Russian Federation

Ozone Depleting Substance Consumption Phase-Out Project Third Tranche

Project Document
May 1999

THE WORLD BANK

GEF Documentation

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RUSSIAN FEDERATION

OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT

PROJECT PROGRESS REPORT
AND
THIRD TRANCHE SUBMISSION

May 1999

Socially Sustainable Development Division
Europe and Central Asia Region

CURRENCY EQUIVALENTS

Currency Unit	=	Ruble
December 1994 US$1	=	3.550
December 1995 US$1	=	4.640
December 1996 US$1	=	5.850
December 1997 US$1	=	5.960
December 1998 US$1	=	20.65

FISCAL YEAR

January 1 - December 31

WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND ACRONYMS

CFC	-	Chlorofluorocarbons
CPPI	-	Center for Preparation and Implementation of International Projects on Technical Assistance
CTC	-	Carbon Tetrachloride
DME	-	Dimethyl Ether
EA	-	Environmental Assessment
EMP	-	Environmental Management Project
EPE	-	Extruded Polyethylene
FSU	-	Former Soviet Union
GEF	-	Global Environmental Facility
GWP	-	Global Warming Potential
HAP	-	Hydrocarbon Aerosol Propellant
HCFC	-	Hydrochloroflourocarbon
HFC	-	Hydrofluorocarbon
ICB	-	International Competitive Bidding
ICP "Ozone"	-	ODS Investment Project Unit
IS	-	International Shopping
JSC	-	Joint Stock Company
MCF	-	Methyl Chloroform
MEPNR	-	Ministry of Environmental Protection and Natural Resources of the Russian Federation
MP	-	Montreal Protocol
MPMF	-	Montreal Protocol Multi-lateral Fund
MT	-	Metric Ton
NCB	-	National Competitive Bidding
NPAF	-	National Pollution Abatement Facility
NS	-	National Shopping
ODP	-	Ozone Depleting Potential
ODS	-	Ozone Depleting Substance
OORG	-	Ozone Operations Resource Group
PIU	-	Project Implementation Unit
VNIIPO	-	All Russian Research Institute for Fire Protection
VOC	-	Volatile Organic Compound
SCEP	-	State Committee of the Russian Federation for Environmental Protection
SGP	-	Small Grant Program
SITRG	-	Special Initiative Technical Review Group
TA	-	Technical Assistance

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCES CONSUMPTION PHASE-OUT PROJECT
PROGRESS REPORT AND THIRD TRANCHE SUBMISSION

TABLE OF CONTENTS

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This report is based on the findings of a joint CPPI/World Bank preparation mission conducted in Russia during January, 1999. The mission comprised Vassily Tselikov (CPPI ICP "Ozone" Manager), Konrad von Ritter (World Bank Sector Team Leader), Vladimir Tsirkunov (World Bank task Team Leader), and R. J. Cooke (World Bank Task Management Consultant). Preparation assistance was provided by COWI Consulting (Moscow), ICF-EKO (Moscow), Arthur D. Little (Moscow) , Dewpoint Consultants (UK), INAAC (Mexico), and RE-A-CT (Denmark) who prepared the pre-appraisal studies for the enterprises. Thomas W. Waltz (World Bank Consultant) coordinated OORG reviews.

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT
THIRD TRANCHE SUBMISSION

SUMMARY

Grantee:	Russian Federation.
Implementing Agency:	Center for Preparation and Implementation of International Projects on Technical Assistance under the State Committee of the Russian Federation for Environmental Protection and Natural Resources.
Beneficiaries:	JSC "Torvary I Lekaratva" in Perm, JSC "Altaivitaminy" in Biisk, JSC "Iceberg" in Smolensk, JSC "Iskra" in Moscow, JSC "Kholodmash" in Yaroslavl, Pyatigorsk Torgtekhnika in Pyatigorsk, Combine Torgtekhnika in Ekaterinburg, Kemerovatorgtekhnika in Kemerova, JSC "Plastik" in Syzran, JSC "Stroidetal", in Moscow, JSC "Nelidovo" in Tver Region, Design Bureau "Salut" in Moscow, and Miass Machine Building Plant in Zlatoust who are consumers of ozone depleting stubstances. JSC "Halogen" in Perm, JSC "Chimprom" and JSC "Kaustik" in Volgograd, JSC "Altaichimprom" in the Altai Region, JSC "Kirovo-Chepetsk Chemical Combinat" in Kirovo-Chepetsk, RSC "Applied Chemistry" in St. Petersburg, JSC "Tekhnoroz" in Redkinko who are producers of ozone depleting substances.
Amount:	US$31.3 million.
Terms:	Sub-Grants to the enterprises per Sub-Grant Agreements between the Grantee and the beneficiaries, subject to approval by the Bank.
Onlending Terms:	Not applicable.
Financing Plan:	The sub-grants to ODS consuming enterprises would finance eligible incremental investment costs up to a maximum amount determined by each enterprise's historical usage of ozone depleting substances. All other associated costs are financed by the enterprises. Sub-grants to ODS production enterprises are compensation for permanent closure of production capacity.

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT
PROJECT PROGRESS REPORT AND THIRD TRANCHE SUBMISSION

EXECUTIVE SUMMARY

i. The Russian Federation has made substantial progress in the phase-out of ozone depleting substances since adopting a comprehensive Country Program in 1996 and subsequently undertaking implementation of the GEF ODS Consumption Phaseout Project. Annual ODS consumption has fallen from a peak level of 70,000 MT in 1990 to under 10,000 MT 1998. Projected consumption in 2001 is 2,520 MT, with the conversion of all major remaining consumers utilizing support from the GEF. While Russia remains the largest ODS producer among Article 2 countries, production has declined from a peak of 118,000 MT in 1990 to 12,070 MT in 1998. Furthermore, the country has committed to the permanent closure of all ODS production facilities in 2000 as part of a companion project, known as the Special Initiative on ODS Production Closure. In summary, Russia is anticipated to reach compliance with its obligations as an Article 2 country in 2000.

ii. The Russian Federation GEF ODS Consumption Phaseout Project is a framework project, involving grant funding up to US$60 million, to be disbursed for eligible phase-out investments and supporting technical assistance in three tranches. It was originally approved in 1996 and the first two tranches, involving grant funding of US$28.7 million for consumption phase-out investments in the aerosol and refrigeration sectors, and institutional strengthening are currently under implementation. To date, the first two tranches have eliminated 2,500 MT of annual consumption and it is estimated that the total annual phase-out will reach 10,813 MT ODP by early 2000. Total contracted commitments for the first and second tranches to date are US$14.7 million.

iii. This document describes the above progress, both with respect to the country's overall ODS phase-out, and the specific activities undertaken under the first and second tranches of this project. More importantly, it documents the proposal to the GEF Council for US$31.3 million in funding under the project's third and final tranche. Consistent with the conceptual third tranche scope which was endorsed by the GEF CEO as part of the second tranche submission in 1998, this proposal expands the project's scope to all consumption sectors. In addition, it proposes the utilization of some third tranche resources for supplementary support of the Special Initiative. Finally, it directs resources to support of priority residual ODS management needs after the effective elimination of major consumption as well as production closure in 2000.

