, specifically HCFC-22, HCFC-142b and HCFC-141b, are non-flammable and can serve as drop-in replacements with minor reformulation or equipment modification, but are more expensive than HAP and are a transitional material requiring eventual phase-out; iii) HFC's, specifically HFC-134a and HFC-152a, are a non-flammable, drop-in option, but their significantly higher cost relative to HAP make them cost effective only where formulation requires specific solvent or other properties; iv) Compressed Gases, such as CO, CO₂, N₂, N₂O, or air, are low cost and non-flammable but require stronger cans to withstand higher pressures, forms a less desirable wet spray and reformulation is required; v) Dimethyl Ether (DME) is more expensive than HAP, somewhat flammable, has a high capacity to dissolve a wide range of substances, particularly aqueous products and is not currently available in Russia; vi) Mechanical Pumps are a cost effective delivery system, but require complete facility replacement, can't be retrofitted for use of hydrocarbons and produces an inferior spray with associated poorer market acceptance; and vii) Roll-On Applicators are cost effective in some applications but have not proven an important substitute in general aerosol applications for marketing reasons. In summary, HAP's have been the principal replacement for CFC aerosols world wide and are approved by the UNEP Technical Options Committee for the Montreal Protocol.

6. The necessity of CFC phase-out is recognized by all aerosol producing enterprises, with limited testing of CFC/HAP blends or 100% HAP being undertaken by most over the last several years. At this time, one enterprise (Chilton) has implemented full conversion to HAP, five enterprises (Novosibirsk, Arnest, Halogen, Chimprom, and Novomoskovsk) have selected conversion to HAP, one enterprise (Mosbytchim) has converted most of its production to HCFC-22 with one remaining line proposed for HAP conversion, and one enterprise (Altaichimprom) has chosen mechanical pumps. The overall Project will cover complete conversion from ODS propellants in all seven remaining ODS users producing cosmetic and industrial aerosols. These users accounted for 85% of ODS used in the aerosol sector in 1992 and consumed 13,121 MT CFC based on 1994 consumption data.

7. Domestic supply of HAP having the necessary purity is currently limited and has been viewed as a significant constraint on conversion. One of the two traditional suppliers was the Karabulag refinery in Grozny, Republic of Chechnya, but this facility is no longer operational. The remaining major supplier in Russia is the Minnebayov Refinery in Almetevsk, but it is largely committed to supplying Chilton which assisted in the development of the capability as part of its ODS phase-out program. However, a number of other refineries are considering introduction of production as demand increases, which requires approximately one year's lead time. In particular, the Neftekumsky Refinery in Stavropol Krai has completed preparatory technical work and has obtained financing for development of 10,000 MT/year of capacity.

II. DOMESTIC REFRIGERATION SECTOR BACKGROUND

8. Project preparation work has identified 12 domestic refrigerator manufacturers² in Russia. Several of these also produce compressors, along with four stand-alone compressor suppliers³. Some compressors are also imported. Total refrigerator production in 1993 was 3,500,000 units with 67% of current capacity concentrated in five major manufacturers (KRP "Biryusa", Saratov, POLUS, Omsk, and Stinol), which produced 2,300,000 units. Traditionally, 80% were sold domestically, and 20% were exported to CIS countries, Eastern and Western Europe, Australia, Cuba, and China. However, markets in developed countries have effectively disappeared with bans on ODS containing consumer goods, which has resulted in a decline in production in some plants that have not developed ODS free "niche" product lines. Refrigerator sizes range from 20 to 125 ft³ in one and two compartment models. Typical refrigerator life is 15 years during which it is serviced once on average.

9. While limited phase-out of ODS has occurred on a selective basis in some plants largely to maintain niche export markets, all major enterprises still currently use CFC-12 refrigerant and rigid polyurethane foam insulation formed with CFC-11. Total ODS consumption in the domestic refrigeration sector in 1993 was estimated at 4,800 MT/year ODS including CFC-113 solvent use during manufacturing processes.

² Domestic refrigerator manufacturers identified are KRP "Biryusa" (Krasnoyarsk), Saratov Electric Aggregate Production (Saratov), Zavod (Zelenodolsk), Orsk Mechanical Plant (Orsk), Polus (Zaloust), NLMK "Stinol" (Lipetzk), Muron Machine Building Plant (Muron), Yuryuzan Mechanical Plant (Yuryuzan), ZIL (Moscow), JSC "Iceberg" (Smolensk), Ussuriysk Machine Building Plant, (Ussuriysk), and Leinetz (St. Petersburg).

³ Domestic manufacturers also producing compressors for internal and or sale are KRP "Biryusa" (Krasnoyarsk), Orsk Mechanical Plant (Orsk), Zil (Moscow), JSC "Iceberg" (Smolensk). Stand alone compressor manufacturers are Astzakhan Weapons Plant (Astzakhan), Tula Armory Plant (Tula), Omsk Compressor Plant (Omsk) and Kirov Plant "Avaitech" (Kirov).

10. Nine of the largest manufacturers have formed a separate joint stock company, JSC Cholod-Byt as a vehicle for scientific and technical support in phasing out ODS. It sponsors research and fact finding on replacement technology and its implementation.

11. Technology options identified for the phase-out of CFC-12 refrigerant are: i) the use of HFC-143a which has advantages of zero ODP, non-flammability, and high efficiency, but also the disadvantages of requiring compressor replacement or re-design, cooling circuit and cabinet re-design, addition of system drying facilities, as well as incompatibility with conventional seal and motor insulation materials, exhibiting significant global warming potential, and lower acceptance in some Western European markets; ii) Blends of HFC and HCFC materials such as HCFC-22, HCFC-124 and HFC-152a offer a drop in option in most applications without loss of efficiency but involve transitional substances; iii) hydrocarbons (isobutane and propane/butane mixtures), which can be readily applied to existing compressor designs without efficiency penalty, utilize the same mineral oil as CFC-12, have zero ODP and global warming potential, but are flammable thus requiring design modifications to the product and infrastructure upgrading in the manufacturing facilities; and (iv) use of HFC-134a as a drop in substitute.

12. Most Russian manufacturers have elected to utilize the HFC-134a option at this time based on it being the most established technology available as phase-out plans were being formulated and the primarily domestic orientation of their market. KRP "Biryusa" is the one significant exception where a propane/butane mixture can be used in an existing compressor design as well as in a new compressor line under construction, and because of a traditional market in Western Europe where this technology option is preferred.

13. Technology options for the replacement of CFC-11 foam blowing agents are: i) HCFC-141b which requires minimal modification of existing production equipment, but is slightly flammable, not compatible with some cabinet lining material, is a transitional substance requiring eventual phase-out and may be subject to restriction in some export markets; ii) HFC-134a which has zero ODP, is non-flammable, is compatible with cabinet lining material and will not condense, but requires high pressure mixing equipment, has a higher thermal conductivity than CFC-11, suffers solubility limitations in polyols, has significant global warming potential and is expensive; iii) CO₂ which is non-toxic, has zero ODP and a small relative global warming potential, but has a 30% higher thermal conductivity than CFC-11 and requires significant dimension changes in the product to be effective; and iv) Cyclopentane which has both zero ODP and global warming potential, offers greater flexibility in adapting blowing equipment, uses smaller quantities and is low cost, but can create explosive mixtures with air, has a slightly higher thermal conductivity than CFC-11 and requires upgraded handling and application facilities.

14. The selection of cyclopentane by Russian refrigerator producers is almost universal as a technology option. The selection of cyclopentane is consistent with current trends globally and is recognized as the preferred option. Only one manufacturer (POLUS) has selected HFC-134a due to the location of their facility, which does not permit the use of a potentially explosive foaming agent.

III. INDUSTRIAL REFRIGERATION SECTOR BACKGROUND

15. In 1993, the Russian industrial refrigeration sector consumed 328 MT CFC-12 and 157 MT HCFC-22. There are six manufacturers of industrial refrigeration machinery including compressors.⁴ Phase-Out in this sector will require development of designs for use of non-ODS materials, principally HFC-134a, and manufacturing machinery with which to fabricate the designs. Production volumes in this sector are low largely due to economic conditions. The result is that any conversions considered have very poor cost effectiveness. Those facilities where planning has been initiated have generally selected the HFC-134a and cyclopentane options, for refrigerant and foam blowing purposes respectively.

IV. COMMERCIAL REFRIGERATION SECTOR BACKGROUND

16. In 1993, the Russian commercial refrigeration sector consumed 195 MT of CFC-11, 146 MT of CFC-12, and 100 MT of HCFC-22. Eleven manufacturers have been identified⁵ with Marikholodmash dominating the sector with 48% of the production volume. Phase-Out in this sector will involve conversion to non-ODS refrigerants, principally HFC-134a, and replacement of CFC-11 with cyclopentane for foam insulation blowing. While demand for this type of equipment is relatively strong, most manufacturers appear to be in financial difficulty and low capacity utilization rates are common to most. This limits the cost effectiveness of most conversion initiatives at this time.

⁴ Industrial refrigeration producers identified are:- Kazan Compressor Plant (Kazan); Moscow "Iskra" (Moscow); Kasinov "Cholodmash"(Kasimov); Cita-Centre Machine Building Plant (Chita); Moscow Compressor (Moscow); and Cherkessk Refrigeration Plant (Cherkessk).

⁵ Commercial refrigeration equipment manufacturers identified are: ANPO "Marikholodmash" (Yoshkra-Ola); Tormash (Ekaterinberg), Refrigeration Equipment Plant (Orenburg); JV. "Sovitalpromash" (Volzhsk); Torhmash (Lubertzy); RPS "Iniziativa" (Aleksandrov); JV "Interholod" (Moscow); JSC "Sneg" (Moscow); "Edelveys" (St. Petersburg), PO "Cholodmash" (Yaroslavl); and Volgograd Tractor Plant (Volgograd).

V. REFRIGERATION SERVICING SECTOR

17. The largest use of ODS in the refrigeration sector generally is for servicing operating equipment, mainly the stock of industrial and commercial units. Approximately 4,500 MT of ODS material is estimated to be consumed annually for servicing operations. For domestic refrigeration, this work is largely carried out by service centers operated by the manufacturers. In the industrial and commercial sector, servicing was traditionally done by a state organization affiliated with the Ministry of Trade. However, this system appears to have largely collapsed and has been replaced by a series of small enterprises formed by former employees of the original state organization. Some consolidation of these operations is occurring with a form of industry association or umbrella organization claiming to have a nation wide network of service capability. However, development of an effective system of recovery and reuse of ODS refrigerants has not yet occurred, although it will become critical as production phase-out begins to take effect. As yet no specific investment projects in this sector have been prepared although several are under consideration. This sector is anticipated to be the focus of future bilaterally funded project preparation work and potentially other investment initiatives. Options and initiatives potentially to be undertaken in this sector include the development of CFC recovery and recycling infrastructure, retrofitting existing equipment for non-ODS materials such as HFC-134a, use of HCFC-22 based drop-in blends, and development of other drop-in alternatives.

PART 2: FIRST TRANCHE SUB-PROJECT DESCRIPTIONS

I. JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT

A. Enterprise Background

18. Arnest is a private joint stock company located in Nevinnomyssk in the Stavropol Region of the Russian Federation. Within the aerosol sector, the enterprise is one of the three largest domestic producers, accounting for over 20% of can production and approximately 10% of ODS consumption in the sector. It is engaged primarily in the manufacture of aerosol products, which accounts for 95% of its business. It was established in 1971 with a production capacity of 20 million cans per year, using equipment originally imported from Italy and Germany. Capacity has been increased over the last 25 years to the current capacity of 40 million cans per year. The enterprise currently employs approximately 1,000 people. While a reduction of 80 persons has occurred over the past year, employment is expected to be stable in the coming years.

19. The enterprise was simultaneously transformed into a joint stock company and privatized in November 1992. The company has two classes of shares, voting shares and preferred (non-voting) shares. About 75% of share capital are voting shares and 25% are preferred shares. The preferred shares as a group have the right to 10% of after tax earnings as dividend. Preferred shares are owned by the workers, pensioners and management of Arnest. The shares of Arnest are freely traded. The ownership structure of the total share capital is as follows: First Voucher Fund (38%); other funds and enterprises (11%); management (10%); workers and pensioners (31%); and other individuals (10%).

20. The enterprise is a fully integrated aerosol producer, inclusive of valve and can manufacturing capability. The aerosol product mix involves a wide range of individual brand names, broadly distributed among five product lines as follows: hair spray (46%), deodorants (15%), insecticides (18%), cosmetic creams (15%) and air fresheners (6%). It has an installed capacity of 40 million cans per year. In 1992, 33 million units were produced, consuming 2,380 MT of CFC. Production levels have been maintained since that time with 1994 production and consumption being 34 million cans and 2,456 MT of CFCs, respectively. Projected 1995 production is 38.5 million cans with 2,921 MT of CFC consumption. In the first nine months of 1995, 27 million cans were produced which is equivalent to 36 million cans per year. The only other product lines produced by the enterprise are several brands of foams and tints produced in internally made polyethylene containers. This is estimated to account for 4.5% of total sales in 1995.

21. The operating cost structure in the first half of 1995 was as follows: raw materials and half-products - 81.7 %; energy - 3.8 %; salaries - 6.1 %; benefits (social costs) - 4.5 %; and other - 4.0 %. During the first half of 1995, the average unit operating cost was estimated

to be US\$ 0.35 per aerosol can. The enterprise anticipates this production cost structure to remain fixed over the next several years with no change in unit production costs in real terms.

22. Raw materials are primarily imported from Western Europe. Price differentials between Russian and foreign raw materials are small and are offset by the more consistent quality of imports. Foreign suppliers generally require advance payment, particularly for aluminum which represents 50% of raw material cost and is purchased on the basis of 45 days advance payments. Raw material inventories are generally no more than required for 5 days of production.

23. Arnest has responded to the disappearance of the former state distribution system for consumer non-durable products and current absence a western type wholesale system by establishing agreements with a network of small distributors. They typically sell to distributors on one day prepayment terms. Such contracts account for 90% of all sales, representing 70% cash advance payment and 20% barter advance payment. The latter involves sale against the supply of raw materials, consumables and services. Transactions on the basis of credit arrangements are limited to approximately 10% of sales and apply to important customers with an established credit history.

24. The enterprise's products appear to be well received by the Russian consumer market as reflected by the steady growth in production during the recent difficult economic period. Approximately 95% of sales are within Russia; mainly in European Russia including Moscow and St. Petersburg. The remainder are sold in other CIS countries with Ukraine being the only market of individual significance. It is noted that advertising costs are very low (0.3 % of total costs in 1994) in comparison to those of western consumer non-durable producers.

25. The main domestic competitor to Arnest's products is Chilton in Kazan which produces similar product lines in the European Russian market, but carries a 5 to 10% selling price advantage. This is likely due to their use of inexpensive tinplate cans and cheaper HAP propellant obtained from the Minnebayov Refinery in Almetevsk, for which they cofinanced development of HAP production. In addition, low quality imported aerosols which have a significant market in Russia represent another competitive factor. The average wholesale price realized by Arnest in the first half of 1995 was approximately 3,000 RBL (US\$0.67) per can including VAT or 2,400 RBL (US\$0.54) per can net of VAT.

26. Arnest has remained in a positive cash flow position during the period 1992 to the present. Over this period, it has increased production and sales, while making significant capital investments in production facilities and initial investments for ODS phase-out utilizing internally generated funds. In 1994, the enterprise had equity of US\$8.0 million, no long term debt and US\$6.6 million in before tax net income.

27. The long term prospects of this enterprise appear generally positive, subject to the various issues noted below. As a fully private enterprise with a strong base of employee and management ownership, it appears to have a well motivated workforce and forward looking corporate direction. Western oriented marketing practices are being developed, notably the adoption of a comprehensive business plan and monthly market surveys of aerosol products and prices to keep up with the competitive situation. Their business plan for 1995 assumes production of 38.5 million aerosol cans with significant expansion to 43 million cans in 1996, and 50 million cans from 1997. This increase in production above the current capacity of 40 million cans per year will be made possible by removing production bottlenecks, unrelated to the conversion to HAP. In particular, Arnest has purchased used but relatively modern can manufacturing equipment from a closed aerosol plant in Riga. This provides incremental capacity of 10 million cans per year. Market expansion beyond its traditional areas and particularly into export markets is being actively explored.

28. A number of overall corporate business issues affecting the enterprise's future prospects can be identified. Most critical is the need for conversion of its existing production capacity from the use of ODS based propellants. This is recognized as fundamental to any future development of the enterprise's business and in fact to its viability. The former state enterprise initiated design work and evaluation of substitute materials in 1989 and this has been continued by Arnest. Specific work undertaken includes building and systems design for HAP conversion and partial construction of the propane/butane warehouse, production buildings and final product warehouse. However, additional financing is required to continue the conversion program. Concern has been expressed about having to import rather than manufacture valves. This would entail a significant cost penalty. Uncertainty associated with accessing reliable HAP supply has also been identified. The remaining issues are essentially commercial in nature. The enterprise's competitive position will be largely determined by price, which is currently higher than major competitors. The enterprise may be optimistic in assuming price rises for its products in real terms for the immediate future due to competition from both domestic and foreign producers. In fact, a real price reduction of up to 5% could occur in order to maintain market share relative its major domestic competitor. Similarly, expansion of production beyond 40 million cans per year may be market rather than capacity determined in the near future.

B. Sub-Project Objective

29. The objective of this investment sub-project is to convert Arnest's installed aerosol production capacity of 40 million cans per year from CFCs as propellant to HAP. Arnest has selected HAP as its chosen technology. This decision was based on its evaluation of both HAP and other propellants, such as DME on a trial basis, HAP's cost effectiveness, and its technical performance in atomizing can contents. This technology selection decision is consistent with general practice for aerosol producers of this type elsewhere and with international practice generally.

C. Sub-Project Scope and Description

30. The present CFC based facilities are recognized as being inadequate for HAP utilization in the following respects: i) present CFC storage facilities do not meet Russian national safety standards for flammable materials and are not designed for the higher pressures required; ii) CFC delivery and filling systems are not fire and explosion proof and poorly located within the main production facility for handling flammable materials; iii) existing valve production facilities can not make sufficiently reliable valves for use with HAP, since leakage presents a significant fire risk; and iv) present warehousing of finished product within the main plant would contravene Russian safety requirements and restrictions on quantity of material stored within each structure or isolated room. It is also recognized that the change to HAP will require upgrading of operational and safety related practices, and in the training of personnel.

31. The scope of the proposed conversion involves the retention of the existing can manufacturing facilities which are adequate for HAP, and new investment for the replacement of existing filling and valve manufacturing facilities, along with required support infrastructure. The principal capital components of the overall investment consist of the following:

- i) Propellant delivery, storage and handling facilities meeting current Russian fire protection, design pressure and fugitive emission control standards for the safe receiving, handling, storage and transfer of HAP;
- ii) Propellant filling lines meeting established safety standards for HAP will be installed to replace existing CFC filling lines;
- iii) Valve production equipment and molds will be installed to replace existing CFC valve production equipment which does not have adequate tolerances for production of HAP valves to prevent leakage under extended storage conditions;
- iv) Finished product warehouse meeting Russian National Safety requirements involves a separate building having segregated storage areas accommodating a maximum of 120,000 aerosol cans per room. Each room is to be equipped with sensors and an automatic fire fighting system;
- v) Molecular sieve safeguard purification system required to ensure reliable quality HAP material, to be supplied by a refinery which does not have an established record of supplying this material at the required level of quality; and
- vi) Support equipment in the form of a unit to safely destroy defective cans containing flammable material, and laboratory equipment required to monitor HAP quality.

D. Sub-Project Cost Estimates

32. The total investment cost estimate for the proposed conversion as agreed during appraisal is provided in Table A2.1. This estimate defines historical costs and annual expected expenditures by year for each major item and sub-item, expressed in June 1995 US\$ and including an overall 10% physical contingency. The installation estimates reflect actual costs for expenditures to date and updated local construction costs accounting for the significant inflation in such costs over the past year. Imported equipment costs have been based on preliminary quotations from several suppliers. The total project cost estimate is US\$15,786,200, of which \$5,650,000 is proposed to be provided by the GEF grant and US\$10,136,200 will be provided by Arnest. Prior to June 1995, the enterprise has spent US\$134,400 and current commitments for the period June 1995 to June 1996 are US\$836,800. These past and current commitments apply principally to HAP storage and handling facilities, finished goods warehouse construction, general infrastructure, engineering and environmental assessment expenditures. The cost effectiveness of the sub-project based on 1994 consumption of CFCs and the proposed GEF grant of US\$5,650,000, is US\$2.30/kg. ODP. The cost effectiveness improves to US\$ 1.86/kg. ODP based on the full 40 million can per capacity, which is estimated to consume 3,034 MT CFC. In either case, this is better than the threshold of US\$4.40/kg. ODP currently used by the Montreal Protocol Multilateral Fund.