iv. It is proposed that the third tranche will fund up to thirteen specific consumption phase-out investment opportunities in financially viable enterprises that have been prepared for detailed appraisal. Sub-projects in the consumer aerosol, medical aerosol, domestic and commercial refrigeration, refrigeration servicing, non-insulating foam and solvent sectors are proposed for US$14.2 million in grant funding (including agency fees). Total annual phase-out is estimated to

be 1,029 MT. In combination with the sub-projects under implementation in the first and second tranches, this will account for all major remaining consumers in the country.

v. With respect to support for the Special Initiative, it is proposed that US$8.5 million from the third tranche be used to supplement the US$19 million in donor funding assembled by the World Bank for compensation payments to producing enterprises in exchange for permanent closure of all ODS production facilities. This proposal is consistent with the GEF Secretariat's confirmation of eligibility in principle for GEF funding and the undertaking of the Special Initiative donors to support it through their GEF representation. Disbursement of these funds would be governed by the agreed principles established at the Special Initiative Donor's Meeting held in Moscow in October 1998. These principles include: i.) the development, independent expert clearance, and appraisal of detailed closure plans, and monitoring and verification procedures; ii) signing a Grant Agreement between the Russian Federation and World Bank; iii) initial disbursement of 30% of compensation payments upon acceptance of signed Sub-Grant Agreements from all producing enterprises; and iv) final disbursement of 70% of compensation payments upon independent verification of permanent closure of all production facilities. The overall cost effectiveness of the total Special Initiative funding is estimated to be US$0.63/kg ODP based on 1995 production and US$0.20/kg ODP based on production capacity.

vi. The final component of the third tranche is US$8.5 million in funding directed to support of three specific residual ODS management initiatives. The first of these, known as the Small Grants Program (US$5.8 million), would fund small consumption phase-out investments from US$50,000 to US$250,000, particularly related to developing recovery and recycling capacity in smaller refrigeration servicing enterprises, and in the solvent sector. This program would operate for up to three years after the ban on production and new consumption of ODS comes into effect in 2000. It would be processed using a series of auctions that would allow selection of the most cost effective opportunities. It is also proposed to support a Halon Banking Program (US$1.5 million) based on establishment of a Central Halon Banking Office to coordinate the re-distribution of the country's unused stocks to ensure critical fire protection needs are met, and to develop regional banking capacity within the existing national servicing network. Finally, a program of technical assistance (US$1.3 million) is proposed including additional regulatory strengthening, enforcement training, a public awareness initiative, support in implementing current phase-out alternatives, and development of a phase-out plan for transitional substances.

vii. In summary, Russia has made significant progress in meeting its international obligations respecting ODS phase-out with international assistance. The proposed third tranche program presented in this document offers the opportunity to support the completion of this process.

RUSSIAN FEDERATION
OZONE DEPLETING SUBSTANCE CONSUMPTION PHASE-OUT PROJECT
PROJECT PROGRESS REPORT AND THIRD TRANCHE SUBMISSION

I. Project Background

1. The Russian Federation Ozone Depleting Substance Consumption Phase-out Project (Project) is being undertaken to assist Russia in the implementation of its overall Country Program for phase-out of ozone depleting substances (ODS). As adopted in 1995, this Program defines Russia's commitment to eliminate the production and new consumption of ODS by 2000 and has been agreed to by the Montreal Protocol Implementation Committee. Consistent with the Implementation Committee's call for favorable consideration of international assistance to Russia, the Project is being funded by the Global Environmental Facility (GEF) with the World Bank acting as implementing agency. Project preparation was undertaken during 1995 and 1996 by the World Bank and Ministry of Environmental Protection and Natural Resources of the Russian Federation (MEPNR) utilizing a GEF project preparation advance. It was approved by the GEF in April 1996 as a framework project with an overall grant allocation of US$60.0 million. As initially approved, this is to be disbursed as sub-grants in three tranches to eligible phase-out investments in the high consumption aerosol and refrigeration sectors, and for institutional technical assistance related to upgrading of the national regulatory framework for ODS control. The first tranche investment sub-project portfolio was included in the appraisal and subsequent processing of the overall Project. The Project Document[1] published at the time of GEF approval provides a complete description of the Project, as originally structured. It also includes background on overall ODS production and consumption in Russia up to 1995, the status of Russia's international phase-out obligations and agreements with the Parties to the Montreal Protocol, and institutional initiatives related to ensuring compliance.

2. The second tranche of the Project was prepared and appraised during 1997. The second tranche Project Document, providing a progress report and individual second tranche appraisal reports for four sub-projects in the aerosol and refrigeration sectors[2], was submitted to the GEF Secretariat in December, 1998 as the basis for a total second tranche grant request of US$26.2 million. The submission also proposed a general framework for the third tranche, valued at US$27.0. Based on the substantive phase out that was being achieved in the originally targeted high consumption aerosol and refrigeration sectors, this submission requested expansion of the project scope to other consumption sectors, as well as allocating funding in support of the closure of ODS

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1 *Global Environment Facility, Russian Federation Ozone Depleting Substances Phase-out Project, Project Document*, The World Bank, Report No. 15326-RU, May 1996

2 *Global Environment Facility, Russian Federation Ozone Depleting Substances Phase-Out Project, Project Document: Second Tranche*, The World Bank, Report No. 17391-RU, February 1998

production capacity through the proposed by World Bank Special Initiative on ODS Production Closure (Special Initiative). In January, 1998, GEF CEO endorsement of the second tranche investment sub-projects and revised project scope was received, following circulation of the documentation to Council members. A summary of the revised project scope and tranche funding allocation, along with the original scope for comparison, is provided in Table 1.1

3. This Project Document is intended as a further progress report on the Project's implementation and to serve as support for the submission of the third and final tranche of sub-projects for approval consideration by the GEF Council. Consistent with the approach used in the second tranche submission document, it provides a summary of the Project's status and overall ODS phase-out progress in Russia including: a) a description of project implementation arrangements; b) institutional developments c) the results of the first and second tranche implementation to date; d) summary data on and analysis of overall ODS production and consumption in Russia; and e) details of third tranche preparation, the sub-projects proposed for funding, and proposed support for residual ODS management initiatives beyond the year 2000. Unlike the previous submissions, the proposed investment sub-projects in the third tranche have not yet been formally appraised, although all have received OORG clearance and been evaluated in terms of beneficiary financial viability.

II. Project Implementation Arrangements

4. The Project's counterpart implementing agency is the State Committee of the Russian Federation for Environmental Protection of the Russian Federation (SCEP, formally MEPNR), under the terms of a Global Environmental Facility Trust Fund Agreement[3] (Grant Agreement) between SCEP and the World Bank, signed on September 29, 1996. An amendment to the Grant Agreement was approved in December 1997 to accommodate changes in procurement procedures and a further amendment was approved in February 1999 to accommodate expansion of the project scope to other consumption sectors and the production sector. Within Russia, the Project is supervised by the Inter-Agency Commission for Ozone Layer Protection (Inter-Agency Commission) established under SCEP. It includes representatives of government and industrial stakeholders impacted by ODS phase-out and operates under the Chairmanship of the SCEP Chairman. In addition, final funding proposals for individual investment sub-projects are subject to the appraisal and review processes established by the National Pollution Abatement Facility (NPAF), including formal approval by the NPAF Supervisory Board, which is made up of representatives from the Ministry of Finance, Ministry of Economy, and SCEP.

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[3] *Global Environmental Facility Trust Fund Grant Agreement, GEF Trust Fund TF028314,* September 29, 1996, Amended October 1997, Amended February 1999

ORIGINAL PROJECT SCOPE				REVISED PROJECT SCOPE (SECOND TRANCHE APPROVAL)			
TRANCHE/SECTOR/ COMPONENTS	NO. OF SUB-PROJECTS	GEF GRANT (US$X1000)	ESTIMATED ODS PHASEOUT (MT)	TRANCHE/SECTOR/ COMPONENTS	NO. OF SUB-PROJECTS	GEF GRANT (US$X1000)	ESTIMATED ODS PHASEOUT (MT)
FIRST TRANCHE				**FIRST TRANCHE**			
Aerosol	1	5.650	2,456	Aerosol	1	5.650	3,050
Domestic Refrigeration	1	1.976	117				
Technical Assistance		0.748		Technical Assistance		0.748	
Agency Fee		0.226		Agency Fee (Note 1)		0.500	
Sub-Total	2	8.600	2,573	Sub-Total	1	6.898	3,050
SECOND TRANCHE				**SECOND TRANCHE**			
Aerosol	4	23.333	10,665	Aerosol	3	24.319	6,766
Domestic Refrigeration	2	9.628	740				
Commercial Refrigeration	1	0.509	33	Commercial Refrigeration	1	0.881	35
Technical Assistance		0.526		Technical Assistance		0.526	
Agency Fee		1.004		Agency Fee (Note:1)		0.426	
Sub-Total	7	35.000	11,438	Sub-Total	4	26.152	6,801
THIRD TRANCHE				**THIRD TRANCHE (Note 2)**			
Domestic Refrigeration	4	15.266	1,343	Residual Aerosol/Refrigeration	3	5.000	1,800
Refrigeration Servicing	1	0.654	-	Refrigeration Servicing	1	6.500	4,150
				Halon Banking	1	2.000	100
				Non-Insulating Foam	5	6.000	332
				Fire Protection Equipment	2	0.500	20
				Medical Aerosols	3	1.000	75
				Solvents	4	1.000	50
				Production Phaseout Support	1	5.000	
Agency Fee		0.480		Agency Fee		0.850	
Sub-Total	5	16.400	1,343	Sub-Total		26.950	6,527
TOTALS	14	60.000	15,354	TOTALS	20	60.000	13,054

NOTES:

1. First tranche agency fee is equal to the initial payment into the special account made under the terms of the Grant Agreement
Second tranche agency fee based on the reconciliation of first tranche over payment.
2. The proposed scope of the third tranche is indicative and funding allocations are subject to confirmation after further project preparation
and approval of GEF Council.

5. The functional implementation responsibility for the Project has been assigned to the Center for Preparation and Implementation of International Projects on Technical Assistance (CPPI) established within SCEP in association with the World Bank Russian Federation Environmental Management Project (EMP) and which provides project implementation unit (PIU) capacity for a number of projects including the GEF Russian Federation Biodiversity Project. This assignment of responsibility is formalized in a Project Implementation Agreement between SCEP and CPPI, dated January 28, 1997. Within CPPI, project management responsibility is assigned to a dedicated project implementation unit (ICP "Ozone") which is funded under the Project through the agency fees provided for in the Grant Agreement. This group operates in accordance with a work plan and budget approved annually by the NPAF Supervisory Board and World Bank. ICP "Ozone" is responsible for: i) the overall administration of the Project; ii) preparation, appraisal and implementation of Project investment sub-projects; iii) institutional technical assistance components of the Project; iv) providing support to SCEP in the overall implementation of the Country Program; v) acting as a secretariat to the Inter-Agency Commission; vi) assisting in assembling information required in the fulfillment of Russia's reporting obligations under the Montreal Protocol; and vii) preparation of the Special Initiative. This unit has a staff of nine, providing technical, procurement, financial, institutional and administrative expertise for the Project. It is supported by specialist staff from the NPAF and broader CPPI organization, as well as local and foreign consultants as required.

6. The expansion of the Project scope in the proposed third tranche (Section VII) will require a further major amendment to the Grant Agreement in order to accommodate the contribution to the Special Initiative and inclusion of the Small Grants Program as part of residual demand management support after the closure of production after the year 2000. This will have to make specific provision for a linkage to the Grant Agreement covering the Special Initiative to allow the transfer of funds upon effectiveness of the latter agreement. It will also have to be modified to set out the conditions for disbursement of the proposed Small Grant Program as well as procurement practices that would apply. Finally, it is anticipated that the current Grant Agreement completion date will be extended until December 31, 2001 to cover the completion of the proposed third tranche investment sub-projects. SCEP and Ministry of Finance have undertaken to initiate a formal request to the World Bank for this Amendment in March 1999 to facilitate its processing and Board approval in June 1999.

III. Institutional Developments

7. The primary regulatory authority responsible for ODS control in the Russian Federation is the SCEP and, within SCEP, the Department of Ecological Control and Environment Safety. The legal basis for the control of ODS is provided by various

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[4] *Global Environmental Facility Trust Fund Grant Agreement, GEF Trust Fund TF028314*, September 29, 1996, Amended October 1997, Amended February 1999

resolutions of the government adopting the Country Program[5], and administrative control measures over ODS production, imports and exports[6][7]. The mandate and organization of the Inter-Agency Commission[8] has also been strengthened to ensure coordination and cooperation of regulatory and investment activities among all stakeholders within the government. The major direct regulatory control initiatives that have been or are being implemented since initiation of the Project are:

a) Development of a system of annual ODS production quotas that provides for the progressive reduction in ODS production by producing enterprises such that complete phase-out can be achieved by 2000, while ensuring that supplies are available as consumption phase-out is being implemented[9]. A reserve is also provided for allowing production under special SCEP permits, either for export to Article V countries as allowed the under MP and for emergency domestic use. This system has been operational since 1996. Quotas established for 1999, while substantially reducing production for domestic consumption and the special SCEP permit allowance, also provides a quota allocation for banking of material by producers for sale to existing consumers after production closure in 2000. This is further described in Section VI.

b) In association with the Ministry for Trade of the Russian Federation and the State Customs Committee of the Russian Federation, a system of import and export controls has been implemented that requires compliance with international obligations respecting ODS and ODS containing products. Specific provision for export allowances to other countries in the CIS have been provided in order to ensure essential supplies while phase-out occurs in these countries. Full implementation and associated reporting capacity was in place by the end of 1997.

c) The delegation of permitting and enforcement authority for ODS control to regional and local Environment Committees was tested in nine locations in 1997 as the basis of developing cost effective national capacity and

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5 *Resolution on Priority Measures to Ensure Compliance with the Vienna Convention on Ozone Layer Protection and Montreal Protocol on Ozone Depleting Substances*, Resolution No. 526 of the Government of the Russian Federation, May 1995.