TABLE A2.1
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
COST AND FINANCING SUMMARY
(US\$)

COST COMPONENT	PRE-JUNE/98 EXPENDITURES	JUNE/98 - JUNE 98 EXPENDITURES	1998			TOTAL PROJECT COST	GEF GRANT ALLOCATION
			1998 (July -Dec.)	1997	1998		
HAP Storage and Handling Facilities							
- Preliminary Equip./Construction	95,800					95,800	
- Electrical/Controls/Fire		100,000	100,000	164,100		364,100	
- Tankage/Mechanical Equipment			71,700	178,000		249,700	
- Pipe, Valves and Fittings			81,000	141,000		202,000	
- Installation		172,000	247,000	578,500		995,500	
HAP Tank Cars (6)			90,000	210,000		300,000	
HAP Filling Line (2)							
- Building			430,000	1,120,800		1,550,800	
- Equipment			1,180,000	2,000,000	358,000	3,538,000	3,538,000
- Installation					689,000	689,000	
Finished Goods Warehouse							
- Lift Truck Equipment (Elevators)				250,000		250,000	
- Equipment (Other)		55,000	200,000	52,900		307,900	
- Installation/Building		168,700	89,800			258,500	
Valve Making System							
- Equipment and Molds				2,000,000		2,000,000	2,000,000
- Installation					300,000	300,000	
HAP Molecular Sieve			80,000	138,000		198,000	112,000
HAP Q/C Equipment				43,700		43,700	
Defective Can Destruction Unit					80,000	80,000	
Infrastructure Improvements							
- Equipment	24,200	44,000	40,000	50,000	40,800	199,000	
- Installation	14,200	25,000	390,000	510,000	387,900	1,327,100	
Engineering		100,000	50,000			150,000	
Environmental Impact Assessment		98,000				98,000	
Import Agent Fee			10,000	20,000	20,000	50,000	
Import Taxes				700,000	304,000	1,004,000	
Start Up Down Time					123,000	123,000	
Physical Contingency (10%)		78,100	300,000	818,000	282,000	1,458,100	
TOTALS	134,200	836,800	3,318,500	8,971,000	2,524,700	15,786,200	5,650,000

FINANCING REQUIREMENTS

Internal Enterprise Financing	134,200	836,800	2,079,500	4,919,000	2,188,700	10,138,200
GEF Grant			1,240,000	4,052,000	358,000	5,650,000

TABLE A2.2
INCREMENTAL OPERATING COST SAVINGS
(Based on 1993 Production)

Product	With CFC (\$/000 units)	With HAP (\$/000 units)	Difference (\$/000 units)	Yearly Sales (units/year)	TOTAL SAVINGS (\$/year)
Deodorant	273.74	222.70	51.04	3,000,000	153,120
Hair Spray	277.76	273.86	3.90	23,000,000	89,700
Cream	253.34	249.93	3.41	2,000,000	6,820
Air Freshener	217.52	157.38	60.14	2,000,000	120,280
Insecticide	107.67	49.89	57.69	3,000,000	173,070
TOTAL				33,000,000	542,990

NPV @10% = 542,990 + 493,627 + 448,752 + 407,956 = \$1,893,325

33. The conversion from CFC propellants to less expensive HAP's will result in operating cost savings. While these will not impact on the investment requirements, they represent a benefit to the enterprise that may be realized after conversion is completed. The estimated net present value over four years of these cost savings, based on 1993 production, are estimated to be US\$1,893,325 as summarized in Table A2.2.

E. Sub-Project Implementation

34. Arnest has initiated the sub-project with the investments in HAP handling infrastructure noted above. Assuming approval and effectiveness of grant funding being available by September 1996, the sub-project's remaining implementation will be undertaken primarily during 1996 and 1997, with start up and commissioning occurring in the third and fourth quarters of 1998. Figure A2.1 provides an overall implementation schedule for the proposed sub-project. In addition to grant effectiveness, critical milestones associated with the

FIGURE A2.1
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
SUB-PROJECT IMPLEMENTATION SCHEDULE

ACTIVITY	1995				1996				1997				1998				REMARKS	
	Q1	Q2	Q3	Q4														
Grant Documentation and Approval				■														
GEF Grant Negotiations					■													
Board Presentation						■												Board Presentation March 96
Grant Agreement Execution						■	■											Grant Effectiveness - June 30/96
Sub-Grant Agreement					■	■												CPPI/Arnest to finalize by Negotiations
Procurement Specifications - Major Equip.				■	■													CPPI Project Preparation Assistance
Detailed Engineering					■	■	■	■	■	■								Arnest responsibility - Local supply
Environmental Impact Assessment					■	■	■											Bank approval as condition of disbursement
Regulatory Approvals						■	■											Bank approval as condition of disbursement
HAP Storage and Handling Facilities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Arnest responsibility - Local supply
HAP Rail Cars					■	■	■	■										
- Tender					■	■	■	■										IS Procurement Practice to qualify for
- Equipment Supply									■	■	■	■	■	■	■	■	■	sub-grant funding (Contingency)
HAP Filling Line					■	■	■	■										
- Tender					■	■	■	■										ICB Procurement Practice to qualify for
- Equipment Supply									■	■	■	■	■	■	■	■	■	sub-grant funding
- Installation													■	■	■	■	■	
- Training and Commissioning														■	■	■	■	
Valve Making Equipment and Molds					■	■	■	■										
- Tender					■	■	■	■										ICB Procurement Practice to qualify for
- Equipment Supply (Valves)									■	■	■	■	■	■	■	■	■	sub-grant funding
- Equipment Supply (Molds)													■	■	■	■	■	
- Installation																		
- Training and Commissioning																		
HAP Molecular Sieve					■	■	■	■										
- Tender					■	■	■	■										IS Procurement Practice to qualify for
- Equipment Supply									■	■	■	■	■	■	■	■	■	sub-grant funding
HAP Q/A Equipment					■	■	■	■										
- Tender					■	■	■	■										IS Procurement Practice to qualify for
- Equipment Supply													■	■	■	■	■	sub-grant funding (Contingency)
Defective Can Destruction Unit									■	■	■	■	■	■	■	■	■	
- Tender									■	■	■	■	■	■	■	■	■	Arnest responsibility - Local supply
- Equipment Supply																		
Finished Goods Warehouse					■	■	■	■										
- Elevator Equipment Tender					■	■	■	■										IS Procurement Practice to qualify for
- Elevator Equipment Supply/Install																		sub-grant funding (Contingency)
- Building Construction	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Arnest responsibility - Local supply
Infrastructure Improvements	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Arnest responsibility - Local supply
Commissioning and Startup																■	■	Arnest responsibility - Local supply

schedule are identified as: i) receipt of necessary environmental and safety approvals; ii) procurement and supply of filling lines; and iii) procurement and supply of valve making equipment and molds.

35. A procurement plan was developed at appraisal. It is based on the allocation of grant resources to critical imported equipment, and the procurement from Arnest's resources of other equipment and services likely to be available in Russia, or former CIS countries. World Bank procurement practices, as set out in "Guidelines for Procurement Under IBRD Loans and IDA Credits, January 1995" will apply to goods to which grant resources are applied. More specifically, International Competitive Bidding (ICB) will be undertaken for two packages: the HAP filling line equipment US\$3,538,000, and the valve manufacturing equipment and molds US\$2,000,00. International Shopping (IS) will be applied to the procurement of the HAP molecular sieve (US\$196,000), for which at least a portion (US\$112,000) of the cost will be covered by the grant. Arnest consider the cost estimates for the major equipment to be high and grant resources could potentially be available for other expenditures. For this reason, procurement of the ICB packages have already been initiated with the support of the CPPI in order to accommodate the lengthy ICB process such that prices can be fixed as early as possible. In order to ensure that other expenditures will qualify for grant funding if lower prices are obtained, IS procedures will be applied to three other packages: the HAP rail cars (US\$300,000), HAP quality control equipment (US\$44,000), and the warehouse elevators (US\$250,000). A summary of the proposed procurement plan is provided in Table A2.3.

36. Arnest was able to demonstrate that several areas of uncertainty associated with the sub-project identified during preparation had been resolved. Firstly, extensive research and procurement planning had been undertaken related to the acquisition of valve manufacturing equipment and molds. Early indications were that suppliers would not be available for this equipment and Arnest might be forced to import valves. This would have added an estimated US\$0.08 to the unit cost of each can. However, at least three international valve manufacturing equipment suppliers in more than two countries have been identified and have supplied preliminary quotations. This provides confirmation that valve making rather than purchase is feasible and that competitive pricing of equipment can be obtained.

37. The second area of technical uncertainty relates to the presently constrained availability of domestically produced HAP. In response, Arnest has been part of the initiative to develop this capability at the Neftekumsky Refinery, through provision of feasibility study funding. With financing from local governments, this refinery is proceeding to develop approximately 10,000 MT/year of HAP supply capacity, of which Arnest will provide a base market for 2,000 to 4,000 MT/year. A guaranteed supply arrangement at a price of approximately US\$500/MT is currently being negotiated. In addition, a molecular sieve has been included in the sub-project investment to assure quality of material delivered from relatively new producers.

TABLE A2.3
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
PROCUREMENT PLAN

DESCRIPTION OF GOODS, WORKS OR SERVICES	ESTIMATED PACKAGE AMOUNT (US\$)	PROPOSED PROCUREMENT PROCEDURE	REMARKS
HAP Storage & Handling Facilities			
- Preliminary Equipment Supply/Installation	104,500	Local Shopping	Enterprise Financed
- Electrical, Controls, Fire Protection Systems	401,810	Local Shopping	Enterprise Financed
- Tankage and Pumps	274,670	Local Shopping	Enterprise Financed
- Pipe, Valves and Fittings	222,200	Local Shopping	Enterprise Financed
- Installation	1,094,500	Local Shopping	Enterprise Financed
HAP Tank Cars (6)	330,000	IS	Contingency Item for GEF Funding
HAP Filling Lines (2)			
- Building	1,705,880	Local Shopping	Enterprise Financed
- Filling Line Equipment	3,891,800	ICB	GEF Funded
- Installation	735,900	Local Shopping	Enterprise Financed
Finished Goods Warehouse			
- Lift Truck Equipment (Elevators)	275,000	IS	Contingency Item for GEF Funding
- Equipment/Furnishings	338,890	Local Shopping	Enterprise Financed
- Installation - Building	282,150	Local Shopping	Enterprise Financed
Valve Making Production Line			
- Valve Production Equipment	2,200,000	ICB	GEF Funded
- Valve Making Equipment			
- Molds			
- Installation	330,000	Local Shopping	Enterprise Financed
HAP Molecular Sieve	215,800	IS	GEF Funded (Partially)
HAP Q/C Equipment	48,070	NS / IS	Contingency Item for GEF Funding
Defective Can Destruction Unit	66,000	Local Shopping	Enterprise Financed
Infrastructure Improvements			
- Equipment	218,900	Local Shopping	Enterprise Financed
- Installation	1,459,810	Local Shopping	Enterprise Financed
Engineering	185,000	Sole Source	Enterprise Financed
Environmental Impact Assessment	107,800	Sole Source	Enterprise Financed
	14,468,080	TOTAL GEF FUNDED PROCUREMENT:	
		ICB: US\$5,538,000	
		IS: US\$112,000	

Note: JSC Arnest will apply IS procedures to an additional US\$598,000 of equipment purchasing in order to allow re-allocation of grant funding to these commitments in the event that the presently proposed ICB and IS grant funded purchases be less than estimated.

38. A preliminary environmental impact statement on the proposed sub-project has been prepared. It identified the major issues as those associated with the increased release of volatile organic compounds (VOC's) and the increased safety and fire risk, both of which are a consequence of using flammable HAP. A more detailed assessment is being prepared based on site specific plans and detailed engineering. This will be submitted to local authorities for review and amendment of Arnest's existing permit. Since this development is viewed as a modification of an existing permitted facility, no new permit is required. A number of other environmental compliance issues associated with Arnest's present operations were also identified by the local environmental authorities. These include: i) waste and storm water discharge quality from the site and the need for Arnest to participate in the development of a treatment plant for a number of local enterprises, and ii) solid industrial waste disposal practices. It was also noted that other regulatory approvals would be required from agencies responsible for workplace health and safety and these would be undertaken during detailed design. It is understood that all local and national environmental and safety approvals, as well as submission of acceptable environmental assessment information for World Bank review as a Category "B" project would be a condition of sub-grant disbursement.

39. Arnest's capacity to manage the sub-project's implementation appears generally adequate, recognizing that limited direct experience with Bank or western commercial and procurement arrangements exists. The enterprise has maintained and operated a relatively modern and efficient facility through the recent period of economic transition. In addition they have undertaken significant preliminary capital works associated with this sub-project. Finally, they have identified experienced technical and project implementation support through the successor to the institute in Kiev, which has historically provided these services to the sector. However, the appraisal mission noted several areas related to project implementation that would require continuing support and assistance. These are: i) undertaking environmental impact assessment of the development; ii) development of technical specifications for foreign equipment; and iii) administering procurement procedures in accordance with World Bank competitive bidding practices.

F. Enterprise Financial Evaluation

40. An enterprise financial evaluation was performed to test Arnest's ability to sustain its financial contribution to the ODS phase-out investment, as well as confirming the enterprise's overall viability. This was accomplished by; i) reviewing its accounting and management information systems; ii) noting significant aspects of the tax regime; iii) analyzing current and recent balance sheets and income statements; and iv) identifying significant business issues and risks. This information was then used to develop a conservative financial projection for the enterprise including the proposed sub-project.

41. A review of Arnest's accounting system indicated that, like most such enterprises in Russia, it is designed to serve traditional state planning and tax calculation objectives. The accounting system as well as the tax system are currently in a state of flux, with new regional and federal taxes being added faster than accounting forms can be changed. Similarly, tax rates and deductibility rules change frequently. The current system does provide the mandatory annual and quarterly statements covering balance sheets, and profit and loss. The information utilized in these statements is collected on a monthly basis and is used in this form by management for internal control purposes as well. No review of these statements by an external auditor has been traditionally undertaken but they have been certified by the regional tax inspection authorities. Statements are not published, but rather are reported verbally to a meeting of shareholders. It should also be noted that external auditing will be mandatory, starting in the 1995 financial year and JSC Arnest are making arrangements for this. The analysis provided below assumes that the unaudited statements give a full and true picture of enterprise's financial situation.

42. While a formal western style management information system is not operated by the enterprise, a system of "analytical accounts" is maintained. These provide an accounting of inventory and itemized costs for reporting periods. However, the ability to undertake cash flow analysis or real value analysis within the current inflationary environment is limited, something that represents a business risk. The enterprise recognizes the limitations of its present financial management system and is beginning to address these concerns. In this regard, a comprehensive business plan has been developed with western consulting assistance.

43. The significant features of the current tax system impacting on Arnest's financial situation and its ability to handle it's portion of the investment are:

- i) Taxable income is reduced by capital investment in the current tax year up to 50% of taxable income. No carry over from year to year is permitted.
- ii) The GEF sub-grant is considered taxable income on the income statement but will be deductible from taxable income to the extent that it is invested in the year in which it is received, subject to the overall limitation of investment deductions being limited to 50% of taxable income.
- iii) Depreciation on the value of fix assets is tax deductible, allowing a double tax shield on investments (depreciation rates used by Arnest are 10 to 12 years for equipment and 40 years for buildings).
- iv) Assets are revalued annually to account for inflation using official factors, even though this is recognized as not necessarily reflecting the actual market value of assets.

- v) Revaluing assets to their market value can be undertaken and has the benefit of a lower asset tax rate (2%) than the tax benefit derived from depreciation, which, for equipment, is estimated to be 3.5%. JSC Arnest will undertake a market revaluation at the end of the 1995 financial year.

44. A conventional balance sheet was developed during appraisal for the years 1992 through to the first half of 1995. This is provided in Table A2.4 and indicates the following significant points related to Arnest's current financial position at the end of the second quarter of 1995: i) total equity of US\$8.6 million; ii) no long term debt; iii) US\$0.9 million in cash and receivables; iv) US\$1.53 million and US\$0.9 million in working capital tied up in inventories and prepayment to suppliers (mainly of aluminum), respectively; v) US\$3.3 million in current assets; and vi) US\$1.7 million in current liabilities. While the company exhibits a reasonable current asset to liability ratio (1.94), most of these assets are tied up in inventories and advance payments resulting in a lower current asset to liability ratio when adjusted for these items. While this may be mitigated to some degree by management's ability to control some current liabilities (consumption fund contributions, future expenses, and in kind transactions for payables), it reflects a restraint on available working capital. A small credit facility (500 million RBL) has recently been established to provide short term financing (2-3 days per month) in response to this constraint.

45. The mission identified the availability of working capital as a potential risk. While working capital is generally adequate for current operations, it was concluded that short falls would likely occur when production is being expanded, especially during the period in which extensive capital expenditures were required for the ODS phase-out investments. Arnest were encouraged to increase access to working capital in the future by increasing contributions of after-tax cash flow to the Accumulation Fund, or establishment of a larger credit facility. The enterprise management acknowledges this issue and are investigating a longer term credit line of 10 billion RBL (US\$ 2.2 million) to support the ODS phase-out investments. However, the high cost of utilizing such a facility remains a constraint.

TABLE A2.4
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
SUMMARY CORPORATE BALANCE SHEET

	1992	1993	1994	1995 First Half
Total Fixed Assets	2,003,863	3,266,594	5,055,739	6,967,700
Revalued Fixed Assets	2,522,143	6,068,167	6,644,346	7,815,310
Accumulated Depreciation	1,298,103	3,190,516	3,158,242	2,855,154
Assets under Construction	779,823	388,943	1,569,635	2,007,545
Intangibles				
Long Term Investments	3,429	4,374	7,775	
Long Term Receivables		11,028		
Current Assets (A)	1,933,200	1,778,507	3,977,330	3,298,888
Cash	6,560	1,100	299,086	74,381
Receivables	511,394	355,275	584,788	450,135
Goods Shipped			404,397	342,098
Advance Payments to Suppliers (B*)	706,000	406,973	855,607	902,509
Inventories (B)	709,246	1,015,159	1,833,454	1,529,765
Other				
Deferred Costs	280	493	31,363	52,452
Total Assets	3,940,771	5,060,995	9,072,207	10,319,040
Total Equity (C)	2,494,491	3,904,991	7,152,374	8,620,891
Long Term Debt (F)				
Financial Investments				
Total Current Liabilities (D)	1,446,280	1,155,010	1,919,833	1,698,149
Payables	1,174,371	566,431	860,000	946,661
Advances	13,137	78,258	218,645	206,594
Short Term Loans	258,771	279,275		77,778
Other		231,047	841,189	467,117
Deferred Income	0	0	0	0
Total Equity/Liabilities (E)	3,940,771	5,060,995	9,072,207	10,319,040
Current Ratio (A/D)	1.34	1.54	2.07	1.94
Quick Ratio ((A-B)/D)	0.85	0.66	1.12	1.04
Quick Ratio* ((A-B-B*)/D)	0.36	0.31	0.67	0.51
Debt:Equity Ratio ((F/(F+C))				

46. The enterprise income statement developed during appraisal for the years 1992 through to the first half of 1995 is provided in Table A2.5. This shows that Arnest has positive and growing after tax income over the period considered, and has been able to finance new investment from internal cash generation, as well as provide for other income distribution obligations, namely preferred and ordinary share dividends, additions to working capital funds and social infrastructure allocations. However, it is also apparent that the higher investment requirements after full commitment to ODS phase-out will require a larger share of available cash flow, and, if financed internally, will require reductions in allocations to other income demands.

47. Utilizing the information developed during appraisal, a conservative model for projection of financial performance was developed to test Arnest's ability to finance their portion of the overall investment in the proposed sub-project (Table A2.6). The two conservative assumptions applied concurrently in the projections were: i) production volume does not increase above the current 40 million cans per year, and ii) real prices of Arnest's products are reduced by 5% to match their main competitor. It is noted that the enterprise business plan forecasts increasing production to 50 million cans by 1997 and no reduction in price. The results of this model are provided in Table A2.6. This indicates that even under these conservative assumptions, Arnest will be able to finance its portion of the ODS phase-out investment, provided the shortfall of US\$1.4 million projected for 1997 is allocated from after tax surplus from 1996.