6 *On Control Over Imports to the Russian Federation and Exports from the Russian Federation of ODS and ODS Containing Products*, Resolution No. 563 of the Government of the Russian Federation, May 1996

7 *On Establishment of Quotas for Production of ODS in 1997*, Order of the State Committee for Environmental Protection of the Russian Federation, February 1997.

8 *On Inter-Agency Commission for Protection of the Ozone Layer,* Resolution No. 612 of the Government of the Russian Federation, May 1997.

9 Orders of the State Committee of the Russian Federation for Environmental Protection, No. 50 (February 20, 1997), Number 589 (December 31, 1997), Number 719 (December, 1998)

coverage[10], and is now being implemented nationally using harmonized documentation, and a data management system for reporting and information collection.[11]

d) A formalized system of collecting and reporting information to the Montreal Protocol Secretariat, consistent with the countries obligations, has been developed and fully implemented.

e) A formal Federal Program[12] on long term ODS phase-out and residual demand management has been developed and approved by all major institutional stakeholders, including the Ministries of Economy and Finance, under the auspices of the Inter-Agency Commission. Formal adoption of the Federal Program is anticipated in the second quarter of 1999.

f) Establishment of working groups within the Inter-Agency Commission to address sectoral phase-out requirements related to refrigeration, halons, medical uses, solvent uses, chlorine containing feedstock production and ODS production.

g) Preparation of draft Government Resolutions that will ban ODS production, new consumption and import/export in 2000. The resolution banning ODS production is anticipated to be effective in March 1999[13]. The companion resolution banning new ODS consumption and export/import is anticipated to be effective in June 1999.

8. Four further regulatory control measures have been approved for development. These are:

a) Controls applicable to the banking system based on quota allocations to producers in the years preceding production closure.

b) Introduction of a quota, licensing and pricing mechanism for ODS consumption after 2000, linked to the development of the banking system and its regulation.

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10 *On Launching an Experiment to Develop a Mechanism to Control Imports of ODS Containing Products*, Order of the State Committee of the Russian Federation for Environmental Protection, No. 48, February 1997.

11 *On the Procedures of Review and Evaluation of Justification Materials Presented when Applying for Permission to Engage in ODS Import and Export from the Russian Federation*, Order of the State Committee for Environmental Protection of the Russian Federation No. 529, November 27, 1997

12 *Phase-out of Production and Consumption of ODS in the Russian Federation in 1998-2000*, Draft Federal Program, December 1998

13 These Government resolutions are to be in force as a condition of Grant effectiveness for the Special Initiative.

c) Development and implementation of reporting formats for closed ODS producers, primary consumers, bank operations, and recycling operations.

d) Development and implementation of regulations for strengthening state ecological control and monitoring of production (including closed operations) and consumption of ODS.

9. Overall, the Russian Federation has developed an effective administrative structure for the formal regulation of ODS, both during the phase-out period covered by the Project and as a basis for controls after it is in full compliance with its obligations under the MP. However, technical assistance work undertaken as part of the Project[14] has identified several areas where additional institutional strengthening could be undertaken. With respect to regulatory measures, implementation of more comprehensive licensing of ODS consumption is needed, and strengthening of enforcement capacity, particularly through training would be productive. It is also generally acknowledged that the development of economic instruments providing incentives for the management and ultimate elimination of residual ODS consumption should be developed. As noted in Section VII, in relation to the Special Initiative, this represents a key element of the country's undertaking in support of ODS production phase-out. Support for this within the third tranche of the project is recommended.

[14] *Report to Address Gaps in Russia's ODS Regulatory Framework.* ICF/EKO. December 1998.

IV. IMMPLEMENTATION STATUS OF THE FIRST TRANCHE

10. The Project's first tranche, as originally approved, involved a total grant of US$8.6 million (Table 1.1). It was to include two investment sub-projects, one in each of the aerosol and domestic refrigeration sectors and technical assistance related to project processing and institutional strengthening. However, in the course of initiating implementation activities, it became apparent that new financial viability concerns had developed with one of the enterprises, JSC "KRP Birusa". This enterprise had been the largest producer of domestic refrigerators and compressors in Russia (750,000 units/year) but had effectively stopped production in 1996 due to market problems and possible restructuring. As a consequence, it was decided to defer the sub-project to a subsequent tranche, conditional on demonstration of financial viability. Therefore, first tranche implementation activities have been directed at the remaining investment sub-project in the aerosol sector (JSC "Arnest") and the technical assistance component. The actual value of the first tranche is set at US$6.6 million.

11. **JSC "Arnest".** This investment sub-project is a conversion from CFC11/12 mixture to hydrocarbon aerosol propellant (HAP) conversion. The enterprise was one of the country's largest consumer aerosol producers and sustaining consumers of ODS, being appraised on the basis of a consumption level of 2,456 MT ODS. The conversion involves a total investment of US$15.8 million of which GEF grant funding is US$5.650 million. Its principal components are the supply of new filling lines, upgraded valve making facilities, HAP storage and handling infrastructure, and fire protection systems. By mid 1998, ODS usage has been completely eliminated with the replacement and destruction of old filling lines, installation of all basic HAP handling capacity, and use of externally purchased valves. Contracting for all remaining equipment supplied under the project is complete and the major remaining equipment items are being delivered. Completion and full disbursement of the grant is anticipated in November 1999. Verification of 100% ODS phase-out and critical equipment destruction was completed by SCEP/ICP "Ozone" in January 1999.

12. **Technical Assistance.** This component of the first tranche has had a primary emphasis on support of institutional strengthening related to regulatory control of ODS. In addition to the establishment of the Project implementation capacity in ICP "Ozone" described above, foreign technical assistance has been provided in support of regulatory framework development. The scope of this work covered a review of international regulatory practices for ODS phase-out, development of specific regulatory initiatives in Russia at the national and regional level and support in their implementation through training and operational assistance. The last part of this work will be undertaken in early 1999. Additionally, foreign technical assistance covering upgrading of monitoring and reporting has been canceled, largely due to the accelerated progress made in this area within SCEP using in-house resources and the ICP "Ozone" staff. These resources are currently being re-directed to a number of support tasks associated with development and implementation of the draft Country Program, and to areas identified as requiring

additional institutional strengthening in the initial foreign technical assistance work. These include: i) analysis of ODS Banking mechanisms and options, ii) development of detailed licensing and reporting requirements for residual ODS consumption and trade; and iii) development of a code of conduct for responsible authorities involved in the enforcement of ODS regulatory controls. These activities will provide the basis for the supplementary regulatory technical assistance being proposed for the third tranche. Grant resources have also been directed at the provision of computer and communications equipment for SCEP and the Inter-Agency Commission to facilitate more effective data collection and reporting. These are specifically being used to support the implementation of the "OZONE" data management system developed independently for SCEP to handle tracking of regulatory permitting transactions as well as imports and exports. The first tranche resources have also supported a modest public information and awareness program on ODS phase-out among both ODS consumers and the general public. This will form the basis for expanded public awareness activities to be proposed under the third tranche. Finally, the technical assistance component supported the detailed screening and preparation of second tranche investment sub-projects during 1997.