TABLE A2.5
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
SUMMARY CORPORATE INCOME STATEMENT

	1992	1993	1994	1995 First Half
INPUT ASSUMPTIONS				
# aerosol cans produced and sold	31,122,000	29,352,000	33,900,000	17,066,000
Average production cost per aerosol can	0.11	0.14	0.32	0.35
Average wholesale price aerosols	0.22	0.27	0.65	0.67
Average selling price per can (net of VAT)	0.18	0.23	0.53	0.54
Gross Sales Revenue (Total)	6,846,274	8,017,464	22,145,153	11,391,660
NET SALES REVENUES (A)	5,617,846	6,610,951	17,819,663	9,192,929
OPERATING EXPENSE (B)	3,379,920	4,240,519	10,853,841	5,974,234
Raw materials and half products	na	3,060,032	8,157,944	4,879,060
Energy	na	188,442	528,520	227,648
Salaries	na	494,113	909,548	363,007
Benefits (Social costs)	na	26,609	625,483	270,717
Other	na	471,323	632,347	239,954
NET OPERATING INCOME BEFORE DEPRECIATION	2,237,926	2,370,433	6,965,823	3,218,695
TOTAL DEPRECIATION (C)	21,686	14,836	157,487	116,901
Depreciation	21,686	14,836	157,487	116,901
Project Depreciation				
NET OPERATING INCOME BEFORE INTEREST (D)	2,216,240	2,355,596	6,808,336	3,101,794
Interest on Bank Credits		126,935	79,169	61,527
NET OPERATING INCOME	2,216,240	2,228,662	6,729,167	3,040,268
Trading Income		(895)		35,890
Net Other Revenues (non-realized), including:	21,726	9,999	(102,667)	(118,114)
Stocks, bonds, and participation	886	376	3,992	
Foreign currency exchange rates gains & losses		140	14,347	(530)
NET INCOME BEFORE TAX	2,234,503	2,237,906	6,626,500	2,958,044
Special Tax Deductions (investments and social costs)	222,160	440,959	899,202	748,734
Profit tax (35% of income after deductions)	780,811	735,802	2,236,607	663,388
NET INCOME AFTER TAX	1,453,691	1,502,104	4,389,893	2,294,656
Add Back Depreciation	21,686	14,836	157,487	116,901
Net Cash Flow	1,475,377	1,516,940	4,547,380	2,411,557
INCOME DISTRIBUTION				
Preferred Share Dividend (10% of Net)	145,369	150,210	438,989	229,466
Available for Investments and Distributions	1,330,008	1,366,730	4,108,391	2,182,091
Enterprise Investments (non ODS)	381,457	379,133	379,058	186,823
Enterprise Invest (ODS Project)			410,647	560,468
Available for Other Distributions	948,551	987,597	3,318,686	1,434,801

TABLE A2.6
JSC ARNEST HAP AEROSOL CONVERSION SUB-PROJECT
CORPORATE FINANCIAL PROJECTION

	1994	1995 First Half	1995 Full year	1996	1997	1998
INPUT ASSUMPTIONS						
# aerosol cans produced and sold	33,900,000	17,066,000	36,000,000	40,000,000	40,000,000	40,000,000
Average production cost per aerosol can	0.32	0.35	0.35	0.35	0.35	0.35
Average wholesale price aerosols	0.65	0.67	0.67	0.64	0.64	0.64
Average selling price per can (net of VAT)	0.53	0.54	0.54	0.51	0.51	0.51
Gross Sales Revenue (Total)	22,145,153	11,391,660	24,120,006	25,600,000	25,600,000	25,600,000
NET SALES REVENUES (A)	17,819,663	9,192,929	19,464,547	20,400,000	20,400,000	20,400,000
OPERATING EXPENSE (B)	10,853,841	5,974,234	12,600,000	14,000,000	14,000,000	14,000,000
Raw materials and half products	8,157,944	4,879,060	10,290,216			
Energy	528,520	227,648	480,124			
Salaries	909,548	363,007	765,602			
Benefits (Social costs)	625,483	270,717	570,958			
Other	632,347	239,954	493,100			
NET OPERATING INCOME BEFORE DEPRECIATION	6,965,823	3,218,695	6,864,547	6,400,000	6,400,000	6,400,000
TOTAL DEPRECIATION (C)	157,487	116,901				
Depreciation	157,487	116,901				
Project Depreciation						
NET OPERATING INCOME BEFORE INTEREST (D)	6,808,336	3,101,794	6,864,547	6,400,000	6,400,000	6,400,000
Interest on Bank Credits	79,169	61,527	65,527	8,000	8,000	8,000
NET OPERATING INCOME	6,729,167	3,040,268	6,799,021	6,392,000	6,392,000	6,392,000
Trading Income		35,890				
Net Other Revenues (non-realized), including:	(102,667)	(118,114)		1,240,000	4,052,000	358,000
Stocks and Bonds + GEF grant	3,992			1,240,000	4,052,000	358,000
Foreign Currency exchange gains and losses	14,347	(530)				
NET INCOME BEFORE TAX	6,626,500	2,958,044	6,799,021	7,632,000	10,444,000	6,750,000
Special Tax Deductions (investments and social costs)	899,202	748,734	1,497,468	3,315,000	5,222,000	2,524,000
Profit tax (35% of income after deductions)	2,236,607	663,388	1,855,543	1,755,000	2,402,000	1,816,000
NET INCOME AFTER TAX	4,389,893	2,294,656	4,943,477	5,877,000	8,042,000	4,934,000
Add Back Depreciation	157,487	116,901				
Net Cash Flow	4,547,380	2,411,557	4,943,477	5,877,000	8,042,000	4,934,000
INCOME DISTRIBUTION						
Preferred Share dividend (10% of Net-GEF grant)	438,989	229,466	494,348	463,700	463,700	463,700
Available for Investments and Distributions	4,108,391	2,182,091	4,449,130	5,413,000	7,575,000	4,470,000
Enterprise Investments (non ODS)	379,058	186,823	666,667			
Enterprise Invest in ODS + GEF grant	410,647	134,200	836,800	3,315,000	8,971,000	2,525,000
Available for Other Distributions	3,318,686	1,434,801	2,945,663	2,098,000	(1,396,000)	1,945,000
Memorandum Item: GEF Grant Investment				1,240,000	4,052,000	358,000

II. JSC KRASNOYARSK REFRIGERATOR PLANT "BIRYUSA" HYDROCARBON REFRIGERANT CONVERSION

A. Enterprise Background

48. KRP is a joint stock company located at Krasnoyarsk, in the Siberian Region of the Russian Federation. It is Russia's largest manufacturer of domestic refrigeration products, specifically refrigerators, freezers and compressors and this is its sole business. With an annual production capacity of 750,000 units and 1,000,000 compressors per year, it accounts for approximately 21% of national production. The enterprise currently employs approximately 6,500 people. It was established in 1964 with a capacity of 300,000 units which has been increased to present levels in two phases since that time. Compressor manufacturing utilizing imported equipment was added in 1971. The manufacturing operation is located within the boundaries of a military industrial complex that was previously its parent.

The operation consists of a compressor plant, two refrigerator and freezer assembly lines, three refrigerator circuit assembly lines, three door and three cabinet foaming lines. Ten different models are made, including table/minibar models, two chamber refrigerator freezers up to 270 liter capacity and freezers to 220 liter capacity. The compressors manufactured are of the scotch yoke type and are used in the enterprises own product lines directly, or as replacements through their service network.

49. In 1992, the management of KRP was separated from the military industrial complex (Kras mash) that it was originally part of and established as an open joint stock company. In 1994, it was privatized. Ownership is distributed in freely traded common shares, distributed as follows: employees of Kras mash (20%); employees of KRP (31%); State Property Fund of Krasnoyarsk (15%), First Voucher Fund (19%); and other small investors (15%). The State Property Fund is currently reducing its interest to 10% through sale of shares on a local stock exchange.

50. In recent years, KRP has operated at close to or above capacity (750,000 units) with annual unit production as follows: 1992 - 737,000 units; 1993 - 767,000; and 1994 - 743,000 units. However, sales are projected to fall in 1995 to 684,000 units as restrictions on sales of CFC based technology come into force in its traditional Western European export markets. KRP have responded by undertaking the conversion of one refrigerant charging line with an installed annual production capacity of 100,000 units, where HFC-134a is being used as a drop-in refrigerant charge into existing compressors. A cyclopentane conversion of one relatively modern foam blowing line of similar capacity has also been completed. This interim conversion is expected to allow limited re-entry into the Western European market and allow a return to at least historical production levels. This conversion is not part of the current GEF funded sub-project and the enterprise is not seeking any retroactive grant support for it. In the

longer term, the enterprise has a capital expansion plan to increase capacity to 1,000,000 units per year with annual compressor production capacity being expanded to 1,500,000 units.

51. In 1994 when production was near nominal capacity, ODS consumption was 135 MT/year of CFC 12 refrigerant and 302 MT/year of CFC 11 for foam blowing. However, with the drop in sales projected for 1995 and the prior conversion of production capacity (100,000 units) to non-ODS materials, the replacement capacity of the plant is considered to be 650,000 refrigerators/freezers, net of exports, with a CFC-phase-out of 117 MT/year associated with the refrigerant conversion sub-project currently being appraised.

52. Expansion of compressor production is contingent upon the installation of a new imported compressor manufacturing line that has recently been delivered. However, several technical and commercial uncertainties apply to this. The Japanese manufactured equipment is part of an arrangement made by the former Soviet Government for the supply of three such lines under the terms of Japanese EXIM Bank financing in 1991. The lines, which were designed for CFC-12, were supplied to Baranovich (now Atlant) in Belarus and the Orsk Mechanical plant, as well as KRP. Atlant has installed and converted its line and the installation and conversion at ORSK is currently underway. However, KRP have only recently taken delivery of the equipment and preparatory work required for conversion to HFC-134a has just begun. In addition, commercial issues related to repayment terms and customs duties remain to be resolved.

53. The operating cost structure for KRP's manufacturing operation in the first half of 1995 was as follows: raw materials - 46%; half-products - 20.2 %; energy - 6.7 %; salaries and benefits (social costs) - 15.6 %; and other (including interest) - 10.9 %. The principal raw materials are polyester, sheet metal, paints, and polyol which have traditionally been purchased from suppliers within the FSU that exercise monopoly pricing and require advanced payment. A program now exists to identify and utilize alternative suppliers to create competitive pricing and payment terms. This has been successful for polyol, paint, and brushes.

54. KRP's primary market is in the Russian Federation, where it is recognized as among the highest quality of domestically produced products. Its primary competition is from NLMK "Sintol" in Lipetsk which has a new facility producing an Italian designed product. KRP has also enjoyed a strong export market in the UK, Germany, France, and Australia that has historically accounted for 30 % of sales. The loss of Western European markets as noted above has dropped exports to 10% of sales in 1995, although the positive prospects exist for their recovery with the interim conversions now being completed and ultimately when complete conversion occurs. In 1995, projected exports outside the FSU are 55,000 units, with 7,000 units being exported to other FSU countries.

55. Marketing is done mainly through a network of technical service centers in which KRP maintains a majority interest in partnership with the local operators. Fifty seven such centers are operated in Russia, along with fifteen in Kazakstan and one in the Kyrgyz Republic. In addition, sales are made through a network of wholesale dealers, directly to bulk purchasers such as hotels, and through a developing group of retailers of which approximately 150 carry KRP products in Russia. Sales are made primarily on the basis of advance payment with some credit being extended to sound customers and some barter sales with suppliers of raw materials and energy being used. KRP also has servicing contract arrangements with a number of service enterprises to allow warranty and after sales work to be done.

56. KRP has remained in a positive cash flow position during the period 1992 to the present. Over this period, it has maintained production and sales, while initiating capital investments in modernizing production facilities and initial investments for ODS phase-out utilizing internally generated funds. In 1994, the enterprise had equity of US\$93.0 million, US\$ 59.0 million in long term debt related primarily to supplier credits financed by the Japanese EXIM Bank and US\$36.6 million in before tax net income. Results for the first half of 1995 are less positive due to a decline in margins from 34% in 1994 to 21% for the first half of 1995. Income before tax in this period was US\$7.6 million. This decline in financial performance is directly attributable to the loss of European export markets.

57. The long term prospects of this enterprise appear generally positive, subject to the various issues noted below. As a fully private enterprise with a strong base of employee ownership, it appears to have a well motivated workforce, strong in-house technical capability, and forward looking corporate direction. Initiatives to regain export markets are positive as are long term plans for modernization. The latter is considered particularly important given the relatively low level of automation in the assembly operations and somewhat dated design of the products, particularly the compressors.

B. Sub-Project Objective

58. The objective of this investment sub-project is to convert KRP's installed domestic refrigerator and freezer production capacity of 650,000 units (net of converted capacity intended for exports) from using CFC-12 to a propane/butane mixture as refrigerant. KRP's selection of hydrocarbon technology was based on its evaluation of its long term compatibility with its present compressor design and the fact that this type of technology is favored in some Western European markets to which the company has traditionally exported.

C. Sub-Project Description

59. The sub-project consists of two phases: i) modifications of the testing and charging areas, primarily involving the purchase and installation of test equipment, and trial production; and ii) upgrading of the production facility charging line and construction of hydrocarbon storage and handling infrastructure. A listing of the specific facility additions and activities involved in the sub-projects is provided in Table A2.7 along with costs and schedule of expenditures.

60. The feasibility of simply charging the existing CFC 12 compressors with the hydrocarbon refrigerant without any modifications was initially questioned. However, KRP demonstrated that this was a viable arrangement, based on test results carried out by the German refrigerator manufacturer, FORON which indicated compatibility of the CFC compressors for use with the hydrocarbon mixture proposed by KRP. The tests also indicate a 10% increase in the energy-efficiency of the CFC compressors when charged with the hydrocarbon mixture as compared to CFC-12.

61. KRP have taken delivery of a new compressor manufacturing facility for producing advanced, more energy efficient compressors which, while initially designed for CFC-12, are capable of using hydrocarbon mixtures. However, this facility has not been installed and some uncertainty remains respecting financing arrangements, payment of import duties and the condition of delivered equipment which has been held in storage for some time. It was concluded that installation of this new line is not relevant to the technical viability of the proposed sub-project which is based on drop in charging of existing compressors and present production capacity. However, the financial arrangements associated with its purchase, including repayment arrangements of a loan from the Japanese EXIM Bank, allowance for outstanding import duties, and cost allowances for its installation are relevant to the enterprise financial appraisal.

D. Sub-Project Cost Estimates

62. The current sub-project incremental investment cost has been estimated as US\$4,505,000, inclusive of US\$300,000 of past expenditures in preparatory work and another US\$103,000 of expenditures anticipated prior to July 1996. The original estimates of expenditures were adjusted at appraisal to reflect current local costs and updated equipment pricing. In addition a 10% physical contingency was applied for technical uncertainty in the absence of final design and regulatory approvals. The GEF grant support from the first tranche was set at US\$1,976,000. US\$410,000 of eligible expenditures were judged to be safety-related costs. This results in a grant cost-effectiveness (net of safety costs) of US\$13.38 per kg. ODP. This is slightly better than the current Montreal Protocol Multilateral Fund cost

TABLE A2.7

**JSC KRASNOYARSK REFRIGERATOR PLANT "BIRYUSA" HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
COST AND FINANCING SUMMARY**

COST COMPONENT	PRE-JUNE/95 EXPENDITURES	JUNE/95 - JUNE 96 EXPENDITURES	1996	1997	1998	TOTAL PROJECT COST	GEF GRANT ALLOCATION
			(July -Dec.)				
Preparatory Works							
- Imported Charging Equipment	245,000					245,000	
- Modification of Conveyors	40,000					40,000	
- Charging Ventilation Enclosure	5,000					5,000	
- Installation							
- Civil Works	8,000					8,000	
- Equipment Installation	2,000					2,000	
PHASE 1							
Modifications -Testing and Charging Area			9,400			9,400	
Test Facilities Equipment							
- Refrigerant Charging Equipment			30,000			30,000	30,000
- Calorimeter			220,000			220,000	220,000
- Noise & Vibration Tester			90,000			90,000	90,000
Trial Production Costs		4,000				4,000	
Local Training Costs			9,200			9,200	
PHASE 2							
Production Facility Equipment							
- Helium Leak Detection System				244,900		244,900	244,900
- Refrigerant Charging Equipment			634,600			634,600	634,600
- Sealing System				30,000		30,000	30,000
- Hydrocarbon Transfer Pumps			51,600			51,600	51,600
- Vacuum Pumps				180,000		180,000	180,000
- Foreign Training			55,000			55,000	55,000
Installation and Infrastructure Improvements							
- Dismantling CFC-12 Equipment				600,000		600,000	
- Installation of Charging Equipment			450,000			450,000	
- Installation/Production of Gas Tight Enclosures				94,500		94,500	
- Construction of Hydrocarbon Storage Facilities				890,000		890,000	439,900
Engineering		50,000				50,000	
Environmental Impact Assessment		40,000				40,000	
Import Taxes			93,900	45,500		139,400	
Contingency (10%)		9,400	164,400	208,500		382,300	
TOTALS	300,000	103,400	1,808,100	2,293,400		4,504,900	1,976,000

FINANCING REQUIREMENTS

Internal Enterprise Financing	300,000.0	103,400	726,900	2,293,400		2,528,000
GEF Grant			1,081,300	894,700		1,976,000

effectiveness threshold of US\$13.76 per kg-ODP for domestic refrigeration conversion projects.

63. The conversion from CFC-12 to hydrocarbons results in increased incremental operating costs due to product design changes associated in locating switches outside of the cabinet, and costs associated with using the technology selected for the sealing the charging stub. While not to be financed by the sub-grant, these are a legitimate sub-project costs that will be borne by the enterprise in its future operations. The NPV of these costs over four years are calculated to be US\$2,211,000.

E. Sub-Project Implementation

64. The sub-project implementation schedule, assuming grant effectiveness by September, 1996, extends over a two-year period, beginning with detailed engineering, environmental assessment and initiation of critical procurement early in 1996 and completion expected early in 1998. This schedule is provided in Figure A2.2.

65. A procurement plan was developed at appraisal for the sub-project as summarized in Table A2.8. World Bank procedures, as set out in "Guidelines for Procurement Under IBRD Loans and IDA Credits, January 1995" will apply to goods to which grant resources are applied. The sub-grant was allocated to cover the complete purchase of several imported equipment packages. International Shopping (IS) procedures would apply to a number of equipment packages (US\$1,536,000) of imported equipment for the test facilities. In addition, a portion (US\$440,000) of the hydrocarbon storage facility would be covered by the sub-grant. Construction of these facilities would be undertaken using National Competitive Bidding procedures. KRP were advised that preparation of specifications and bidding documents for the IS packages should start immediately upon confirmation of GEF funding in order to maintain the proposed schedule. The CPPI undertook to assist in the preparation of the procurement packages for IS and ICB.

66. It was determined that KRP is assured of a secure propane supply from a nearby refinery. An agreement-in-principle for guaranteed supply has been reached, and long-term supply negotiations are currently in progress. The small quantities of isobutane required (20 MT/year) will be procured internationally, where it is readily available at competitive prices.

67. The enterprise has yet to prepare an environmental impact assessment of the proposed sub-project. This will be prepared on completion of final design for submission to the Regional Environmental Committee Inspectorate for review and approval. The mission indicated that this approval, along with an EA prepared in accordance with World Bank Category B requirements would be conditions of sub-grant disbursement. The World Bank EA requirements have been supplied to the enterprise by the CPPI.

68. KRP's's capacity to manage the sub-project's implementation appears generally adequate, recognizing that limited direct experience with Bank or western commercial and procurement arrangements exists. The enterprise has maintained and operated a relatively modern and efficient facility through the recent period of economic transition. In addition, they have undertaken significant preliminary capital works associated with this sub-project. The enterprise has strong internal technical capability related to design, research and development and in manufacturing operations. However, several areas were noted that would require continuing support and assistance during project implementation. These are: i) undertaking environmental impact assessment of the development; ii) development of technical specifications for foreign equipment; and iii) administering procurement procedures in accordance with World Bank competitive bidding practices.

FIGURE A2.2
JSC KRASNOYARSK REFRIGERATOR PLANT "BIRYUSA" HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
SUB-PROJECT IMPLEMENTATION SCHEDULE

ACTIVITY	1995				1996				1997				1998				REMARKS	
	Q1	Q2	Q3	Q4														
Grant Documentation and Approval				■	■													
GEF Grant Negotiations/Agreement					■	■	■											Grant Effectiveness - June 30/96
Sub-Grant Agreement				■	■													CPPI/KRP to finalize by Negotiations
Procurement Specifications - Major Equip.				■	■													CPPI Project Preparation Assistance
Detailed Engineering				■	■	■	■											KRP responsibility - Local supply
Environmental Impact Assessment				■	■	■	■											Bank approval as condition of disbursement
Regulatory Approvals					■	■												Bank approval as condition of disbursement
Preparatory Works	■	■	■															KRP responsibility - Local supply
Phase 1																		
Modifications - Test and Charging Area					■	■	■											KRP responsibility - Local supply
Test Facilities Equipment																		
(a) Refrigerant Charging Equipment					■	■	■											IS Procedures (GEF Sub-Grant Funded)
- Tender					■	■	■											
- Equipment Supply							■	■										
b) Calorimeter					■	■	■											IS Procedures (GEF Sub-Grant Funded)
- Tender					■	■	■											
- Equipment Supply							■	■										
(c) Noise and Vibration Tester					■	■	■											IS Procedures (GEF Sub-Grant Funded)
- Tender					■	■	■											
- Equipment Supply							■	■										
Trail Production								■	■									
Local Training								■	■									
Phase 2																		
Production Facility Equipment																		
(a) Tender Equipment Package					■	■	■											IS Procedures (GEF Sub-Grant Funded)
(b) Leak Detection System								■	■	■								
Supply and Installation								■	■	■								
(c) Charging Equipment Supply								■	■	■								
(d) Sealing System Supply and								■	■	■								
Installation								■	■	■								
(e) Hydrocarbon Transfer Pump								■	■	■								
Supply and Installation								■	■	■								
(f) Vacuum Pump Supply and								■	■	■								
Installation								■	■	■								
Training										■	■							
Infrastructure Improvements																		
- Dismantling CFC-12 Equipment																		KRP - Force Account
- Charging System Installation																		KRP - Force Account
- Gas Tight Enclosure Installation																		KRP - Force Account
- Hydrocarbon Storage Construction																		KRP - Force Account (Partially GEF Sub-Grant Funded)
Start Up and Commissioning																■	■	

TABLE A2.8

ANNEX 2

**JSC KRASNOYARSK HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
PROCUREMENT PLAN**

DESCRIPTION OF GOODS, WORKS OR SERVICES	ESTIMATED PACKAGED AMOUNT (US\$)	PROPOSED PROCUREMENT PROCEDURE	REMARKS
Preliminary Works			
- Charging Equipment - Conveyor Modifications - Charging Ventilation Enclosure - Installation/Civil Works	264,000 44,000 5,500 11,000	IS Force Account Force Account Force Account	Enterprise Financed Enterprise Financed Enterprise Financed Enterprise Financed
Test Facilities Equipment			
- Refrigerant Charging System - Calorimeter - Noise and Vibration Tester	33,000 242,000 99,000	IS IS IS	GEF Funded GEF Funded GEF Funded
Trail Production	4,400	Force Account	Enterprise Financed
Local Training	10,120	Sole Source	Enterprise Financed
Production Line Conversion			
- Helium Leak Detection Equipment - Refrigerant Charging Equipment - Sealing System - Hydrocarbon Transfer Pumps - Vacuum Pumps - Foreign Training/Technical Support	269,000 679,000 33,000 57,000 198,000 61,000	IS IS IS IS IS IS	GEF Funded GEF Funded GEF Funded GEF Funded GEF Funded GEF Funded
Equipment Installation/Infrastructure Upgrading			
- Dismantling of CFC-12 Equipment - Installation of Charging Equipment - Gas Tight Enclosure Construction/Installation - Hydrocarbon Storage Facilities Installation	660,000 495,000 103,950 979,000	Force Account Force Account Force Account NCB	Enterprise Financed Enterprise Financed Enterprise Financed Partially GEF Funded
Engineering	55,000	Sole Source	Enterprise Financed
Environmental Impact Assessment	44,000	Sole Source	Enterprise Financed
	4,346,970		

F. Enterprise Financial Evaluation

69. An enterprise financial evaluation has been performed to test KRP's ability to sustain its financial contribution to the ODS phase-out investment, as well as confirming the enterprise's overall financial viability. This was accomplished by; i) reviewing its accounting and management information systems; ii) noting significant aspects of the tax regime; iii) analyzing current and recent balance sheets and income statements; and iv) identifying significant business issues and risks. This information was then used to develop a conservative financial projection for the enterprise including the proposed sub-project.

70. A review of KRP's accounting system indicated that, like most such enterprises in Russia, it is designed to serve traditional state planning and tax calculation objectives, rather than for financial management of the business. In particular, there are no requirements to prepare cash flow statements and the form of presentation of the balance sheet and income statements are not suited to internal financial management. During the past three years the Russian accounting system has been constantly changing. Moreover, due to high yearly rates of inflation and constantly changing foreign exchange rates the basis for yearly comparisons of balance sheets and income statements is tenuous at best. As a result, no attempt has been made to adjust the statements to constant 1995 prices, but rather simply reflect the US dollar rates for each year.

71. Annual and quarterly reporting of balance sheet and profit and loss statements to the Russian tax authorities are mandatory. The accounts are checked by the tax inspections but no external auditing has been required. Thus in the case of KRP, the accounts have not been audited by an external auditor, but are certified by the regional tax inspections. The analysis provided below assumes that the unaudited statements give a full and true picture of enterprise's financial situation. From the full year statement for 1995, external auditing will be mandatory. However, at the time of appraisal a local auditing firm had not yet been contracted by the enterprise to carry out this audit. The enterprise was informed that submission of audited financial statements will be a requirement of the Sub-grant Agreement.

72. Assets are revalued annually to reflect the impact of inflation by the use of official coefficients for asset revaluation. The stated asset values, however, do not necessarily reflect the actual market value of the assets. The "western format" summary balance sheet presented in US\$ (Table A2.9) uses the revalued end of period exchange rate. The following end of year ruble exchange rate against the US\$ have been used in the calculations for 1992, 1993, 1994 and the first quarter of 1995: 415; 1,250; 3,550; and 4,500 respectively. The western format" income statements presented in Table A2.10 was converted to US\$ using an average exchange rate for the year. The following average ruble exchange rates were used in the calculations for 1992, 1993, 1994, and the first half of 1995: 263; 830; 2,400; and 4,500 respectively.

73. The significant features of the current tax system impacting on KRP's financial situation and its ability to handle it's portion of the investment are:

- i) Taxable income is reduced by capital investment in the current tax year up to 50% of taxable income. No carry over from year to year is permitted;
- ii) The GEF sub-grant is considered taxable income on the income statement but will be deductible from taxable income to the extent that it is invested in the year in which it is received, subject to the overall limitation of investment deductions being limited to 50% of taxable income;
- iii) Depreciation on the value of fix assets is tax deductible, allowing a double tax shield on investments; and
- iv) Assets are revalued annually to account for inflation using official factors, even though this is recognized as not necessarily reflecting the actual market value of assets;

74. A conventional balance sheet was developed during appraisal for the years 1992 through to the first half of 1995. This is provided in Table A2.9 and indicates the following significant points related to KRP's current financial position at the end of the second quarter of 1995: i) total equity of US\$113.0 million; ii) US\$40.0 million in long term debt; iii) US\$13.7 million in cash and receivables; iv) US\$3.4 million and US\$14.6 million in working capital tied up in inventories and prepayment to suppliers respectively; v) US\$30.0 million in current assets; and vi) US\$23.6 in current liabilities.

75. The balance sheet for the end of June 1995 has been restated to reflect the purchase of a new compressor line using the Japanese EXIM loan. The total cost of the compressor line is US\$115.0 million, for which the enterprise paid a deposit of US\$11.5 million in 1991. However, delivery of the equipment was delayed until August 1995. The final shipment is expected in December 1995, when an additional US\$5.75 million will be due. Arrangements have been made with the Russian Government for shared payment of the loan with the enterprise responsible for 40.8%, or US\$40.0 million over a period of 9 years starting at the end of 1996. Total interest due on the enterprise portion of the loan is approximately US\$23.4 million. The new Sanyo compressor line has been realistically valued at US\$60.0 million in the mid year 1995 balance sheet statement, while the Japanese EXIM loan has been included at its face value of US\$40.0 million.

76. While the current ratio (current assets divided by current liabilities) was 1.27 at the end of June 1995, it should be noted that a significant part of the current assets are tied up in inventories (of which 75% are raw materials) and advance payments on supplies. The quick ratio (current assets minus inventory divided by current liabilities) was 0.65 as of the end of June 1995 and the adjusted quick ratio (current assets minus inventories and supplier advances divided

by current liabilities) was 0.51. As shown in Table A2.9, the liquidity position of the enterprise has deteriorated over the past two years, as a result of a decline in its export sales.

77. The enterprise income statement developed during appraisal for the years 1992 through to the first half of 1995 is provided in Table A2.10. This indicates that KRP generated US\$25.6 million in after tax cash flow in 1994, compared with US\$21.8 million in 1993 and US\$10.9 million in 1992. In the first half of 1995 the after tax cash flow decreased to US\$7.1 million reflecting a 12.5% drop in sales volume and a drop in the net operating margin from 34% to 21% in 1995. The following factors contributed to this:

- i) Annualized sales dropped by 12.5% in the first half of 1995 reflecting the enterprises inability to sell ODS containing products in its traditional markets in the OECD region;
- ii) Average production cost per unit increased by 30% in the first half of 1995 reflecting raw material price increases and increases in employee salaries in real terms, as well as increased costs associated with the conversion of approximately 10% of its production to ozone free products for the export market; and
- iii) Average gross revenue per unit increased by only 10% in the first half of 1995 reflecting partially the reduction in sales to the more profitable Western markets.

78. During the period 1992-1995 after tax cash flow has been distributed to two social/employee benefit funds and an enterprise investment fund. Approximately 17.5% is distributed annually to the two social/benefit funds and the balance is used to fund yearly investments for plant modernization and maintenance. Currently there is no distribution to shareholders. Due to the highly labor intensive nature of the manufacturing operation, this emphasis on plant modernization is necessary for its long term viability, as will be the investments needed to convert to non-ODS technologies. The enterprise has been consistently cash flow positive over the past three years.

TABLE A2.9
JSC KRASNOYARSK HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
SUMMARY CORPORATE BALANCE SHEET

	1992	1993	1994	1995 First Half
Total Fixed Assets				
Revalued Fixed Assets	8,229,648	76,722,316	98,629,787	77,787,165
Accumulated Depreciation	4,190,925	37,662,466	43,706,343	34,662,395
Assets under Construction	672,185	25,842,344	52,710,142	44,942,784
Equipment Financed by EXIM Loan				60,000,000
Intangibles		8,745	11,326	8,626
Long Term Investments	108,748	478,543	5,550,746	6,381,342
Long Term Receivables				
Current Assets (A)	19,338,789	4,083,974	30,674,306	30,013,707
Cash	3,999,145	11,359,458	314,803	136,114
Receivables	66,155	985,622	723,079	1,972,414
Goods Shipped	5,733,873	10,992,795	10,435,315	9,932,967
Advance Payments to Suppliers (B*)	3,143,403	2,540,720	7,414,263	3,397,321
Inventories (B)	6,392,813	14,959,790	11,786,358	14,551,175
Other	3,400	1,088	389	23,716
Deferred Costs				288,647
Total Assets	24,158,443	106,228,996	143,869,864	184,759,878
Total Equity (C)	10,917,733	74,604,922	115,513,775	113,004,816
Long Term Debt (F)	34,773			40,000,000
Financial Investments				
Total Current Liabilities (D)	9,873,785	19,259,882	21,166,922	23,621,916
Payables	6,801,268	13,587,738	15,749,825	14,647,017
Advances		1,266,524	1,532,741	937,110
Short Term Loans	2,983,725	2,501,189	1,934,995	5,894,084
Other	54,020	1,904,432	1,949,362	2,143,704
Deferred Income	3,366,925	10,893,792	7,189,167	8,133,147
Total Equity/Liabilities (E)	24,193,215	104,758,596	143,869,864	184,759,878
Current Ratio (A/D)	1.96	2.12	1.45	1.27
Quick Ratio ((A-B)/D)	1.31	1.34	0.89	0.65
Quick Ratio* ((A-B-B*)/D)	0.99	1.21	0.54	0.51
Debt:Equity Ratio ((F/(F+C))				0.26

TABLE A2.10
JSC KRASNOYARSK HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
SUMMARY CORPORATE INCOME STATEMENT

	1992	1993	1994	1995 First Half
INPUT ASSUMPTIONS				
Number of refrigerators produced and sold	736,991	766,559	783,281	342,553
Number of compressors produced and sold (Note 1)	921,239	958,199	979,101	428,191
Average production cost per unit (Note 2)	25.61	37.41	85.56	111.66
Average wholesale price per unit (Note 2)	53.92	92.29	157.60	176.20
Average selling price per unit (net of VAT)	44.48	79.35	128.75	141.25
Gross Sales Revenue (Total)	39,737,514	70,741,911	123,443,129	60,359,426
NET SALES REVENUES (A)	32,781,154	60,822,828	100,847,000	48,384,646
OPERATING EXPENSE (B)	18,871,053	28,673,810	67,018,000	38,251,171
Raw materials and halfproducts	N/A	N/A	N/A	N/A
Energy	N/A	N/A	N/A	N/A
Salaries	N/A	N/A	N/A	N/A
Benefits (Social costs)	N/A	N/A	N/A	N/A
Other	N/A	N/A	N/A	N/A
NET OPERATING INCOME BEFORE DEPRECIATION	13,910,101	32,149,018	33,829,000	10,133,475
TOTAL DEPRECIATION (C)	664,199	1,009,223	2,359,000	1,346,475
NET OPERATING INCOME BEFORE INTEREST (D)	13,245,903	31,139,795	31,470,000	8,787,161
Interest on Bank Credits				
NET OPERATING INCOME	13,245,903	31,139,795	31,470,000	8,787,161
Trading Income	94,126	21,953	17,877	526,221
Net Other Revenues (non-realized), including:	(235,063)	(2,188,929)	(1,177,649)	(1,741,068)
Stocks, bonds, and participation		67,027	205,791	8,480
Foreign currency exchange rates gains & losses		159,616	3,171,683	9,097
NET INCOME BEFORE TAX	13,104,966	28,972,820	30,503,000	7,572,314
Special Tax Deductions (investments and social costs)	6,552,484	14,486,410	15,251,500	2,480,782
Profit tax (35% of income after deductions)	2,553,000	6,750,000	7,278,000	1,782,036
NET INCOME AFTER TAX	10,551,966	22,222,820	23,225,000	5,790,278
Add Back Depreciation	664,199	1,009,223	2,359,000	1,346,475
Net Cash Flow	11,216,165	23,232,043	25,584,000	7,136,753
Principal payments on Exim loan				
INCOME DISTRIBUTION				
Available for Investments and Distributions	11,216,165	23,232,043	25,584,000	7,136,753
Enterprise Investments (non ODS)	8,922,796	18,162,043	20,291,000	4,655,810
Enterprise Invest (ODS Project)				
Social and Benefit Funds	2,293,369	5,070,000	5,293,000	2,480,782
Memorandum Item: GEF Grant				
Net Operational Margin	0.42	0.53	0.34	0.21

NOTES: 1. Assumed to be 1.25 times the number of refrigerators produced and sold.

2. Average unit prices and costs apply to one refrigerator/freezer plus 1/4 compressor for servicing

79. In order to determine if the enterprise can finance its share of the investments for conversion to non-ODS refrigerants and foams, a conservative financial model has been developed. The following assumptions have been made:

- i) Increased operating costs resulting from conversion to non-ODS technologies will be born by the enterprise;
- ii) The production level of refrigerators, freezers and compressors remain at the same depressed 1995 level for 1996, but increases to the current production capacity of 750,000 refrigerators and freezers in 1997 and 1998 as a result of non-ODS technology investments;
- iii) Real costs (apart from increased operational costs) and real prices per unit are constant. However, a reduction in the 3% additional VAT charge by 1.5% in 1995 and by 1.5% in 1996 are not passed on to the consumer;
- iv) The enterprise will be required to pay a 5% import duty charge in 1995 on the imported compressor line, even though its management believes that it will be able to negotiate an exemption;
- v) No operating cost reduction is included as a result of installation of the new compressor line, even though it will reduce the number of paid employees in this section of the plant by a half compared with the existing line;
- vi) A principal repayment of US\$1.0 million is assumed for the new compressor line in 1995 and US\$4.75 million in 1996. Repayment of principal and interest on the US\$40.0 million Japanese EXIM loan is assumed to begin in 1997;
- vii) Social and employee benefit funds that are distributed from the after tax income of the enterprise is assumed to increase from 17.5% in 1995 to 20% in subsequent years due to employee lay-offs resulting from installation of the new compressor line; and
- viii) Additional cash flow of US\$2.0 million and US\$4.0 million in 1994 and 1995 will result from sale of bonds which the enterprise holds as a result of the bankruptcy of Nasheconbank in 1991. These bonds were issued to the enterprise by the government to cover its losses on export sales owing to it at the time of the bank failure.

80. The results of the financial analysis under this conservative scenario are provided in Table A2.11. It indicates that the enterprise can maintain its net income before tax at the depressed level of US\$16.0 to US\$17.0 million (compared with US\$30.0 million in 1994) through the critical period 1995-1998, when it is converting to non-ODS technologies. Moreover, by giving preference to funding these investments the enterprise will be able to cover its portion of the investments out of its own after tax cash flow, but will only have about US\$4.0 million for other plant investments. This will considerably restrict its ability to fund other critical investments in plant improvements and maintenance, which averaged US\$15.0 million per year in the period 1992- 1994. Highest priority after the non-ODS technology investments will be the installation of the new compressor line, which will absorb most of any available investment funds in 1996 and 1997.

81. Based on this analysis, it is concluded that KRP has the capacity to finance its portion of the ODS investments (US\$8.6 million in 1996 and US\$5.6 million in 1997) from internally generated revenue. This includes both the current sub-project and the foam conversion project anticipated in the overall Project's second tranche. This analysis is conservative in that: sales have been limited to less than or equal to current capacity, despite impending availability of additional capacity and re-entry into the export market; real costs and prices are held constant at the current level keeping the operating margin at the current low levels; and the increased operational costs under the sub-project can not be passed on to the consumers, thereby reducing the operational margin further from 1998. With three negative factors present at the same time, the enterprise is able to generate sufficient after tax cash flow to finance their part of the project. However, in this scenario funds available for other critical investments in plant modernization and maintenance in 1996 and 1997 will be very limited.

82. The adequacy of the existing working capital under the assumptions used in the financial projections is identified as an issue of concern. Working capital is inadequate for current operating margins and, therefore, additional after tax cash flow will have to be allocated to working capital further reducing the amount available for enterprise investment. In response, KRP have make a commitment to ensuring the enterprise co-financing for the sub-project by giving it preference to any other distribution from the cash flow after tax and interest over a 2 to 3 year period.

83. While KRP will be able to finance their part of the sub-project (if approved as presented) and further will be a viable enterprise beyond its implementation, it would not have been able to finance the full cost of the ODS phase-out investments. This implies, that the GEF assistance is essential for the enterprise's ability to convert to ozone safe technologies and for the long run viability of the enterprise.