V. IMPLEMENTATION STATUS OF THE SECOND TRANCHE

13. The second tranche of the Project was prepared and appraised during 1997. A supporting Project Document, providing a progress report and individual sub-project appraisal reports[15], was submitted to the GEF Secretariat in December 1998. It received CEO endorsement in January 1998, upon which implementation was started. The approved overall second tranche grant is US$26.2 million, inclusive of four investment sub-projects with US$25.2 million in grant funding to phase-out 14,139 MT ODP in consumption capacity and an appraised consumption of 8,357 MT ODP. US$526,000 in technical assistance component was also provided for. The implementation status of the four investment sub-projects and technical assistance component are described below:

14. **JSC "Harmonia".** This enterprise is a manufacturer of consumer aerosol products located in Moscow. The approved sub-project involves propellant conversion from CFC11/12 mixtures to HAP. The overall incremental investment cost is US$8,592,685 of which US$ 6,252,000 will be provided by a sub-grant. The appraised consumption phase-out is 2,585 MT ODP and the cost effectiveness is US$2.42/kg. ODP. The principal grant financed components are two aerosol filing lines, HAP storage and handling facilities, tank cars, explosion proof lift trucks, and fire protection equipment. Sub-project implementation began with signing of the Sub-Grant Agreement in April 1998. This included satisfaction of conditionality associated with contracting for engineering and procurement services, demonstration of financial reserves to support enterprise contributions, and obtaining environmental approvals. Engineering is currently being completed and procurement of all grant funded items has been initiated.

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[15] *Global Environment Facility, Russian Federation Ozone Depleting Substances Phase-Out Project, Project Document: Second Tranche*, The World Bank, Report No. 17391-RU, February 1998

Contracting of goods and services worth US$3,422,116 has been completed and the remaining contracting is in various stages of preparation and tendering. Sub-project completion is scheduled for March 2000.

15. **JSC "Chimprom".** This enterprise is a large basic chemical firm, located in Volgograd, making a wide range of products including CFC-11, CFC-12 and CFC-113, as well as consumer and industrial aerosol products. The approved sub-project involves propellant conversion from CFC11/12 mixtures to HAP. The overall incremental investment cost is US$ 8,044,316 of which US$ 5,092,000 will be provided by a sub-grant. The appraised consumption phase-out is 1,769 MT ODP and the cost effectiveness is US$2.88/kg. ODP. The principal grant financed components are two aerosol filing lines, HAP storage and handling facilities, tank cars, explosion proof lift trucks, and fire protection equipment. Sub-project implementation began with signing of the Sub-Grant Agreement in October 1998. This included satisfaction of conditionality associated with completing site preparation works, satisfactory progress design work, and obtaining environmental approvals. Engineering is currently being completed and procurement of all grant funded items has been initiated. Contracting of goods and services worth US$1,842,552 has been completed and the remaining contracting is in various stages of preparation and tendering. Sub-project completion is scheduled for May 2000.

16. **JSC "Sibiar".** This enterprise is a manufacturer of consumer aerosol products located in Novosibirsk. The approved sub-project involves propellant conversion from CFC11/12 mixtures to HAP. The overall incremental investment cost was originally estimated at US$18,562,994 of which US$13,141,270 was to be provided by a sub-grant. The appraised consumption phase-out was 3,971 MT ODP and the cost effectiveness was US$3.31/kg. ODP. The principal grant financed components were two aerosol filing lines, HAP storage and handling facilities, tank cars, valve production equipment, can manufacturing facilities, explosion proof lift trucks, and fire protection equipment. Substantial delays were encountered in signing a sub-grant agreement due to difficulties in the enterprise demonstrating financial capacity for its contribution and its requested changes in scope after appraisal. As an alternative to canceling the sub-project, it has been scaled down to approximately two thirds of its appraised production capacity, a level more consistent with the enterprise's market prospects and financial capacity to implement it. The currently estimated incremental investment cost is US$14,213,180 of which US$8,748,000 is to be provided by a sub-grant. The new cost effectiveness is US$2.20/kg. On this basis a Sub-Grant Agreement was signed in October 1998. This includes conditionality associated regular financial viability confirmation prior to major disbursements and obtaining environmental approvals. Engineering services have been contracted and preparation of procurement documents has been initiated. The Bank has informed ICP Ozone and the enterprise that "no objection" of major commitments will be conditional on regular confirmation of financial viability. It has also established August 1, 1999 as a target for demonstrating substantive progress in proceeding with sub-project implementation, specifically with contracting of major equipment. In the absence of such progress, the enterprise will be unable to complete the required conversion before

domestic production closure occurs and the ban on production becomes effective. The sub-project is currently scheduled for completion in December 2000.

17. **ANPO "Marikholodmash".** This enterprise is the county's largest manufacturer of commercial refrigeration equipment located in Yoshkar-Ola. The approved sub-project involves conversion of CFC-12 refrigerant to HFC-134a and CFC-11 foam blowing agent to cyclopentane. The overall incremental investment cost is US$4,281,859 of which US$882,000 will be provided by a sub-grant. The appraised consumption phase-out is 32 MT ODP and the cost effectiveness is US$8.74/kg. ODP. The principal grant financed components are cyclopentane foam blowing and refrigerant charging equipment Sub-project implementation began with signing of the Sub-Grant Agreement in June 1998. This included satisfaction of conditionality associated with enterprise financial capacity and obtaining environmental approvals. Contracting of grant funded goods and services worth US$816,810 has been completed and the installation of foam blowing equipment is in progress Sub-project completion is scheduled for June 1999.

18. **Technical Assistance.** This component in the second tranche has been devoted to screening and preparation studies for the proposed third tranche, and preparation of the Special Initiative. Four technical assistance contracts are currently active through to completion of the appraisal of third tranche investment sub-projects. These cover: i) refrigeration servicing and commercial refrigeration sectors; ii) residual consumers in the aerosol and refrigeration sector; iii) the non-insulating foam sector; and iv) the solvent and fire protection sectors. A fifth contract is devoted to the preparation of detailed ODS production closure plans and enterprise specific monitoring procedures in preparation for appraisal and processing of the Special Initiative. This contract also covers additional preparation work required for the design of third tranche technical assistance components such as enhancement of halon banking activities and other residual ODS management initiatives.

VI. ANALYSIS OF CURRENT ODS CONSUMPTION AND PRODUCTION

19. This section provides an analysis of current ODS consumption by sector and of ODS production as an update to a similar analysis provided in the second tranche Project Document[16]. This analysis is based on a combination of data collected through ICP "Ozone" and SCEP, along with information obtained in the course of third tranche preparation. The overall purpose of this analysis is to provide the status of ODS phase-out in the Russian Federation as it approaches its year 2000 MP compliance commitment, and to obtain reasonable estimates of residual ODS requirements after that time. The latter is important in designing the proposed third tranche to effectively support the orderly management of these requirements and their elimination with the minimum of social and economic disruption.

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[16] *Global Environment Facility, Russian Federation Ozone Depleting Substances Phase-Out Project, Project Document: Second Tranche*, The World Bank, Report No. 17391-RU, February 1998

20. Historically, the Soviet Union was one of the world's major producers and consumers of ODS. In 1990, when ODS production reached its peak at 198,000 MT (including HCFC's and CTC), it accounted for approximately 15% of global production. Domestic consumption at that time was estimated to be 70,000 MT. In 1992, ODS production excluding feedstocks and transitional substances in the Russian Federation was 66,500 MT and domestic consumption was estimated to be approximately 48,000 MT (44,000 MT ODP). As reported in the second tranche Project Document, both production and consumption have fallen dramatically since that time, due in part to phase-out initiatives including those under this Project, but predominately due to the decline in industrial production and market driven rationalization of major consuming sectors.

21. **Aerosol Sector.** In 1992, aerosol consumption in Russia was estimated to be 18,150 MT/Year[17], concentrated in eight producers of consumer and industrial products (17,850 MT ODP/year) and a smaller quantity for the production of medical aerosol (300 MT ODP/year). Consumption capacity was estimated at 34,000 MT ODP/year By 1994, consumption had fallen to 13,280 MT ODP in the major consumers, on the strength of the conversion of one large plant (JSC "Chiton") to HAP on its own initiative and the introduction of CFC/HAP blends at JSC "Arnest". The estimated sector consumption in 1996 fell to 7,651 MT ODP as rationalization of major producers took effect. In 1998, consumption is estimated to be 3,287 MT ODP, reflecting the conversion of the largest consumer (JSC "Arnest") and closure of two plants. The remaining large consumers are currently implementing conversion sub-projects in the second tranche and two smaller consumers are included in the proposed third tranche. On this basis, residual sectoral ODS requirements are estimated to be 110 MT in one medical aerosol consumer, after 2000. Table 6.1 provides a summary of the enterprises identified in the sector and their current status.

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17 *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

TABLE 6.1

ENTERPRISE AND ODS CONSUMPTION STATUS
CONSUMER AND MEDICAL AEROSOL SECTOR

ENTERPRISE	SUBSTANCES	ANNUAL CAPACITY		CONSUMPTION ODP MT		STATUS
		UNITS	ODP MT	1997	1998	
JSC "Arnest" (Nevinnomyssk)	CFC-11/12	40,000,000 Cans	3,034	657	111	Completed 1st tranche sub-project Phase-out complete in July 1998
JSC "Sibiar" (NDCP) Novosibirsk)	CFC-11/12	30,000,000 Cans	5,550	1,197	1,400	2nd tranche sub-project Under implementation
JSC "Tovary I Lekaratva" (JSC-"Halogen" - Perm)	CFC-11/12	22,500,000 Cans	1,831	89	118	Proposed 3rd tranche sub-project
JSC" Chimprom" (Volgograd)	CFC-11/12	20,000,000 Cans	5,500	796	650	2nd tranche sub-project Under implementation
JSC "Novomoscowskbytchim" (Novomosowsk)	CFC-11/12	40,000,000 Cans	4,821	0	0	Screened 2nd tranche sub-project Closed production
JSC "Bytchim" (Altaichimprom - Slavgorod)	CFC-11/12	20,000,000 Cans	4,888	0	0	Screened 2nd tranche sub-project Rejected due to financial viability
JSC "Harmonia" (Mosbytchim - Moscow)	CFC-11/12	20,000,000 Cans	4,012	747	825	2nd tranche sub-project Under implementation
JSC "Chiton" (Kazan)	CFC-11/12	40,000,000 Cans	4,000	0	0	Prior conversion to HAP
Moskhimpharmpreparaty (Moscow)	CFC-11/12	4,500,000 Cans	110	110	110	Declined participation in project
JSC "Altaivitaminy (Birsk)	CFC-11/12	5,000,000 Cans	147	38	53	Proposed 3rd tranche sub-project 60% Capacity increase - 1998
JSC "ICN Octyabr" (St Petersburg)	CFC-11/12	400,000 Cans	33	0	20	Screened 3rd tranche sub-project Closing production.
CONSUMER AND MEDICAL AEROSOL SECTOR TOTALS			33,926	3,634	3,287	

22. **Domestic Refrigeration Sector.** A major rationalization of the Russian domestic refrigeration sector has occurred over the past several years. In 1993, twelve manufacturers were reported to produce 3,500,000 domestic refrigeration units/year. The sector's overall nominal capacity was approximately 4 million units/year with an estimated ODS consumption potential of 3,780 MT. Four of these manufacturers also produced compressors, along with four additional stand alone compressor manufacturers. Direct ODS consumption (CFC-11, CFC-12, CFC-113) during manufacturing was estimated in 1992 to be 3,600 MT ODP[17]. In 1996, it is estimated that less than 1,187,000 units were manufactured and 834,700 were made by a single manufacturer (JSC "Stinol"). Estimated direct ODS consumption in 1996 had fallen to 664 MT, of which 60% was by JSC "Stinol". and 1998 estimates indicate that total sectoral consumption had dropped to 457 MT ODP, 286 MT of which were at JSC "Stinol". While consumption has declined, largely as a result of increasing use of non-ODS substitutes and transitional substances as well as effective closure of a number of producers, a modest increase in production and consumption over 1997 has occurred in some of the traditional manufacturers formally operating at very low capacity. This is attributable to increased import costs and limitations on barter transactions with traditional suppliers in Belarus and Ukraine. Based on sector screening undertaken during third tranche preparation, only one remaining enterprise (JSC "Iceberg") in this sector appears to be potentially viable and interested in participation in the project. Stinol intends to utilize HCFC-134a and HCFC-141b in its modern facility, rather than lower cost CFC-12 and CFC-11, once ODS production closure occurs in 2000. The others that are or might be continuing in production have stated an intention to convert to transitional substances, mainly HCFC-141b and a locally manufactured drop-in refrigerant blend. On this basis, the residual requirements, principally for CFC-12 after 2000 are estimated to be 20 MT or less. Table 6.2 provides a summary of the enterprises identified in the sector and their current status. In summary, it can be concluded that effective phase-out in this sector is achievable after 2000.

23. **Commercial Refrigeration Sector.** In 1993, the Russian commercial refrigeration sector consisted of twelve producers of refrigeration equipment and compressors, although a substantial portion of the latter were imported from Ukraine. However, almost half of the actual refrigeration equipment production volume was concentrated in a single enterprise (ANPO "Marikholodmash"). Estimated consumption in 1993 was 346 MT ODP, including HCFC-22. In 1996, the structure of the sector remains essentially the same but production has fallen and a substantial amount of conversion to HCFC-141b and additional conversion to HCFC-22 has occurred. Import of CFC-12 based compressors from Ukraine has largely been discontinued and use of imported compressors based on HFC-134a and HCFC-22 from Western Europe has increased. Reliable estimates of current consumption are not available except for CFC-12 which was 151 MT ODP in 1996. 1998 consumption declined to 138 MT ODP. With the conversion of the dominant producer in the sector (APNO

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[17] *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