TABLE A2.11
JSC KRP HYDROCARBON REFRIGERANT CONVERSION SUB-PROJECT
CORPORATE FINANCIAL PROJECTION

	1994	1995 First Half	1995 Full Year	1996	1997	1998
INPUT ASSUMPTIONS						
Number of refrigerators produced and sold	783,281	342,553	685,106	685,106	750,000	750,000
Number of compressors produced and sold (Note 1)	979,101	428,191	856,383	856,383	937,500	937,500
Average production cost per unit (Note 2)	85.56	111.66	111.66	111.66	115.04	115.04
Average wholesale price per unit (Note 2)	157.60	176.20	176.20	176.20	176.20	176.20
Average selling price per unit (net of VAT)	128.75	141.25	145.02	146.83	146.83	146.83
Gross Sales Revenue (Total)	123,443,129	60,359,426	120,718,852	120,718,852	120,718,852	120,718,852
NET SALES REVENUES (A)	100,847,000	48,384,646	99,354,000	100,594,000	110,122,000	110,112,000
OPERATING EXPENSE (B)	67,018,000	38,251,171	76,502,343	76,502,343	86,280,000	86,280,000
Raw materials and halfproducts	N/A	N/A	35,650,092	N/A	N/A	N/A
Energy	N/A	N/A	15,453,473	N/A	N/A	N/A
Salaries	N/A	N/A	5,125,657	N/A	N/A	N/A
Benefits (Social costs)	N/A	N/A	11,934,365	N/A	N/A	N/A
Other	N/A	N/A	8,338,755	N/A	N/A	N/A
NET OPERATING INCOME BEFORE DEPRECIATION	33,829,000	10,133,475	22,852,000	24,092,000	23,842,000	23,842,000
TOTAL DEPRECIATION (C)	2,359,000	1,346,475	2,692,629	2,692,629	2,692,629	2,692,629
NET OPERATING INCOME BEFORE INTEREST (D)	31,470,000	8,787,161	20,160,000	21,400,000	21,150,000	21,150,000
Interest on Bank Credits			170,000	110,000	1,652,000	2,822,000
NET OPERATING INCOME	31,470,000	8,787,161	19,990,000	21,290,000	19,498,000	18,328,000
Trading Income	17,877	526,221				
Net Other Revenues (non-realized), including:	(1,177,649)	(1,741,068)	(2,200,000)	3,082,600	(9,500)	(2,200,000)
Stocks, bonds, and participation	205,791	8,480		5,282,000	2,190,500	
Foreign currency exchange rates gains & losses	3,171,683	9,097				
NET INCOME BEFORE TAX	30,503,000	7,572,314	17,790,000	24,372,600	19,488,500	16,128,000
Special Tax Deductions (investments and social costs)	15,251,500	2,480,782	8,895,000	12,186,300	9,744,250	8,064,000
Profit tax (35% of income after deductions)	7,278,000	1,782,036	9,984,000	5,800,700	4,638,000	3,838,000
NET INCOME AFTER TAX	23,225,000	5,790,278	7,806,000	18,571,900	14,850,500	12,290,000
Add Back Depreciation	2,359,000	1,346,475	4,692,629	6,692,629	2,692,629	2,692,629
Net Cash Flow	25,584,000	7,136,753	12,498,629	25,264,529	17,543,129	14,982,629
Principal payments on Exim loan			1,000,000	4,750,000	2,820,000	4,820,000
INCOME DISTRIBUTION						
Available for Investments and Distributions	25,584,000	7,136,753	11,498,629	20,514,529	14,723,129	10,162,629
Enterprise Investments (non ODS)	20,291,000	4,655,810	7,212,629	2,761,929	3,813,629	6,937,629
Enterprise Investment plus GEF grant (ODS Project)			728,000	13,914,600	7,450,500	
Social and benefit funds	5,293,000	2,480,782	3,558,000	3,838,000	3,459,000	3,225,000
Memorandum Item: GEF Grant				5,282,600	2,190,500	
Net Operational Margin	0.34	0.21	0.23	0.21	0.21	0.21

NOTES: 1. Assumed to be 1.25 times the number of refrigerators produced and sold.

2. Average unit prices and costs apply to one refrigerator/freezer plus 1/4 compressor for servicing

PART 3: SECOND AND THIRD TRANCHE SUB-PROJECT DESCRIPTIONS

A. Second Tranche Sub-Project Descriptions

84. The following provides a summary description of the eleven investment sub-projects proposed for the second tranche to be presented to the GEF Council in April 1996 (Schedule A Table A1). These cover the six remaining aerosol sub-projects representing the largest remaining ODS consumers in the sector, and five refrigeration sub-projects, which completes phase-out in two of the largest domestic refrigerator manufacturers in Russia, as well as undertakes phase-out in the major commercial refrigeration manufacturer. All sub-projects have undergone OORG review and have either approved, or conditionally approved subject to clarification as noted below. The required additional information is currently under preparation and where warranted changes will be made. Approval of the OORG reviewer will be a requirement to proceed to appraisal. The total incremental investment is US\$56.0 million of which US\$35.0 million is proposed for GEF funding.

85. JSC Halogen, located in Perm, is a partially integrated aerosol manufacturer that is part of a large chemical complex which supplies the ODS propellant for aerosol manufacture. It is one of Russia's major ODS producers. Halogen's aerosol manufacturing operation has installed capacity to produce 22.5 million cans per year. In 1994, production was 15.5 million cans with CFC usage of 1,435 MT. This is approximately 8% of ODS consumption in the sector. For 1995 consumption is estimated to rise to 1,560 MT based on the first half year of production. The manufacturing operation involves only product formulation and filling, with cans and valves being purchased externally. The enterprise's primary requirements are conversion of filling facilities to HAP, which involves the purchase of one new filling line, upgrading of a second, and installation of facilities for handling and storage of flammable HAP, including a finished goods warehouse, hydrocarbon tank farm, rail cars and storage facilities, gas detection systems and training. The total incremental investment required is US\$2.8 million, of which US\$2.0 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$1.40/kg. ODP.

86. Novosibirsk Domestic Chemical Plant (NDCP), located in Novosibirsk, is a fully integrated aerosol manufacturer and the county's largest traditional CFC consumer in the sector. It has an installed capacity of 40 million cans. In 1994, production was 20 million cans with CFC consumption of 3,700 MT, or 20% of usage in the sector. In order to use HAP safely, the enterprise must replace its entire can and valve making facility, plus convert its filling operation and upgrade its storage facilities. The existing can manufacturing operation cannot produce aerosol containers strong enough to withstand the higher pressures required for HAP. Similarly precision valves are required to minimize leakage and fire hazards associated with the use of HAP based aerosol products. The total incremental investment required is US\$10.9 million, of which US\$8.5 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$1.40/kg. ODP.

87. JSC Himprom Domestic Chemistry Plant, located at Volgograd, is an integrated aerosol manufacturer and part of JSC Himprom, one of the country's largest producers of ODS materials including the propellant used in their aerosol operation. The aerosol operation has a capacity of 20 million cans/year, but has only produced an average of 6.4 million cans/year over the past three years. This is the capacity on which this sub-project is based. Average annual ODS consumption over this period has been 1,769 MT/year, or 10% of usage in the sector. The sub-project involves conversion of the operation to HAP propellant. This will require replacement of filling lines, new valve manufacturing facilities, and addition of hydrocarbon storage and handling facilities in the form of a tank farm, tank cars and a finished goods warehouse. The total incremental investment required is US\$4.3 million, of which US\$2.9 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$1.65/kg. ODP.

88. JSC "Novomoskovskbychim", located in Novomoskovsk, is an integrated aerosol manufacturer and part of a larger industrial chemical complex producing a variety of consumer and industrial products. It has an installed capacity of 40 million cans/year but has historically made considerably less than this. The average production over the last three years has been 10 million cans/year with an average annual consumption of 1,219 MT of ODS, or 7% of usage in the sector. This is the capacity on which the sub-project is based. Conversion to HAP propellant requires the installation of two new filling lines, development of HAP off loading and tank farm facilities, installation of purification equipment, building a finished goods warehouse and other hydrocarbon handling infrastructure. The total incremental investment required is US\$4.9 million, of which US\$3.8 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$3.11/kg. ODP. The OORG review has identified US\$0.5 in potential cost reductions in equipment to be covered by the GEF sub-grant and this is currently being evaluated.

89. Altaichimprom Production Association, located in Slavgorod, is an integrated aerosol manufacturer and a division of a chemical complex that also produces ODS materials. It has an installed capacity of 20 million cans/year but produces considerable less than this. The average annual production over the last three years is 2.3 million cans with ODS consumption of 591 MT/year. Due to the poor quality of existing filling equipment, cans and valves, the complete facility would require replacement to convert to HAP. As a result conversion to mechanical pumps has been selected. This requires purchase and installation of blow molding machines, molds and liquid filling lines. The total incremental investment required is US\$2.4 million, of which US\$2.1 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$3.61/kg. ODP.

90. Mosbychim, located in Moscow, is a partially integrated aerosol manufacturer specializing in consumer products. It has an installed filling capacity of 20 million cans per year, but typically produces about half this level. Average annual production over the last three years has been 10.2 million cans with ODS consumption of 2,211 MT/Year.

The conversion of this facility requires investment in hydrocarbon tank farms, HAP purification equipment, explosion proof filling lines, a finished goods warehouse, support infrastructure for handling a flammable material, and training. The total incremental investment required is US\$8.7 million, of which US\$2.6 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$1.93/kg. ODP. The OORG review has identified US\$0.6 in potential cost reductions in equipment to be covered by the GEF sub-grant and this is currently being evaluated.

91. KRP Biryusa, located at Krasnoyarsk, is the largest domestic refrigerator manufacturer in Russia with production capacity of 750,000 refrigeration units and one million compressors per year. A sub-project involving the conversion to HFC-134a refrigerant has been appraised and recommended for funding under the Project's first tranche. This second tranche sub-project completes the plant's phase-out through conversion of its foaming operation to cyclopentane. This will phase-out 302 MT/year of CFC-11 based on current production of 650,000 units/year. The sub-project will be undertaken in two phases. The first phase will have a capacity of one hundred units to confirm techniques and procedures. The second phase will involve the installation and commissioning of replacement foam forming lines for doors and cabinets along with appropriate support infrastructure to safely handle cyclopentane and mitigate its flammability risk. This will include new storage and transfer piping systems, upgrading of plant fire protection and electrical systems, addition of explosion proof foam mixing facilities, plant ventilation, and training. The total incremental investment required is US\$15.8 million, of which US\$5.5 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$9.00/kg. ODP.

92. ISC Saratov Electrounit Production Association (SEPO), located in Saratov, is a domestic refrigerator manufacturer producing 630,000 units per year (1993). Two sub-projects are proposed for GEF grant funding. The first sub-project replaces 210 MT per year of CFC-11 with cyclopentane in its application of foam insulation. It is based on the modification by a western supplier of older Eastern European equipment and the replacement of specific components such as mixing equipment, piping, as well as installation of cyclopentane storage and handling infrastructure. The total sub-project cost including increased operating costs is US\$6.7 million, of which US\$2.8 million is incremental capital investment. US\$2.6 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$10.40/kg. ODP. The second sub-project involves replacement of 228 MT per year of ODS through the elimination of CFC-12 refrigerant consumption and CFC-113 used in the manufacture of older design compressors. After conversion, custom designed HFC-134a compressors will be externally purchased. The sub-project will be accomplished in two Phases. In Phase 1, a trial batch of one hundred refrigerator units will be produced incorporating new HFC-134a compressors. Following testing of these refrigerators and incorporation of any changes in the manufacturing facility, Phase 2 will complete the transition of the factory to the non-ODS refrigerant HFC-134a. The changes in refrigerator plant equipment cover new facilities for drying lubricating oil, charging HFC-134 and oil, detection

of leaks, and evacuation and testing facilities for refrigerators and freezers. The total sub-project cost including increased operating costs is US\$8.4 million of which US\$1.6 million is incremental capital investment. US\$1.5 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$7.65/kg. ODP. The OORG review has conditionally approved this sub-project, subject to further of clarification in relation to: training; field testing; vacuum pump selection; condition and disposition of existing equipment; and filling machine sizing. These issues are currently being addressed by the company.

93. ANPO Marikholodmash, located in Yoskar-Ola, is the largest manufacturer of commercial refrigeration equipment in Russia. In 1994, it produced 24,700 units, or 48% of the county's output. Two sub-projects are proposed for GEF funding. The first involves the conversion of foam insulation blowing operations from CFC-11 to cyclopentane with a phase-out benefit of 15 MT/year, based on 1994 usage. The conversion requires investment in a new foam blowing line and associated infrastructure to store and handle the flammable hydrocarbon. The total incremental investment required is US\$1.3 million, of which US\$0.5 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$7.12/kg. ODP. The sub-project has been approved by OORG review conditional on clarification of safety standards applicable to cyclopentane storage. This is currently being resolved. The second sub-project involves conversion of equipment charging lines from CFC-12 to HFC-134a. It is estimated that 18 MT/year of ODS usage will be eliminated, based on 1994 production. Purchased compressors designed for HFC-134a will be used. The sub-project requires investment in product development and re-design, evacuation and recovery units, leak detection equipment, and servicing capability. The total incremental investment required is US\$0.5 million, of which US\$0.2 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is S\$9.00/kg. ODP.

B. Third Tranche Sub-Project Descriptions

94. The following provides a summary description of the eight investment sub-projects proposed for inclusion in the third tranche (Schedule A Table A1). These are anticipated to be presented to the GEF Council in late 1996, and involve all the remaining major domestic refrigeration manufacturers. In addition, provision has been made to fund investment and training in the refrigeration sector in anticipation of a project in this sector being prepared. With the exception of the yet undefined refrigeration servicing sub-project, all sub-projects have under gone OORG review. Where conditional approvals have been received, outstanding issues are currently being evaluated and final approval of the OORG reviewer will be a condition of proceeding to appraisal. The total incremental investment is US\$26.5 million, of which US\$16.4 million is proposed for GEF funding.

95. ISC NLMK Stinol, located in Lipetsk, is a domestic refrigerator manufacturer, operating a modern plant of Italian design and having an ultimate production capacity of 1,000,000 units per year. The 1995 production is anticipated to be 450,000 units. One sub-

project has been identified involving the phase-out of 260 MT/year of CFC-11 used for the foam insulation by replacing it with cyclopentane. The conversion will be completed in three stages during normal down time over a two year period. It will involve the installation of new facilities for the storage and processing of flammable cyclopentane, which meet appropriate standards of fire protection, electrical design, containment, and ventilation, and will provide for training in the safe handling of cyclopentane. The total sub-project cost including increased operating costs is US\$11.8 million, of which US\$4.2 million is incremental capital investment. US\$3.1 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$9.93/kg. ODP. The OORG review has conditionally approved this sub-project subject to clarification of the fate of the existing dosing machine. These issue is currently being addressed.

96. Orsk Mechanical Plant, located in Orenburg, is a domestic refrigerator manufacturer having a capacity of 500,000 units per year with production at 370,000 units in 1993. Two sub-projects have been identified. The first sub-project will phase-out 202 MT/year of CFC-11 used for foam insulation by replacing it with cyclopentane. This sub-project will accomplish a phased transition from CFC-11 to cyclopentane foams on six foaming lines. This will be supported by upgraded infrastructure to accommodate the flammable properties of cyclopentane, including new storage and transfer piping systems, upgrading of plant fire protection and electrical systems, addition of explosion proof foam mixing facilities, plant ventilation, and training. The total sub-project cost including increased operating costs is US\$11.4 million, of which US\$8.8 million is incremental capital investment. US\$4.8 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$12.90/kg. ODP. The second sub-project will convert the existing refrigerant charging lines for the use of HFC-134a and involve purchase of charging and evacuation equipment, a reclaim unit and a leak detection system. An estimated 158 MT/year of ODS will be phased out. This work will be undertaken in parallel with internal investments in the conversion of a new Japanese supplied compressor line to HFC-134a, providing the enterprise with sufficient capacity for its own needs, as well as sale to other manufacturers which are anticipated to discontinue compressor production. The total sub-project cost including increased operating costs is US\$2.8 million, of which US\$1.6 million is incremental capital investment. US\$1.1 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$6.90/kg. ODP. The OORG review has conditionally approved this sub-project, subject to clarification for the following areas: training; field testing; vacuum pump selection; condition and disposition of existing equipment; and filling machine sizing. These issues are currently being evaluated.

97. ISC POLUS, located in Zlatoust, is a domestic refrigerator manufacturer with a total production capacity of 380,000 units per year and a production rate of 279,000 units per year in 1993. Two sub-projects have been identified. The first sub-project will eliminate 250 MT of CFC-11 foam blowing agent by substituting HFC-134a. The selection of HFC-134a as a foam blowing agent, as opposed to the more common cyclopentane, is based on the plant's location and potential safety considerations. This sub-project has not been approved by the OORG reviewer, who has questioned the feasibility of using HFC134a as a foam blowing agent in this application. This question is currently being evaluated recognizing that its resolution will be a condition of continued processing of the sub-project for GEF funding. The second sub-project will phase-out 123 MT of ODS consumption in the enterprise by replacing CFC-12 refrigerant with HFC-134a. The implementation of the two sub-projects will be integrated and will be conducted in two phases over a three year period. During Phase 1, 1000 refrigerators will be produced using imported HFC-134a compressors, and tested to confirm the validity of all components and procedures involved in the phase-out. CFC conservation and recovery measures will be instituted and 50% reduced foam technology will be introduced. During Phase 2, the manufacturing plant will be fully converted to use of non-ODS materials. This will include the addition of new facilities for charging HFC-134a, leaks detection and product testing, and the replacement of CFC-113 solvents in the manufacturing process. For the foam sub-project, the total sub-project cost including increased operating costs is US\$3.2 million, of which US\$0.8 million is incremental capital investment. US\$0.7 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$2.90/kg. ODP. For the refrigerant sub-project, the total sub-project cost including increased operating costs is US\$4.1 million, of which US\$1.2 million is incremental capital investment. US\$0.7 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$6.04/kg. ODP. The OORG review has conditionally approved this sub-project, subject to provision of clarification on the following: field testing; vacuum pump selection; leak detection equipment selection; and condition and disposition of existing equipment. These issues are currently being evaluated.

98. PO Zavod, located in Zelelenodolsk, is a domestic refrigerator manufacturer with an annual production capacity of 420,000 units and average production rate over the past three years of 220,000 units per year. Two sub-projects have been included. The first sub-project will phase-out 191 MT/year of CFC-11 used for the foam insulation by replacing it with cyclopentane. It will be accomplished through a phased transition from CFC-11 to cyclopentane foams by modification of to the existing foaming lines and new equipment additions. Infrastructure will be upgraded to accommodate the flammable properties of cyclopentane including new storage and transfer piping systems, upgrading of plant fire protection and electrical systems, addition of explosion proof foam mixing facilities, plant ventilation, and training. The total sub-project cost including increased operating costs is US\$9.7 million, of which US\$6.8 million is incremental capital investment. US\$3.6 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$18.60/kg. ODP. The second sub-project involves the conversion of 150 MT/year of CFC-12 consumption through

conversion to HFC-134a refrigerant. Specific expenditures cover the purchase and installation of charging, leak detection, drying and recycling equipment. The total sub-project cost is US\$6.2 million, of which US\$1.9 million is incremental capital investment. US\$1.3 million is proposed as a GEF sub-grant. The sub-project cost effectiveness is US\$7.94/kg. ODP. The OORG review has conditionally approved this sub-project, subject to of clarification on the following areas: technology transfer arrangements; field testing; vacuum pump selection; and condition and disposition of existing equipment. These issues are currently being evaluated.

99. Refrigeration Servicing will be included as an investment sub-project in the third tranche and a grant of US\$0.6 million has been provided for initiating work in this area. A specific sub-project will be prepared using technical assistance resources provided in the second tranche and will cover provision of recycling and recovery equipment along with training for a key pilot project, in the industrial and commercial servicing sector.

PART 4 - TECHNICAL ASSISTANCE COMPONENT

A. Background

100. The following describes the technical assistance component of the Russian Federation GEF ODS Consumption Phase-Out Project (the Project) to be financed by the first and second tranches. This technical assistance is generally aimed at strengthening Russia's institutional and regulatory capacity to support the ODS phase-out Country Program adopted by the Government and on which Russia's fulfillment of its current international obligations are based. Other elements of the component provide resources for enhancing local implementation capacity for undertaking phase-out investment activities, supplementary project preparation for ODS consumption as well as production phase-out, and public information initiatives.

101. Russia is one of the World's largest remaining producers and consumers of ODS. Effective January 1, 1996, it will cease to be in compliance with its obligations for phase-out action in accordance with the Montreal Protocol. At the same time, it is the sole supplier of ODS to users in other parts of the Former Soviet Union (FSU), where phase-out also lags, and where significant economic hardship would result if this material was not available in the near term. As a consequence, substantial international attention is being paid to completing phase-out in Russia as rapidly as possible, while recognizing a need to coordinate this with progress in dependent countries of the FSU. Financial support is being provided in the form of bilateral assistance from several western countries (Denmark and the United States) to prepare ODS phase-out plans, and from the GEF and World Bank for required investments. At the same time, rising concern exists respecting the increase in exports of ODS from Russia onto the world market, something that significantly lessens the credibility of Russia's commitment to phase-out.