TABLE 6.2

ENTERPRISE AND ODS CONSUMPTION STATUS
DOMESTIC REGRIGERATION SECTOR

ENTERPRISE	SUBSTANCES	ANNUAL CAPACITY		CONSUMPTION ODP MT		STATUS
		UNITS	ODP MT	1997	1998	
JSC "KRP Birusa" (Krasnoyarsk)	CFC -11/12 CFC -113	750,000 Units	630	110	61	Screened 1st, 2nd, 3rd tranche Rejected due to financial viability Conversion to HCFC's planned
JSC "SEPO -Temp)" (Saratov)	CFC -11/12 CFC -113	650,000 Units	330	11	8	Effectively stopped production Conversion to HCFC's planned
JSC "Stinol" (Lipetsk)	CFC -11/12	1,000,000 Units	570	423	286	Converted capacity but continues CFC-11/12 use until unavailable
JSC "Ormez" (Orenburg - Orsk)	CFC -11/12 CFC -113	500.000 Units	512	41	35	Conversion to HCFC's planned
JSC "Polus" (Zlatoust)	CFC -11/12	380,000 Units	503	33	2	Effectively stopped production Conversion to HCFC's planned
JSC "Pozis" (Zelendolsk - Zavod)	CFC -11/12	400,000 Units	530	2	7	Effectively stopped production Conversion to HCFC's planned
JSC "Iceberg" (Smolensk)	CFC -11/12	250,000 Units	50	8	10	Proposed 3rd tranche sub-project
JSC "Jurjuzan Mechanical Plant " (Jurjuzan)	CFC -11/12	310,000 Units	210	11	29	Low capacity utilization Conversion to HCFC's planned
AMO "ZIL" (Moscow)	CFC -11/12 CFC -113	300,000 Units	60	8	14	Converted to HCFC's
JSC "Mourom Machine Plant " (Mourom)	CFC -11/12	220,000 Units	200	9	5	Low capacity utilization
JSC "Ussuriysk Machine Building Plant", (Ussuriysk)	CFC -11/12	140,000 Units	n.a	0	0	Stopped production
JSC "Leninetz" (St. Petersburg)	CFC -11/12	n.a	n.a	0	0	Stopped production
JSC "Astzakhan Refrigeration Plant" (Astzakhan)	CFC-12	600,000 Comp. Units	186	0	0	Converted to transition substances Evaluated in 3rd tranche Not viable
JSC "Tula Armory Plant" (Tula)	CFC-12	500,000 Comp. Units	n.a.	0	0	Stopped production
JSC "Omsk Compressor Plant " (Omsk)	CFC-12 CFC-113	600,000 Comp. Units	n.a	0	0	Stopped production
Kirov Plant "Avaitech" (Kirov)	CFC-12 CFC-113	800,000 Comp. Units	n.a	0	0	Stopped production
DOMESTIC REFRIGERATION SECTOR TOTALS			3,781	*656*	*457*	

"Marikholodmash") scheduled for completion in 1999, and the inclusion of two remaining consumers in the proposed third tranche, a. potential residual usage in the sector after 2000 is estimated to be 15 MT.ODP. This will principally be CFC-12 used by small assembly operations that could be converted with relatively small investment. Table 6.3 provides a summary of the enterprises identified in the sector and their current status

24. **Industrial Refrigeration Sector.** In 1993, six manufacturers of industrial refrigeration machinery, including compressors were identified and a consumption level of 335 MT ODP (CFC-12 and HCFC-22) was attributed to the sector. Since that time, the sector appears to have largely disappeared, something that would be consistent with the decline in orders for industrial equipment. Screening studies undertaken during third tranche preparation indicated that only one operational enterprise remained in the sector (JSC "Kazan Compressor Plant") who did not express interest in participation. Current consumption in the sector is estimated to be 25 MT ODP of CFC-12 and this could potentially continue after 2000.. Table 6.3 provides a summary of the enterprises identified in the sector and their current status.

25. **Refrigeration Servicing Sector.** Despite the dramatic decline in new production of new Russian refrigeration equipment, a substantial residual requirement for servicing existing equipment in the domestic, commercial and industrial sectors will remain, particularly as the useful life of older equipment is extended for economic reasons. In 1992, the overall consumption of CFC-12 in the servicing sector was estimated at 8,300 MT ODP, split between domestic (700 MT), commercial (4,500 MT), industrial (2,550 MT), and building air conditioning applications (650 MT)[18]. While, no current estimate of annual consumption is available, it is apparent that, even assuming a progressive reduction in demand as equipment is replaced with imports or non-ODS domestic units, drop-in refrigerants are introduced, and developing recycling capacity, the servicing sector represents the largest residual area of ODS demand in the country, particularly in the commercial and industrial sectors. On this basis, a very approximate estimate of usage in 1998 is 3,000 MT ODP, declining to 2,000 MT after 2000. While lower, this is not inconsistent with the average annual requirement of 2,500 MT assumed in the draft Country Program[19] for purposes of estimating banking requirements. The proposed third tranche contains three sub-projects that will serve to introduce recycling and commercial compressor conversion capacity into some of the few remaining viable regional servicing organizations. It is estimated that this will phase-out 213 MT ODP of CFC-12. A further

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18 *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

19 *Phase-out of Production and Consumption of ODS in the Russian Federation in 1998-2000*, Draft Federal Program, December 1998

TABLE 6.3

ENTERPRISE AND ODS CONSUMPTION STATUS COMMERCIAL AND INDUSTRIAL REFRIGERATION SECTORS

ENTERPRISE	SUBSTANCES	ANNUAL CAPACITY		CONSUMPTION ODP MT		STATUS
		UNITS	ODP MT	1997	1998	
ANOP "Marikholodmash (Yoshkar-Ola)	CFC –11/12	100,000 Units	107	21	15	2nd tranche sub-project Under implementation
JSC "Iskra" (Moscow)	CFC –11/12	2.500 Units	60	12	12	Proposed 3rd tranche sub-project
JSC "Kholodmash" (Yaroslavl)	CFC –12 CFC-113	184,000 Units	600	96	35	Proposed 3rd tranche sub-project
JSC "Torgmash" (Ekaterinburg)	CFC –11/12	40,000 Units	80	16	15	Screened 3rd tranche Potential small grant opportunity
JV "Sovitalprodmash" (Volzhsk)	CFC –12 CFC-113	355 Units	200	n.a	0	Screened in 3rd tranche Not viable
JSC "Volgograd Tractor Works" (Volgograd)	CFC-12	n.a	n.a	n.a	0	Stopped production
JSC "Refrigeration Equipment Plant" (Orenburg)	CFC-12	n.a	n.a	n.a	0	Stopped production
JSC "Torgmash" (Lubertzy)	CFC-12	n.a	n.a	n.a	0	Stopped production
RPS "Initziativa" (Aleksandrov)	CFC-12	n.a	n.a	n.a	0	Stopped production
JV "Interholod" (Moscow)	CFC-12	n.a	n.a	n.a	0	Stopped production
JSC "Sneg" (Moscow)	CFC-12	n.a	n.a	n.a	0	Stopped production
JSC "Edelveys" (St. Petersburg)	CFC-12	n.a	n.a	n.a	0	Stopped production
COMMERCIAL REFRIGERATION SECTOR TOTALS			1,047	145	77	
JSC "Kazan Compressor Plant" (Kazan)	CFC –12 CFC-113	90 Units	250	22	25	Screened in 3rd tranche No sub-project pursued
JSC "Kholodmash" (Kasimov)	CFC –12 CFC-113	n.a	n.a	n.a	Negligible	Screened in 3rd tranche Not viable
ChZM (Cherkessk)	CFC –12 CFC-113	n.a	n.a	n.a	Negligible	Screened in 3rd tranche Not viable
JSC "Compressor" (Moscow)	CFC –12 CFC-113	n.a	n.a	n.a	Negligible	Screened in 3rd tranche Not viable
JSC "Mashzavod" (Chita)	CFC –12 CFC-113	n.a	n.a	2	Negligible	Screened in 3rd tranche Not viable
JSC "Penzacompressormash" (Penza)	CFC –12 CFC-113	n.a	n.a	n.a	Negligible	Screened in 3rd tranche Not viable
INDUSTRIAL REFRIGERATION SECTOR TOTALS			250	24	25	