102. Russia has established the basic institutional structure to support the implementation of the proposed ODS phase-out program as defined in the Country Program. An Inter-Agency Commission has been created to coordinate ODS policy among all relevant government agencies utilizing specific subcommissions dealing with legal, technical, economic/institutional, and monitoring aspects. Responsibility for ODS phase-out activities has been assigned to the Ministry of Environmental Protection and Natural Protection (MEPNR). Project implementation capacity has also been established within the Ministry's Centre For Preparation and Implementation of International Projects on Technical Assistance (CPPI) in the form of dedicated ODS Phase-Out Implementation Units (ODS PIUs) covering the investment and institutional activities of the project, respectively.

103. While a positive start on implementation of the Country Program has been made through establishment of this institutional framework, the practical ability to give substance to many of the policy initiatives remains lacking. In particular, an urgent need exists to develop and implement an effective system of controlling the production, consumption and trade of ODS materials. Furthermore, this must be accompanied by an ability to monitor and report these activities, both for internal purposes and to fulfil Russia's international obligations. This latter aspect, particularly in relation to export of ODS, is viewed as critical to the country's international credibility and continuance of assistance from bilateral and multilateral sources.

B. Component Objective

104. The overall objective of this component is to provide the practical tools required by MEPNR and other federal agencies to rapidly and effectively implement the basic institutional elements of the Country Program. Its specific objectives are: i) identification and implementation of regulatory and fiscal measures to control ODS consumption, production and trade; ii) development and operation of a monitoring and reporting system applicable to ODS production and consumption; iii) identification and action on any gaps in the phase-out implementation plan related to critical investments or sectoral initiatives; iv) strengthening of implementation capacity within MEPNR for undertaking current and future phase-out initiatives; v) creation of increased level of awareness respecting ODS issues among the general public and specific stakeholder groups; and vi) provide mechanisms to ensure that phase-out activities in Russia are co-ordinated with those of dependant countries to minimize social and economic impacts.

C. Component Descriptions

105. This component consists of six sub-components as follows and which are described in more detail below: a) regulatory framework for ODS phase-out; b) monitoring and reporting of ODS phase-out; c) supplementary project identification and preparation; d) implementation capacity strengthening; e) public awareness and information; and (f) evaluation of technology options for ODS production phase-out. The technical assistance will be supplied primarily for

consulting assistance required for each sub-component, but will also include direct assistance to agencies assigned responsibility for various aspects of country program implementation.

106. Regulatory Framework for ODS Phase-Out: This sub-component covers the development of specific regulatory initiatives in the form of policies, legislation and regulations aimed at controlling ODS production, consumption, movement, and trade. The scope of these initiatives may include traditional "command and control" measures such as licensing, and selective bans or quotas. They may also extend to economic instruments such as substance or application specific taxes on production and use, and incentives for adoption of ODS substitutes. Specific emphasis initially should be placed on trade aspects such that Russia's obligations respecting export to developed countries are strictly enforced. This would include elimination of exports to developed countries, independent and creditable control being exercised over the certification of recycled material, and conditioning of export arrangements with dependant countries, such that re-export is prohibited. The experience of other nations with established regulatory systems in this area will be utilized where applicable. Once options for regulatory control are identified and evaluated in the Russian context, those selected will be developed into legislation, regulations and decrees to be implemented at the federal level. An overall plan for their implementation through communication to affected parties and subsequent enforcement will also be prepared. This will include the assignment of specific responsibilities for implementation and provision of enforcement training as required.

107. Monitoring and Reporting of ODS Phase-Out: A system of regular collection of ODS production, consumption, recycling and trade information will be developed and implemented within MEPNR, in parallel with the development of the regulatory framework. Utilizing the Country Program and project preparation work as a starting point, sources of production, distribution intermediaries, consumers, recyclers and exporters will be identified. Close co-ordination with the implementation of a licensing system and associated mandatory reporting requirements will assist in this. Similarly, the implementation status of enterprise specific phase-out investments can be monitored through a system of regular direct contact and accessing progress reports where grant assistance is being provided. The capability to aggregate and document this data will be developed in various forms for use by enforcement agencies, policy makers and for fulfillment of international reporting obligations. The scope of this sub-component will also include the establishment of permanent responsibility for monitoring and reporting within MEPNR or other agency, firm or institute that may be selected.

108. Supplementary Project Identification and Preparation: This sub-component is intended to assist in filling gaps that exist in the present consumption phase-out plan undertaken under this Project. The most urgent need is to carryout financial evaluations of enterprises included in the second tranche. While the Project addresses the highest consumption domestic refrigeration and aerosol sectors, preparation work will also be required related to the refrigeration servicing, solvent, fire protection and foam sectors. In addition, supporting preparation work related to ODS substitute supply may also be required. The modest resources

supplied under this sub-component are not intended to undertake major technical studies or preparation work, but rather to define the need for and scope of such work, and complete specific tasks necessary to ensure investment sub-projects are ready for more detailed preparation. In addition, it will provide resources for identification and facilitation of bilateral funding sources for such work, and for possible bilateral co-financing of phase-out investment projects.

109. Project Implementation Capacity Strengthening: This sub-component provides resources for the training of the ODS Investment Project Unit in financial and technical appraisal methodologies. In addition, it will include the development of an appraisal manual to assist this unit in sub-project appraisal.

110. Public Awareness and Information: This sub-component will provide resources to initiate a program to communicate the importance of ODS Phase-Out to stakeholders and the general public. The modest resources allocated to this element in the first tranche will be devoted largely to identification of effective initiatives and developing a plan for their implementation. Of particular interest is the investigation of an Ozone Free Technology Certification System, such as has proved successful in other countries.

111. Technology Options for ODS Production Phase-Out. There are currently six major ODS producers in Russia. With assistance from the GEF and the Bank a phase-out program has been agreed with these enterprises and funds are being sort from bilateral donors to finance compensation packages to accelerate the program. In parallel the enterprises are developing business plans to manufacture non-ODS substitutes, namely HFC-134a, 152a and the transition HCFC-140 series. Some enterprises are considering producing HCFC replacements such as HFC-32 and 125. These substitute materials have been developed by firms in the West during the past 8 years, but GIPH, the Russia Institute responsible for developing the CFC technologies, has limited experience in developing technologies to produce the substitute materials. Its is, however, proposing new unproven technologies to the Russian enterprises to produce these materials. Since these new technologies may or may not be able to compete with the Western competitors, the Russian enterprises need expert independent evaluations of their technical, as well as financial viability before committing to install such technologies. Thus, it is proposed to hire an expert foreign consultant firm to evaluate the proposed GIPH technologies for non-ODS substitute material, which the Russian enterprises are planning to manufacture (estimated cost US\$250,000). In addition and in parallel with this study, the Russian production enterprises have requested expert foreign assistance in comparing proposals from Western manufacturers to utilize their technologies, or to enter into joint venture manufacturing arrangements to produce non-ODS substitutes. A second contract for \$302,000 will be negotiated with a foreign firm to assist the enterprises to make these evalutiaons and to compare them with the GIPH proposals.

D. Sub-Project Costs and Implementation

112. The funding for the technical assistance component of the first tranche is US\$748,000 and for the second tranche is US\$552,000. It will be used to fund consulting assistance as indicated in Table A2.12. Table B3 (Schedule B) provides a procurement plan for the major consulting packages anticipated to be contracted for the TA component.

113. Planning for the regulatory and monitoring sub-component has begun within MEPNR and the CPPI. During the first half of 1996, terms of reference and invitation packages will be prepared for the major consulting assignments, and consultants will be selected. These will be initiated upon grant effectiveness. The regulatory development is expected to be completed by July 1997, by which time the basic regulatory systems should be in place on a legally enforceable basis. The monitoring and information system is expected to be operational by early 1997. Similarly, supplementary project identification work will begin upon grant effectiveness and continue over a twelve month period. The implementation capacity strengthening sub-component will be largely tied to the second tranche appraisal schedule in the third and fourth quarters of 1996. Completion of the appraisal manual will be targeted for this period so that it can be tested during second tranche appraisal. Public Information activities will be undertaken in parallel with the regulatory initiatives. An implementation schedule based on grant effectiveness in September 1996 is provided in Table A2.13.

114. The technical assistance component will be supervised by the ODS PIUs within the CPPI with the CPPI also providing administrative, disbursement and procurement support, along with overall management direction. The regulatory and monitoring sub-components will be implemented under the direction of MEPNR. The supplementary project preparation, implementation capacity and public information sub-components will be managed by the ODS PIUs directly in consultation with MEPNR and other agencies as required.

115. Table A2.14 has been prepared to provide a summary of the expected outputs from the various technical assistance sub-components of the Project. Some adjustments may be required during the course of the project. An important emphasis will be on improving the regulatory and monitoring systems for ODS phase-out as required by the international conventions. Additional work on identifying sub-projects for ODS consumption phase-out, as well as production of non-ODS substitutes is also of high priority for the TA component.

TABLE A2.12
TECHNICAL ASSISTANCE COSTS

TECHNICAL ASSISTANCE SUB-COMPONENT	COST
a) Regulatory Framework Development i. Review of International Regulatory Practice for ODS phase-out ii. Regulatory Option Selection and Documentation iii. Implementation Training iv. Implementing Agency Computing/Communications Equipment Sub-Total	 80,000 80,000 20,000 20,000 200,000
b) Monitoring and Reporting System i. Monitoring System and Information Source Identification for ODS ii. System Implementation iii. Implementation Training iv. Implementing Agency Computing/Communications Equipment Sub-Total	 100,000 50,000 20,000 20,000 190,000
c) Supplementary Project Identification and Preparation i. Enterprise Financial Evaluations for tranche 2 sub-projects ii. Project Identification/Scoping Studies iii. Bilateral Funding Development Sub-Total	 125,000 85,000 20,000 230,000
d) Implementation Capacity Strengthening i. Training in financial and technical appraisal for tranche 2 sub-projects ii. Appraisal Technical Support Sub-Total	 30,000 20,000 50,000
e) Public Awareness and Information i. Initial Identification Study ii. Phase-Out Workshop Sub-Total	 30,000 48,000 78,000
TOTAL - TRANCHE 1 TA FUNDING	748,000
f) Technology for ODS Substitute Production i. Evaluation of GIPH technologies for non-ODS substitutes ii. Assist enterprises to evaluate Russian and foreign technology	250,000 302,000
TOTAL - TRANCHE 2 TA FUNDING	552,000

TABLE A2.13
IMPLEMENTATION SCHEDULE

TECHNICAL ASSISTANCE ACTIVITY	From	To
a) Regulatory Framework Development <ul style="list-style-type: none"> i. Review of International Regulatory Practice ii. Regulatory Option Selection and documentation iii. Implementation Training iv. Implementing Agency Operation. 	Sept-96 Sept-96 Jan-97 April-97	Nov-97 July-97 April-97
b) Monitoring and Reporting System <ul style="list-style-type: none"> i. Monitoring System/Information Source ID. ii. System Implementation iii. Implementation Training iv. Implementing Agency Operation 	Sept-96 Dec-96 Jan-96 Feb-96	Dec-96 Mar-97 Feb-96
c) Supplementary Project Identification/ Prep. <ul style="list-style-type: none"> i. Enterprise Financial Evaluations for tranche 2 sub-projects ii. Project Identification/Scoping Studies iii. Bilateral Funding Development 	Sept-96 Sept-96 Sept-96	Oct- 96 Oct- 97 Oct- 97
d) Implementation Capacity Strengthening <ul style="list-style-type: none"> i. Training on technical and financial appraisal ii. Appraisal Manual 	Sept-96 Sept-96	Oct-96 Oct-96
e) Public Awareness and Information <ul style="list-style-type: none"> i. Initiative Identification Study ii. Phase-Out Workshop 	Sept-96 Sept-96	Jan-97 July-97
f) Technology Options for ODS Substitute Production <ul style="list-style-type: none"> i. Evaluation of GIPH technologies ii. Evluation of completing technology options 	Sept-96 Sept-96	Dec-96 Feb-97

TABLE A2-14

PROPOSED LIST OF TECHNICAL ASSISTANCE OUTPUTS

a) Regulatory Framework Development

- i. Regulations for licensing system for ODS production, recycle, export and import
- ii. Regulations for quota system for ODS production, export and import
- iii. Regulations for an ODS recycling certification system

b) Monitoring and Reporting System

- i. Regulations and reporting protocol for producers, consumers, traders, recyclers, and distributors of ODS materials
- ii. Recruit and train extra staff in ODS Task Force in MEPNR to collect and report data, and enforce new regulations identified in (a) & (b)

c) Supplementary Project Identification and Preparation

- i. Financial evaluation of 9 enterprises included in tranche 2
- ii. Reports on identification of potential future sub-projects for ODS phase-out in the solvents, fire protection and refrigerant recycle sectors
- iii. Report on identification of bilateral resources for preparation and funding of sub-projects in (c) (ii) above

d) Implementation Capacity Strengthening

- i. Special training courses for ODS PIU staff in sub-project technical and financial appraisal
- ii. ODS sub-project appraisal manual

e) Public Awareness and Information

- i. Press releases describing aspects of the ODS Phase-Out Program
- ii. Interviews with media
- iii. Workshops with industry and government stakeholders to explain and get feedback on ODS regulatory proposals

f) Technology Options for ODS Substitute Production

- i. Report on GIPH technologies for ODS substitute production and recommendations for commercializing these technologies
- ii. Report for each of the six major ODS producers on their proposed technology options for ODS substitute production, evaluating costs and benefits of different options



POSITION PAPER OF THE GOVERNMENT OF THE RUSSIAN FEDERATION

ACHIEVABLE ODS PHASE-OUT SCHEDULE IN THE RUSSIAN FEDERATION

August 1994

I. INTRODUCTION AND BACKGROUND

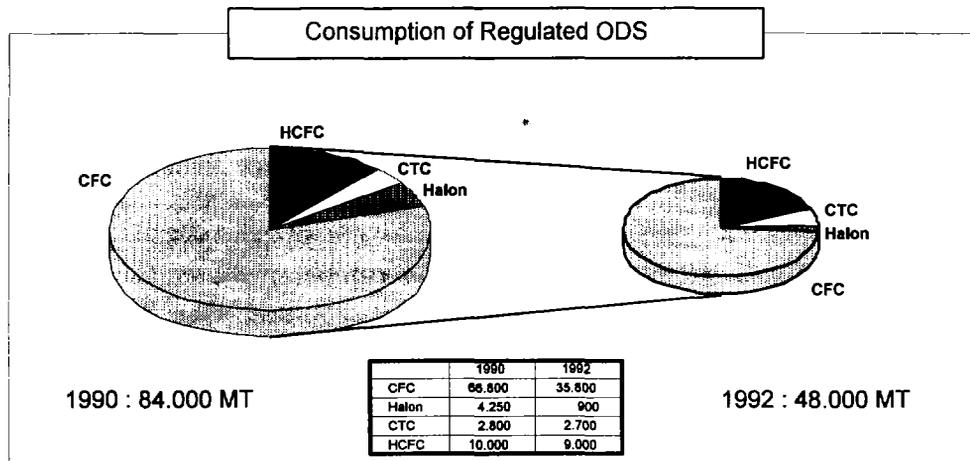
1. The Government of the Russian Federation, represented by the Ministry for Protection of the Environment and Natural Resources, recognizing our obligations under the Montreal Protocol and its Amendments, hereby presents our position on the technically and managerially feasible phase-out schedule for ozone depleting substances (ODS) in The Russian Federation.
2. Following the Accession to the Vienna Convention on June 18, 1986, the former Soviet Union ratified the Montreal Protocol on November 10, 1988. The Russian Federation continues the membership of the former Soviet Union, and on January 13, 1992, The Russian Federation ratified the London Amendments, thereby confirming its strong commitment to take the necessary measures to protect the stratospheric ozone layer.
3. During 1993 a draft National Programme for the phase-out of ODS in the Russian Federation was finalized defining priority phase-out projects in both ODS producing and ODS consuming sectors. Nevertheless, actual progress towards ODS substitution has been constrained by the difficult economic situation in the Russian Federation during the period of economic transition and in particular succeeding the break up of the former Soviet Union.
4. The overall consumption of ODS in The Russian Federation was reduced by more than 40 percent from 1990 to 1992, but this was mainly the result of the economic decline. Neither in the state budget nor in the enterprises have funds been available to go forward with ODS substitution projects after the deepening of the economic crisis.
5. Given the transitional nature of the economy in the Russian Federation since the start of 1991, the implementation of industry level ODS substitution will only be possible with substantial external financial assistance. Until now Russia has received external financial assistance through bilateral sources and from the Global Environmental Facility (GEF) for ODS Country Programme Preparation (Denmark) and for ODS Project Preparation (GEF and USA).

II. ODS CONSUMPTION AND PRODUCTION

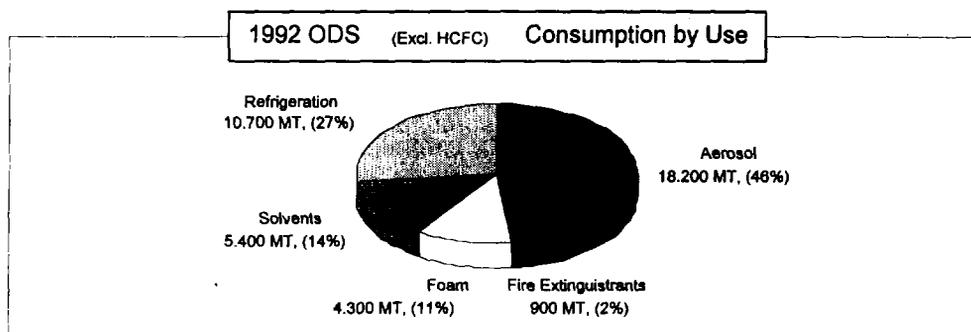
ODS Consumption

6. Since 1990, the Russian consumption of ODS has dropped by more than 40%. In 1992, total regulated ODS consumption in the Russian Federation was estimated at 48,000 MT. The ODP weighted ODS consumption was about 44,000 ODP tonnes. Total regulated CFC consumption was estimated at 36,000 MT in 1992, of which CFC-12 and CFC-11 accounted for 66% and 25%, respectively. The consumption of Halons was about 900 MT. Carbon tetrachloride and HCFC consumption constituted 2,700 MT and 9,000 MT, respectively. The development in the consumption of the individual substances is illustrated in Chart 1 below.

7. ODS consuming industries are supplied exclusively by domestic ODS production. Imports are nil. The calculated (ODP weighted) per capita consumption of CFC and halon in 1992 was 0.3 kg.



8. Measured in absolute terms, ODS phase-out efforts have to date been most successful in the aerosol sector where ODS consumption has declined to 18,200 MT from the 1990 peak level of 36,500 MT. Measured in relative terms, ODS phase-out has also been considerable among manufacturers of fire fighting equipment (65%) and in the solvents sector (25%). It must, however, also be stressed that the dramatic decline in ODS consumption from 1990 to 1992 is mainly caused by the severe economic recession. The largest ODS consuming sector is still aerosol production which accounts for 18,200 MT or 46% of 1992 ODS consumption. The second largest single user sector is the refrigeration sector, which consumed 10,700 MT in refrigerants and 1,400 MT as insulation foaming agents. The 1992 ODS consumption pattern is illustrated in Chart 2.



ODS Production

9. The production of ODS in the Russian Federation peaked in 1990 at about 200,000 MT. Production has since declined, and 1992 ODS production was about 145,000 MT, equal to approximately 75% of 1990 production level. The production of CFC has declined from 111,000 MT in 1990 to 62,000 MT in 1992. Of the present CFC production, about 40% is exported, mainly to the former Soviet Republics. Halon production has dropped from 4,000 MT in 1990 to 900 MT in 1992. The MCF production of 4,000 MT in 1992 is solely for export non-CIS countries. CTC production, which primarily serves as a feedstock in CFC production (non-regulated), peaked at 61,000 tonnes in 1990, of this amount less 5% is used in regulated consumption.

III. GOVERNMENT INITIATIVES SUPPORTING ODS PHASE-OUT

Involved Agencies

10. The Ministry for Protection of the Environment and Natural Resources (MOOSiPR) is the lead agency on issues related to the Montreal Protocol. Within the MOOSiPR, Montreal Protocol related issues falls within the area of responsibility of the Department of Ecological Programmes and Industrial Ecology. The focal point in the institutional framework for ODS phase-out are the ODS Task Force in MOOSiPR, created in 1993, the Inter-Agency Commission for the Protection of the Ozone Layer, created in 1992, and it's Subcommissions, created in 1993.

The Inter-Agency Commission

11. In 1992, the Inter-Agency Commission for the Protection of the Ozone Layer was created by a Government Order. It is responsible for inter-agency coordination of ODS policy and international liaison related to the Montreal Protocol. It includes representatives from all relevant government agencies, industries and institutions involved in ODS phase-out. In 1993, the Inter-Agency Commission for the Protection of the Ozone Layer was strengthened by the creation of four subcommissions, each with its own mandate. The Inter-Agency Commission for the Protection of the Ozone Layer has the mandate to decide urgent problems and conflicts, to disseminate information on ODS phase-out, and to receive immediate response on economic and administrative measures just prepared.

Subcommission on Legal Aspects

12. The Subcommission on Legal Aspects' main function is to elaborate guidelines for and to comment on draft legislation supporting the ODS phase-out.

Subcommission on Technical Aspects

13. The Subcommission on Technical Aspects' main function is to keep record of and to ensure information dissemination to industries on new ODS free technologies developed in Russia and abroad.

Subcommission on Economic and Institutional Aspects

14. The Subcommission on Economic and Institutional Aspects' main function is to develop proposals for a regulatory framework, comprising economic and administrative instruments, in support of the ODS phase-out. Furthermore, it is mandated to put forward proposals on institutional strengthening.

Subcommission on Monitoring of the Ozone Layer

15. The Subcommission on Monitoring of the Ozone Layer's main function is to keep record with and to ensure information dissemination on the state of the ozone layer over Russia.

ODS Task Force

16. In 1993, the ODS Task Force was created by a Decree from the Minister of Environment. The Task Force has over-all responsibility for designing, monitoring and implementing the national ODS phase-out strategy subject to guidelines from the Government, including the issue of production/import licenses, the introduction of sector specific bans and the administration and allocation of economic support for ODS replacement projects at industry level from Russian and international sources. Furthermore, the Task Force acts as a secretariat for the Inter-Agency Commission for the Protection of the Ozone Layer.

17. When fully operational, the ODS Task Force will be an Operational Unit, composed of 4 civil servants from MOOSiPR (currently 2 staff members are assigned). Depending on the load of work, the ODS Task Force may be enlarged by a Technical Advisory Group, composed of ODS technical experts from outside MOOSiPR, supporting the Operational Unit. MOOSiPR will appoint the Task Force staff who will work on a full-time basis for a certain period of time.

18. The ODS Task Force will be the nucleus of the management structure, serving under direct responsibility of the Vice Minister of the Environment responsible for developing and implementing industry environmental programmes. Its major attention will be devoted to ODS replacement at industry level, information dissemination and open dialogue between government agencies, industries and others involved in ODS phase-out. Additionally, the monitoring of ODS production and consumption during the phase-out period will be among the priority assignments.

The Task Force is currently preparing an awareness campaign on ODS phase-out with industrialists, regional environmental committees and NGOs as target groups.

The National Programme and the Study on ODS Phase-out

19. In June 1992, the Government of the Russian Federation issued an order (Governmental Order No. 378: 'Measures to ensure Compliance by the Russian Federation with the Vienna Convention and the Montreal Protocol') mandating the development of a National Programme for ODS phase-out in Russia.

20. The draft National Programme was finalized during 1993 and subsequently formed an important input to the development of the study 'Phase-out of Ozone Depleting Substances in Russia' which was finalized during August 1994 and now shared with i.a. the Montreal Protocol Secretariat. The National Programme and the Study on ODS Phase-out has identified a number of industry level ODS phase-out projects in both ODS producing and ODS consuming sectors.

Legislation supporting ODS Phase-out

21. A new Government Order on ODS phase-out is being prepared in the Russian Ministry for Protection of the Environment and Natural Resources. The Government Order will contain sector specific bans on the use of ODS based on the assessment and recommendations of the study on *Phase-out of Ozone Depleting Substances in the Russian Federation*. Furthermore the Order will establish a production and import/export licensing system for ozone depleting substances. Finally, the Government Order will issue trade restrictions in accordance with the Montreal protocol for trade with non-Parties.

IV. PRESENT INDUSTRY SITUATION

ODS Production

22. ODS production takes place at seven production facilities, mainly in Central Russia. The three largest ODS producers (Ural PO "Galogen", Volgograd PO "Chimprom", Slavgorod PO Altajchimprom") accounted for almost 85% of ODS production in 1992.

23. The scheduled phase-down of ODS production in accordance with the requirements of the Montreal Protocol is to be followed by a simultaneous phase-in of chemical substitutes, such as HCFC-22, HFC-134a, HCFC-122, HCFC-124, HFC-125, HCFC-141b, HCFC-142b, HFC-152a, HFC-32 and HFC-23.

24. The key constraint for a successful conversion of production facilities is the lack of finance. The new technologies are well-known and documented, and the ODS chemical producers are fully aware of the necessity to implement the new technologies.

25. Whole communities will be hurt seriously if a successful conversion of producer enterprises is not accomplished. The reason is three-fold: First, ODS production will have to be

phased out. Second, many ODS producers employ a high share of the workforce in the region in which they are situated. Third, many producers of ODS are highly dependent on ODS production, constituting the dominant business activity of the enterprise.

ODS User Sectors

26. The Russian refrigeration, rigid foam and aerosol sectors are characterized by a relatively small number of large enterprises. Thus, there are today 22 manufacturers of refrigerators and refrigeration equipment, and 8 companies engaged in the production of aerosols. Conversely, the fire fighting and especially the solvents sector are characterized by a large number of enterprises each with a relatively small consumption of ODS.

27. The priority ODS phase-out projects in the ODS consuming sectors in The Russian Federation are within the refrigeration sector because of the long implementation time, and the potential large socio-economic costs of premature scrapping of existing refrigeration equipment and of destruction of essential food supplies if servicing of refrigeration equipment cannot be made, and within the aerosol sector because of the large amount of CFC which is used in this sector in Russia and the low substitution costs in this sector. Although the phase-out costs are relatively high in the refrigeration sector, the social costs, whether public or economy wide costs, of not working fast in this sector could be even higher if enterprises are forced to close down.

28. Russian enterprises have demonstrated a keen interest in implementing the shift to non ODS technologies. This is motivated by both ecological and economic factors. In the domestic refrigeration industry, some of the traditional export markets are increasingly requiring non-ODS products. In the aerosol industry the largest enterprise is converted to hydrocarbon propellant already, thus leaving the remaining facilities at a less competitive position. Furthermore, the domestic scientific and technical knowledge base is substantial and ready to support project implementation.

Factors Limiting Rapid Industry Conversion

29. ODS phase-out project preparation is currently ongoing in all ODS user and producer sectors financed by the GEF and bilateral support. Given that our enterprises are very motivated and the quality of our technical and scientific personnel is high, it should be possible with the external assistance to prepare and document most ODS phase-out projects over the next six months.

30. The main barrier to a rapid conversion of the ODS consuming and producing industries in The Russian Federation is the lack of domestic funding. The difficult economic situation in The Russian Federation does not leave much funding for the many pressing investment needs neither in the state budget, nor in the enterprises. Furthermore, the lack of a fully fledged capital market in the Russian Federation and the inaccessibility of the international

capital markets for Russian enterprises precludes enterprises from financing even projects which would be economically self-sustainable in most other countries.

31. Hence for the implementation of ODS phase-out projects in The Russian Federation to be economically feasible within the foreseeable future, it is of utmost importance for the country to receive international financial assistance in this area. Only with external financial support will further ODS phase-out project implementation occur.

V. TECHNICAL AND MANAGERIAL FEASIBLE PHASE-OUT SCHEDULE

32. In the following, the technical and managerial feasible phase-out schedule is assessed for each of the ODS user sectors on the basis of the ongoing project preparation, sponsored by the GEF and bilateral sources, and taking into account the international experience concerning the time required to implement ODS phase-out projects.

Refrigeration Sector

33. Total phase-out for the domestic and commercial refrigeration manufacturing sectors could be attained by January 1, 1998, taking into consideration the necessity to change all production lines. However, due to the substantial progress made by the largest producers, especially within the domestic refrigeration sector, a substantial replacement of ODS consumption within these two sectors is envisaged to take place in mid-1996. Likewise, total phase-out for industrial refrigeration sectors could be attained by January 1, 1998.

34. Even if international funding is made available for project implementation by early 1995 and project implementation runs smoothly, it will still be technically infeasible to phase-out ODS use in the refrigeration manufacturing sector before 1997 as the required design work, testing and pilot production takes up to two years.

35. Within the refrigeration servicing sector the key problem is to develop and implement a well functioning scheme for recovery of refrigerants, and (depending on the feasibility of a drop-in replacement in the commercial refrigeration sector) recycling and reclaiming of refrigerants. Obviously, the refrigeration servicing sector will need a supply of CFC (new or recycled) for a longer period to avoid premature scrapping of the outstanding stock of refrigeration equipment. It is envisaged that a scheme for recovery will be in full operation by January 1, 2000. Till then, the refrigeration servicing sector will need a supply of new CFC. In the subsequent 10 years, the refrigeration servicing sector will need a supply of recycled CFC. This will mainly be for servicing of domestic refrigeration equipment as the outstanding stock of commercial refrigeration equipment is expected to be retrofitted with HFC-134a in the period 1995-2000.

Aerosol Sector

36. The feasible ODS phase-out date for the aerosol sector is difficult to estimate, but it seems likely that a total phase-out can be attained by January 1, 1997 with the pharmaceutical

sector constituting a minor exception. The key problem within this sector is to ensure an adequate supply of sufficiently pure Hydrocarbon Aerosol Propellants (HAP) and of HAP safety standard cans and valves. The technical factors involved are complicated and will require time to resolve adequately and economically. Thus, a complete phase-out of ODS in aerosol manufacturing can not be attained by January 1, 1996 without a simple close down of a substantial part of the current filling capacity. However, a substantial phase-out of ODS may be attained by January 1, 1996, provided funding aimed at both the conversion to alternative propellants and the production of HAP is made available to the enterprises by early 1995.

Foam Sector

37. The use of ODS in rigid foam production is primarily within the refrigeration insulation sector. Here, the alternative non-ODS technology is likely to be primarily cyclopentane based foam blowing. Where design considerations allow it, CO₂/water is a cheaper alternative, but this is expected mainly to be feasible within commercial refrigeration insulation. The flexible foam sector is characterized by the availability of proved and cost effective alternatives and a quick phase-out should be possible here. Flexible foam application of CFC can be phased out by 1996 whereas rigid foam could be converted during 1995-1997 and a total phase-out should be obtainable by 1998.

Solvent Sector

38. In the solvents sector it is estimated that a total ODS phase-out within electronics could be attained by January 1, 1999 and within metal degreasing and others by January 1, 1997. The reason for the delay of total phase-out within electronics is foremost the present inadequacy of practical indigenous experience with alternative non-ODS technologies. It necessitates further development work of technology adaptation and demonstration at enterprises. The reason for the expedite of total phase-out within metal degreasing and others is that the technical constraints here are more simple to overcome.

39. ODS consumption within fire extinguishing has been reduced remarkably so far, though mainly due to equipment production decline. Conversion of the production of portable fire extinguishers to ODS free extinguishants such as CO₂, dry chemicals or water typically takes about 2 years. The production of alternative fire fighting agents, such as blends of various inert gasses, for stationary equipment will also have to be planned. In parallel with this retrofit technologies should be developed, tested and implemented and a scheme for recovery and eventual recycling of halons should be implemented to secure a supply of halons in existing equipment that has not been retrofitted. It is estimated that a total phase-out within this sector could be attained by January 1, 1997.

ODS Production

40. The likely adverse effect on the major users of CFC in The Russian Federation from quick closure of production facilities is significant. If ODS supplies are cut off before a user industry has had time to test and implement an alternative technology, this industry is forced to stop production of ODS based products until the alternative technology can be implemented. This may cause severe unemployment problems, losses in market shares, shortages on the market for end user products, etc.

41. Recapitulating, ODS phase-out by January 1, 1996 will only be possible in some consumer sectors (flexible foam and possibly metal degreasing and fire extinguishing). For the major ODS consumer sectors (refrigeration and aerosol) the technically feasible phase-out dates are 1-4 years beyond January 1996.

42. Consequently, there is a need for CFC for an intermediate period after January 1996 and the phase-out of CFC production should take this into account. Hence, coordination between the ODS consumer sector phase-out projects, the alternative substance phase-in projects and ODS production capacity shut-down is crucial to the successful completion of the ODS phase-out effort in The Russian Federation. In particular, it is of utmost importance that projects for commercial size production of the needed alternative substances, such as HFC-134a, are promoted in parallel with and in congruency with the consumer sector phase-out projects.

43. Table 1 below provides an overview of the achievable ODS phase-out strategy pursued by the Government of the Russian Federation. This strategy is based on the assumptions that fastest technically feasible phase-out is followed and that international/GEF funding for project implementation is made available to the enterprises in early 1995, at latest.

Table 1: Achievable ODS Phase-Out Strategy in the Russian Federation

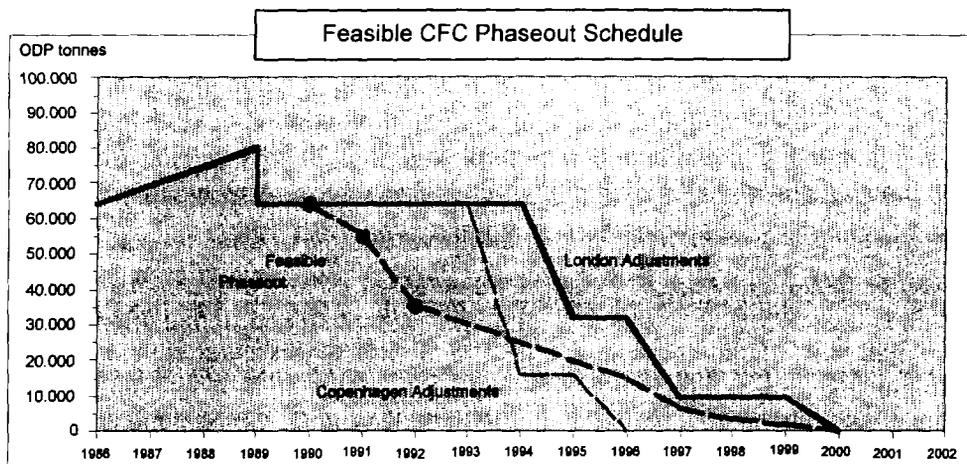
	ODP Tonnes in 1992	Date of 100% Phase-out ¹⁾	Years of Delay
TOTAL	43,800	January 1, 2000	4
Refrigeration Sector	10,700	January 1, 1988	2
- Domestic Refrigeration	800	January 1, 1998 ³⁾	2
- Commercial Refrigeration	800	January 1, 1998 ³⁾	2
- Industrial Refrigeration ²⁾	800	January 1, 1998	2
- Refrigeration Servicing Sector	8,300	January 1, 2000	4
- Domestic Refrigeration	700	January 1, 2000 ⁴⁾	4
- Commercial & Industrial Refrigeration	7,600	January 1, 2000 ⁴⁾	4
Aerosol Sector	18,200	January 1, 1999	3
- Cosmetics and Technical	17,900	January 1, 1997 ⁵⁾	1
- Pharmaceutical	300	January 1, 1999	3
Foam Sector	4,300	January 1, 1998	2
- Rigid Foam	1,400	January 1, 1998	2
- Flexible and Integral Foam	2,900	January 1, 1996	0
Solvents Sector	5,100	January 1, 1999	3
- Electronics	500	January 1, 1999	3
- Metal degreasing and Others	4,600	January 1, 1997	1
Fire Extinguishants	5,500	January 1, 1997	3

Notes:

- 1) The ODS phase-out strategy is based on the assumptions that fastest technically feasible phase-out is followed and that international/GEF funding of projects is available to the enterprises early 1995.
- 2) Including building air conditioning.
- 3) A substantial drop in ODS consumption is envisaged to take place mid-1996.
- 4) Could possibly be reduced by one year. Note that recycled CFC will be used for servicing up to 2010.
- 5) A substantial drop in ODS consumption may be attained by January 1, 1996.

44. Based on the realization of the Government's phase-out programme, it is still possible for Russia to phase out its use of ODS faster than demanded by the London Adjustments. Thus, assuming the availability of external financing and that project implementation starts in early 1995, a complete phase-out of CFC in aerosols can be achieved during 1996 (maybe with a few exceptions in the pharmaceutical sector) thereby reducing Russia's CFC consumption to less than 25% of the 1990 adjusted base level. The London Adjustments demand a 50% reduction by 1996. Reduction to 15% of the 1990 adjusted base level is possible by 1997 and a 100% phase-out can be achieved by January 2000.

45. In Chart 3 below, the achievable phase-out schedule in the Russian Federation is shown together with the Montreal Protocol phase-out requirements (London and Copenhagen Adjustments respectively).



**Chairman of the Government of the Russian Federation
Moscow**

To: Parties of the Vienna Convention on
Ozone Layer Protection and Montreal
Protocol on Ozone Depleting Substances

The Government of the Russian Federation confirms its commitment to ozone protection and essential compliance with the Vienna Convention on Ozone Layer Protection and Montreal Protocol on Ozone Depleting Substances, and would like to inform the Parties of the Vienna Convention and Montreal Protocol on the following.

The Russian Federation has completed the preparation of the Program for the Phase-out of the Production and Consumption of Ozone Depleting Substances developed with the consideration of the results of joint studies performed by international and Russian experts with the assistance of the Danish Agency for Environmental Protection.

The Government of the Russian Federation adopted the special Resolution on the immediate measures to implement the Russian Federation commitments for ozone layer protection. The Resolution includes specific actions to limit utilization of ozone depleting substances. Besides, the Resolution establishes a licensing system regulating export and import of ozone depleting substances, and imposes trade restrictions in compliance with the provisions of the Montreal Protocol concerning the trade relations with non-Party countries. Estimation was made according to which the introduction of the restrictions will result in the drop of consumption by over 85% in 1997 in comparison with 1990.

Despite the fact that in 1993 production of ozone depleting substances in the Russian Federation has already been as 40% of 1990 production, at present the Russian Federation is not in a position to provide complete phase-out of the production and consumption of ozone depleting substances by January 1, 1996, as is required by the Montreal Protocol. The implementation of the most urgent projects on the substitution of ozone depleting substances at Russian enterprises is still at its initial stage.

The Russian Government addresses the Parties of the Vienna Convention and Montreal Protocol with a request that the period of complete phase-out of the production and consumption of CFCs, carbon tetrachloride, and methylchloroform be extended by 4 years and the period of halon production and consumption phase-out - by 3 years.

We would also welcome international financial assistance in the process of transformation of Russian industrial sector to ozone-friendly technologies.

V.S. CHERNOMYRDIN

United Nations Environment Program.
Secretariat of the Vienna Convention
and Montreal Protocol,
Box 30552 P.O., Nairobi, Kenya
Tel.: (254 2) 621234
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**ПРЕДСЕДАТЕЛЬ
ПРАВИТЕЛЬСТВА РОССИЙСКОЙ ФЕДЕРАЦИИ**

г. МОСКВА

Сторонам Венской конвенции об охране озонового слоя и Монреальского протокола по веществам, разрушающим озоновый слой

Правительству Российской Федерации подтверждает свои приверженность решению задач по защите озонового слоя и выполнению в принципе обязательств по Венской конвенции об охране озонового слоя и Монреальскому протоколу по веществам, разрушающим озоновый слой, и полагает необходимым информировать Стороны Венской конвенции и Монреальского протокола о следующем.

Российской Стороной завершена подготовка проекта программы поэтапного сокращения производства и потребления озоноразрушающих веществ, разработанного с учетом результатов совместных исследований, выполненных российскими и иностранными экспертами при поддержке Агентства по охране окружающей среды Дании.

Правительство Российской Федерации приняло специальные постановления и первоочередных мер по выполнению обязательств Российской Федерации по охране озонового слоя, которым предусматриваются конкретные действия по ограничению использования озоноразрушающих веществ. Установлена лицензионная система на осуществление экспорта и импорта озоноразрушающих веществ, а также закреплены соответствующие положения Монреальского протокола в части торговли озоноразрушающими веществами с государствами, не являющимися Сторонами Монреальского протокола. Введение этих ограничений приведет, по расчетной оценке, к сокращению в 1997 г. потребления озоноразрушающих веществ примерно на 86 процентов по сравнению с объемами 1990 года.

Секретариат Венской конвенции
и Монреальского протокола,
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Несмотря на то, что в 1993 году производство озоноразрушающих веществ в Российской Федерации составило 40% от объема 1990 года, в настоящее время не представляется возможным полностью прекратить их производство и потребление к 1 января 1996 г., как того требует положения Монреальского протокола. Реализация на российских предприятиях наиболее важных проектов по замене озоноразрушающих веществ находится пока на начальной стадии.

Правительство Российской Федерации обращается к Сторонам Венской конвенции и Монреальского протокола с просьбой о продлении для России на 4 года срока полного прекращения производства и потребления хлорфторуглеродов, четыреххлористого углерода и метилхлороформа и на 2 года - срока прекращения производства и потребления галонов.

Мы были бы признательны за оказание международного финансового содействия в осуществлении перехода промышленности России на озоносберегающие технологии.

п/п Верно

В. Черномырдин

GOVERNMENT OF THE RUSSIAN FEDERATION

RESOLUTION

Dated May 24, 1995

526

City of Moscow

ON PRIORITY MEASURES TO ENSURE COMPLIANCE WITH
THE VIENNA CONVENTION ON OZONE LAYER PROTECTION
AND MONTREAL PROTOCOL ON OZONE DEPLETING SUBSTANCES

With the purpose of ensuring compliance with the obligations undertaken by the Russian Federation under the Vienna Convention on Ozone Layer of 1985 (hereinafter referred to as the Vienna Convention) Protection and the Montreal Protocol on Ozone Depleting Substances of 1987 (hereinafter referred to as the Montreal Protocol), the Government of the Russian Federation has resolved:

(1) To approve the attached priority measures to ensure compliance with the obligations related to ozone layer protection undertaken by the Russian Federation for a period of 1995 - 1996 (hereinafter referred to as priority measures).

(2) To authorize the Ministry of Environmental Protection and Natural Resources of the Russian Federation to carry out coordination of work related to the implementation of the priority measures.

(3) The Ministry of Environmental Protection and Natural Resources of the Russian Federation, Committee of the Russian Federation on Chemical and Petrochemical Industry, State Committee of the Russian Federation on Defense Industries, Ministry of Nuclear Energy of the Russian Federation, Ministry of Defence of the Russian Federation, Federal Service of the Russian Federation on Hydrometeorology and Environmental Monitoring, Ministry of Science and Technological Policy of the Russian Federation, Committee of the Russian Federation on Machine-Building, Committee of the Russian Federation on Trade, Ministry of Public Health and Medical Industry of the Russian Federation, Committee of the Russian Federation on Standards, Metrology and Certification shall be authorized to ensure in the course of 1995 priority financing of work related to the implementation of the priority measures within the limits of allocated state resources and extra-budgetary funds attracted for this purpose.

(4) The Ministry of Economy of the Russian Federation, Ministry of Finance of the Russian Federation, and Ministry of Science and Technological Policy of the Russian Federation in cooperation with the federal bodies of executive power concerned shall be authorized to provide in the course of 1996 targeted financing of work related to the implementation of the priority measures within the limits of state resources allocated for the said purpose from the federal budget.

(5) It shall be established that as of January 1, 1996 exportation of ozone depleting substances and products containing such substances to and the importation of such substances

and products from countries which are Parties to the Vienna Convention and the Montreal Protocol, as well as exportation of ozone-depleting substances and products containing such substances from the Russian Federal shall be carried out under special licenses.

Importation to the Russian Federation of ozone depleting substances and products containing such substances from countries which are not Parties to the Vienna Convention and the Montreal Protocol, as well as exportation of ozone-depleting substances products containing such substances from the Russian Federation to the said countries shall be forbidden.

The Ministry of Environmental Protection of the Russian of the Russian Federation in cooperation with the Ministry of Foreign Economic Relations of the Russian Federation, State Customs Committee of the Russian Federation, and the federal bodies of executive power and organizations concerned shall be authorized to compile a list of ozone depleting substances and products containing such substances being used in the Russian Federation, the exportation and importation of which are regulated by the Montreal Protocol.

(6) The State Committee of the Russian Federation on Statistics shall be authorized to ensure the submission, by August 1 of each year to the Ministry of Environmental Protection and Natural Resources of the Russian Federation, of statistical data on the production, consumption and utilization of ozone depleting substances in the Russian Federation for the previous year, so that to keep the Secretariat of the Vienna Convention and the Montreal Protocol informed on this issue as required under Article 7 of the Montreal Protocol.

(7) The State Committee of the Russian Federation on Standards, Metrology and Certification of the Russian Federation in cooperation with the federal bodies if executive power concerned shall be authorized to organize metrological support for work related to the implementation of the priority measures, working out and, if that should be necessary, abolition of state standards on ozone depleting substances and products containing such substances, as well as certification of such substances and products.

(8) The Committee of the Russian Federation on Chemical and Petrochemical Industry in cooperation with the federal bodies of executive power and organizations concerned shall be authorized to work out, within a period of three months, and submit to the Government of the Russian Federation proposals for the setting up of reserves of ozone depleting CFCs to provide for continued functioning of the currently operational equipment, and for organizing a system of collection, storage, regeneration and utilization of the ozone depleting substances the use of which is regulated under the Montreal Protocol.

(9) Based on the results of the discussion by Parties to the Vienna Convention and the Montreal Protocol of the State of the Government of the Russian Federation, the Ministry of Environmental Protection and Natural Resources of the Russian Federation shall be authorized to submit to the Government of the Russian Federation a timetable for phased reduction in the production and consumption of ozone depleting substances.

Federal bodies of executive power and organizations - consumers of ozone depleting substances shall be authorized to submit, by December 1 of each year, to the Ministry of Environmental Protection and Natural Resources of the Russian Federation applications for

the production of required amounts of CFCs in accordance with Decisions IV/25 and V/18 of the Fourth and Fifth Meetings of the Parties to the Montreal Protocol.

The Ministry of Environmental Protection and Natural Resources of the Russian Federation shall be authorized to ensure to submission by December 31 of each year to the Secretariat of the Vienna Convention and the Montreal Protocol of the consolidated application of the Russian Federation for the production of ozone depleting substances and to inform the applicants of the results of the discussion of their application within a period of three days following the receipt from the Secretariat of the Vienna Convention and the Montreal Protocol of the corresponding decision of a meeting of Parties to the Montreal Protocol.

Signed:

V. S. CHERNOMYRDIN
Chairman of the
Government of the
Russian Federation

№ 17
Ф. 7688
Их. № 17
Министерство
Российской Федерации

промышленности Российской Федерации, Комитету Российской Федерации по торговле, Министерству здравоохранения и медицинской Федерации Российской Федерации по машиностроению, Комитету Российской Федерации по технике и политике Российской Федерации, Комитету промышленности и мониторингу окружающей среды, Министерству обороны Российской Федерации, Федеральной службе России по Министерству Российской Федерации по атомной энергии, Министерству Российской Федерации по оборонным отраслям промышленности, нефтехимической промышленности, Государственному комитету Российской Федерации по химической и Министерству охраны окружающей среды и природных ресурсов Российской Федерации.

2. Поручить координацию работ по реализации первоочередных мер 1995 - 1996 года (далее именуются - первоочередные меры).

3. Министру охраны окружающей среды и природных ресурсов Российской Федерации (далее именуются - Министр) обеспечить выполнение обязательств Российской Федерации по Венской конвенции об охране озонового слоя 1985 года (далее именуются - Венская конвенция) и Монреальскому протоколу по веществам, разрушающим озоновый слой, 1987 года (далее именуются - Монреальский протокол) Правительством Российской Федерации по следующим пунктам:

1. Одобрить прилагаемые первоочередные меры по выполнению обязательств Российской Федерации по Венской конвенции об охране озонового слоя и Монреальскому протоколу по веществам, разрушающим озоновый слой.

г. Москва

от 24 мая 1995 г. № 526

ПОСТАНОВЛЕНИЕ

ПРАВИТЕЛЬСТВО РОССИЙСКОЙ ФЕДЕРАЦИИ



26.05.95

по стандартизации, метрологии и сертификации обеспечить в 1995 году в приоритетном порядке финансирование работ по реализации первоочередных мер в пределах выделяемых государственных ассигнований и привлекаемых внебюджетных средств.

4. Министерству экономики Российской Федерации, Министерству финансов Российской Федерации и Министерству науки и технической политики Российской Федерации совместно с заинтересованными федеральными органами исполнительной власти предусмотреть в 1996 году целевое финансирование работ по реализации первоочередных мер в пределах ассигнований, предусматриваемых в федеральном бюджете на эти цели.

5. Установить, что с 1 января 1996 г. ввоз и вывоз озоноразрушающих веществ и содержащей их продукции в страны, являющиеся Сторонами Венской конвенции и Монреальского протокола, осуществляются по соответствующим лицензиям.

Запретить ввоз в Российскую Федерацию озоноразрушающих веществ и содержащей их продукции из стран, не являющихся Сторонами Венской конвенции и Монреальского протокола, а также вывоз из Российской Федерации озоноразрушающих веществ и содержащей их продукции в указанные страны.

Министерству охраны окружающей среды и природных ресурсов Российской Федерации совместно с Министерством внешних экономических связей Российской Федерации, Государственным таможенным комитетом Российской Федерации, заинтересованными федеральными органами исполнительной власти и организациями определить список используемых в Российской Федерации озоноразрушающих веществ и содержащей их продукции, ввоз и вывоз которых регулируются Монреальским протоколом.

6. Государственному комитету Российской Федерации по статистике обеспечить представление до 1 августа каждого года в Министерство охраны окружающей среды и природных ресурсов Российской Федерации статистических данных о производстве, потреблении и использовании озоноразрушающих веществ в Российской Федерации за предыдущий год для информирования Секретариата Венской конвенции и Монреальского протокола в соответствии с требованиями статьи 7 Монреальского протокола.

7. Государственному комитету Российской Федерации по стандартизации, метрологии и сертификации совместно с заинтересованными федеральными органами исполнительной власти

организовать метрологическое обеспечение работ по реализации первоочередных мер, разработку и при необходимости отмену государственных стандартов на озонобезопасные вещества и содержащую их продукцию, а также проведение их сертификации.

8. Комитету Российской Федерации по химической и нефтехимической промышленности совместно с заинтересованными федеральными органами исполнительной власти и организациями в 3-месячный срок разработать и представить в Правительство Российской Федерации предложения по созданию резервных запасов озоноразрушающих хлорфторуглеродов для обеспечения находящегося в эксплуатации оборудования, а также по организации системы сбора, хранения, регенерации и утилизации озоноразрушающих веществ, применение которых регулируется Монреальским протоколом.

9. По результатам рассмотрения Сторонами Венской конвенции и Монреальского протокола обращения Правительства Российской Федерации Министерству охраны окружающей среды и природных ресурсов Российской Федерации представить в Правительство Российской Федерации график поэтапного сокращения производства и потребления озоноразрушающих веществ.

Федеральным органам исполнительной власти и организациям - потребителям озоноразрушающих веществ до 1 декабря каждого года представлять в Министерство охраны окружающей среды и природных ресурсов Российской Федерации заявки на производство необходимых объемов хлорфторуглеродов в соответствии с решениями IV/25 и V/18 Четвертого и Пятого совещаний Сторон Монреальского протокола.

Министерству охраны окружающей среды и природных ресурсов Российской Федерации обеспечить представление до 31 декабря каждого года в Секретариат Венской конвенции и Монреальского протокола сводной заявки Российской Федерации на производство озоноразрушающих веществ и информирование заказчиков о результатах рассмотрения их заявок в 3-дневный срок после получения от Секретариата Венской конвенции и Монреальского протокола соответствующего решения совещания Сторон Монреальского протокола.

Председатель Прав
Российской Федера



В.Черномырдин

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT

SUB-PROJECT SELECTION CRITERIA

The following summarizes the investment sub-project selection criteria agreed between the World Bank and the CPPI for application within the framework of ODS Consumption Phase-Out Project. These criteria have been applied in the selection of investment sub-projects now proposed for all tranches of the Project. They will be applied in the event of changes in project scope associated with funding adjustment or where substitutions are necessitated based on changes in enterprise interest or appraisal results.

Two general types of selection criteria have been identified. The first referred to as Primary Criteria are the principal determinants in sub-project selection. The second category, referred to as Secondary Criteria, are to be considered as guidance in making final selections and differentiating between closely competing sub-projects. The following provides a summary of these criteria in each category, listed in order of priority:

A. Primary Criteria

1. Consistency with Country Program priorities.
2. Strategic implications of the proposed sub-project in relation to overall national ODS phase-out objectives (both consumption and production phase-out).
3. Absolute amount of ODP consumption phase-out achieved by the sub-project.
4. Sub-project cost effectiveness.

B. Secondary Criteria

1. Availability of grant funding.
2. Enterprise viability and long term business prospects.
3. Relationship between the proposed sub-project and other related ODS consumption and production phase-out activities within the proposed enterprise and/or the sector in which it operates.
4. Importance of grant support in allowing a potential beneficiary enterprise to undertake phase-out investments.
5. Likelihood that a proposed sub-project will serve as a technical or commercial demonstration for emulation by others.
6. Sustainability and innovation in technology selection.
7. Local social implications and benefits associated with a sub-project.

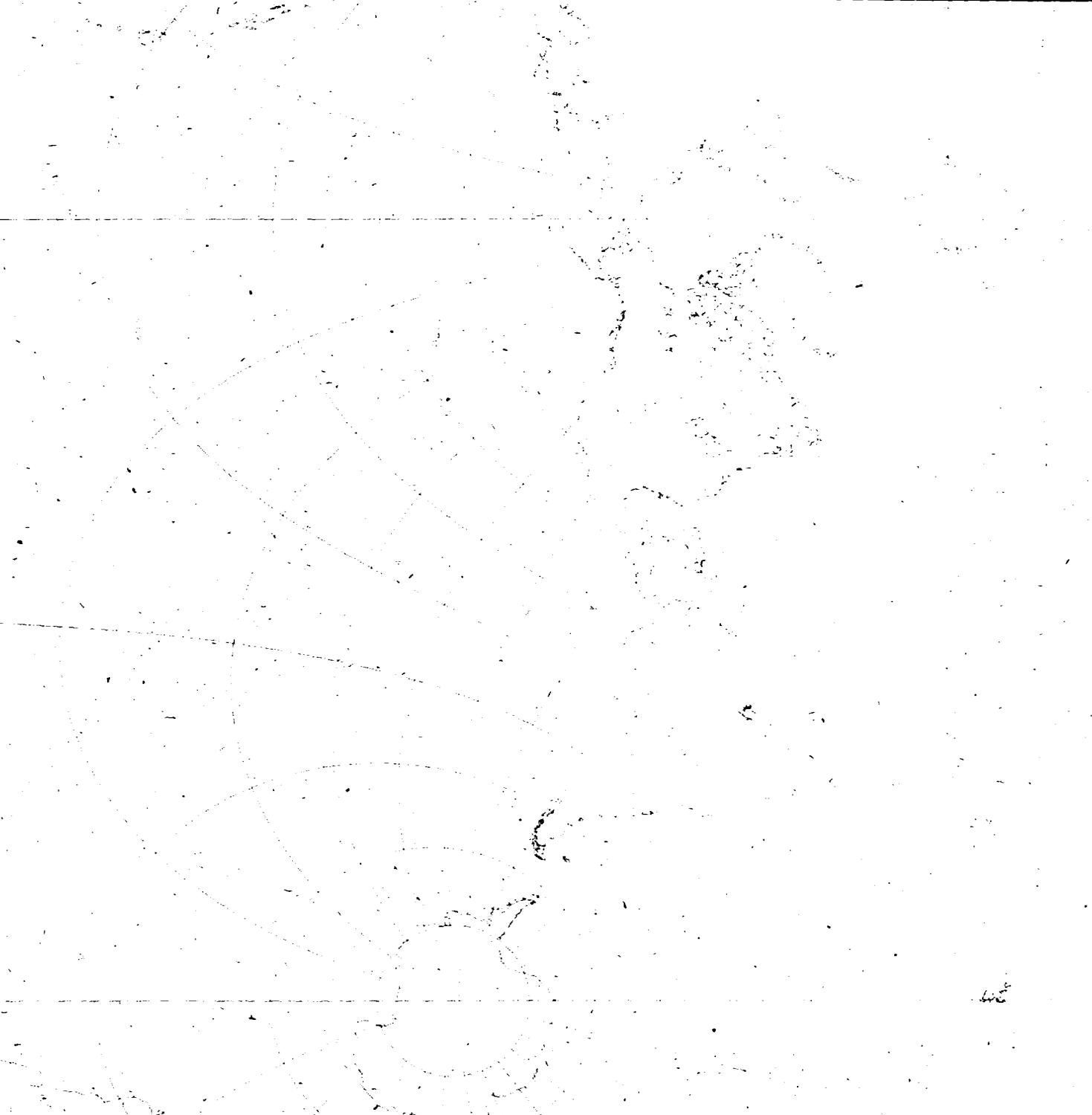
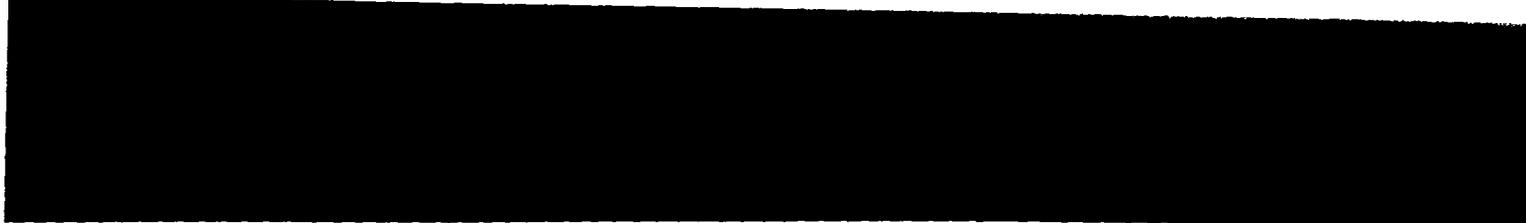
The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

RUSSIAN FEDERATION OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE OUT PROJECT

- PROJECT CITIES
 - ⊕ NATIONAL CAPITAL
 - RIVERS
 - ECONOMIC REGION BOUNDARIES
 - OBLAST, KRAI, OR REPUBLIC BOUNDARIES
 - - - AUTONOMOUS OBLAST, OKRUG, OR REPUBLIC BOUNDARIES*
 - INTERNATIONAL BOUNDARIES
- *Including republics of Adygeya, Altai, Karachaevo-Cherkess, and Khakassiya



I. NORTH	II. NORTHWEST	III. CENTRAL	IV. CENTRAL CHERNOZYOM	V. NORTH CAUCASUS	VI. VOLGA	VII. VOLGO VYATKA	VIII. URA	IX. WESTERN SIBERIA	X. EASTERN SIBERIA	XI. FAR EAST
1. Arkhangel	7. Novgorod	12. Bryansk	22. Tula	30. Chechen	40. Astrakhan	48. Chuvash	53. Bashkortostan	61. Altai	70. Buryat	80. Amur
2. Nenets	8. Pskov	13. Ivanovo	23. Vladimir	31. Dagestan	41. Kalmykia-Khaim Tangch	49. Kirav	54. Chelyabinsk	62. Gorny Altai	71. Chita	81. Kamchatka
3. Karelia	9. Leningrad	14. Kaluga	24. Yaroslavl	32. Ingush	42. Penza	50. Mariy El	55. Kurgan	63. Kemerovo	72. Agin Buryat	82. Koryak
4. Komi	10. St. Petersburg City	15. Kostroma		33. Kabardino Balkar	43. Samara	51. Mordov	56. Orenburg	64. Novosibirsk	73. Irkutsk	83. Khabarovsk
5. Murmansk	11. Kaliningrad	16. Moscow		34. Krasnodar	44. Saratov	52. Nizhniy Novgorod	57. Perm	65. Omsk	74. Ust-Ordyn Buryat	84. Jewish AO
6. Vologda		17. Moscow City		35. Adygeya	45. Tatarstan		58. Komi-Permiok	66. Tomsk	75. Krasnoyarsk	85. Magadan
		18. Orel		36. North Ossetia	46. Volgograd		59. Udmurt	67. Tyumen	76. Evenk	86. Chukot
		19. Ryazan		37. Rostov	47. Ulyanovsk		60. Sverdlovsk	68. Khanty-Mansi	77. Khakas	87. Primorski
		20. Smolensk		38. Stravropol				69. Yamalo-Nenets	78. Taimir	88. Sakhalin
		21. Tver		39. Karachaevo-Cherkess					79. Tuva	89. Sacha (Yakut)



IMAGING

Report No: 15326 RU
Type: PD