TABLE 6.4

ENTERPRISE AND ODS CONSUMPTIONS STATUS
REFRIGERATION SERVICING AND NON-INSULATING FOAM SECTORS

ENTERPRISE	SUBSTANCES	ANNUAL CAPACITY		CONSUMPTION ODP MT		STATUS
		UNITS	ODP MT	1997	1998	
JSC "Torgtekhnika" (Ekaterinburg)	CFC-12	14,400 Comp. Repairs	200	100	n.a	Proposed 3rd tranche sub-project
JSC "Kemerovotorgtekhnika" (Kemerovo)	CFC-12	5,800 Comp. Repairs	213	71	80	Proposed 3rd tranche sub-project
JSC "Pyatigorsktortekhnika" (Pyatigorsk)	CFC-12	4,200 Comp. Repairs	200	42	44	Proposed 3rd tranche sub-project
JSC "Centre for Refrig. Serv." (St. Petersburg)	CFC-12	12,000 Comp. Repairs	324	243	243	Danish bi-lateral phaseout Under implementation.
JSC "Stinol" (Lipetsk)	CFC-12	n.a	n.a	n.a	n.a	Screened in 3rd tranche Enterprise withdrew sub-project.
JSC "Samartorgtechika" (Samara)	CFC-12	6,700	19	n.a	8	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Saratovtorg" (Saratov)	CFC-12	2,000	13	12	11	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Tvertorgtechnika" (Tver)	CFC-12 CFC-113	3,000	8	8	8	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Cheliybtorgtechnika" (Cheliabinsk)	CFC-12	5,000	18	17	18	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Astrachantorgtechnika" (Astrachan)	CFC-12	1,000	3	6	7	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Briansktorgtechnika" (Briansk)	CFC-12	500	2	10	8	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Torgprodtechnika" (Orel)	CFC-12	300	1	7	7	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Permtorgtechnika" (Perm)	CFC-12	500	2	30	29	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Yartirgtechnika"	CFC-12	4,000	12	12	10	Identified in 3rd tranche Potential Small Grant Fund Client
JSC "Orenburgtorgtortechnika" (Orenburg)	CFC-12	5,000	15	6	8	Identified in 3rd tranche Potential Small Grant Fund Client
REFRIGERATION SERVICING SECTOR TOTALS			1,030	564	481	
JSC "Plastik" (Syzran)	CFC-11	2,500,000 Pieces	200	173	141	Proposed as 3rd tranche sub-project
JSC "Stroidetal" (Moscow)	CFC-12	1,000 MT PPU	260	41	39	Proposed as 3rd tranche sub-project
JSC "Nelidovo Plastic Plant) (Nelidovo)	CFC12	500 MT PPU	155	67	26	Proposed as 3rd tranche sub-project
JSC "GAZ"	CFC-11	130,000	39	36	0	Screened as 3rd tranche sub-project
(Nizhni Novogorod)	CFC-113	Cars	40	35	0	Discontinued production
JSC "Moskvich" (Moscow)	CFC-11	110,000 Cars	55	11	12	Screened as 3rd tranche sub-project Low Consumption, Not Viable
JSC "Egron" Voroshilova)	CFC-11	1,000 MT PPU	110	3	3	Screened as 3rd tranche sub-project Low Consumption, Not Viable
NON-INSULATING FOAM SECTOR TOTALS			859	366	221	

243 MT ODP is being phased out in a similar project funded by the Danish Government in the St. Petersburg region. However, the remaining residual consumption is associated with a large number of small service operations typically consuming around 10 to 20 MT/year of CFC-12 and each requiring relatively modest investment to introduce phase-out measures. This remains the highest priority area for a residual ODS management program beyond 2000, both because of the high potential phase-out impact, but also because of the social implications of not having recovered material to sustain existing infrastructure when new ODS production stops. Table 6.4 provides a summary of the enterprises identified in this sector and their current status.

26. **Non-Insulating Foam Sector.** CFC-11 and CFC-11/CFC-12 mixtures have traditionally been used to blow: i) flexible foams for bedding, carpet underlay and shoe soles; ii) integral polyurethane foams for automotive components; and iii) rigid polyethylene foams for construction materials. In 1992, ODS consumption in the sector was estimated at 4,300 MT ODP. However, the introduction of CO_2 blowing techniques, along with the general economic slow down, had reduced this to an estimated 830 MT ODP in 1995[20]. Initial identification work for the project identified six consuming enterprises accounting for 600 MT ODP of this 1995 consumption. Data from major enterprises in the sector indicated a consumption level of 500 MT ODP in 1996 and 221 MT ODP in 1998. All three major current consumers are included in the proposed third tranche and assuming a modest allowance for small consumers not identified, it is forecast that a residual ODS requirement after 2000 may be approximately 50 MT ODP. Table 6.4 provides a summary of the enterprises identified in this sector and their current status.

27. **Solvent Sector.** ODS solvents, specifically CFC-113, carbon tetrachloride (CTC) and methyl chloroform (MCF), have traditionally been used in Russia for electronic components and metal parts cleaning. Some dry cleaning solvent applications have also

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20 *Russia ODS Phase-Out Projects for the Solvent, Halons and Non-Insulating Foams Sector*, ICF Incorporated, January 1997.

21 *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

22 *Russia ODS Phase-Out Projects for the Solvent, Halons and Non-Insulating Foams Sector, ICF Incorporated*, January 1997.

TABLE 6.5

ENTERPRISE AND ODS CONSUMPTION STATUS
SOLVENT AND FIRE PROTECTION SECTORS

ENTERPRISE	SUBSTANCES	ANNUAL CAPACITY		CONSUMPTION ODP MT		STATUS
		UNITS	ODP MT	1997	1998	
NPO "Energomash" Parts cleaning (Moscow)	CFC-113	n.a	80	63	70	Screened in 3rd tranche Enterprise seeking essential use exemption.
BFT "Diana" Dry Cleaning	CFC-113	n.a	80	14	80	Screened in 3rd tranche New user, not eligible
JSC "Schnechogorsk Electro-Mech. Plant" (Schnechogorsk)	CFC-113 Methy Chloro.	n.a	n.a	n.a	n.a	Screened in 3rd tranche Not Viable
Design Bureau "Salut"	CFC-113	n.a	n.a	24	25	Proposed in 3rd tranche
"Krasnaya Zarya" (St. Petersburg)	CFC-113	n.a	n.a	n.a	n.a	Screened in 3rd tranche Not Viable
JSC "Astrakhan Refrigeration Plant" (Astrakhan)	CFC-113	n.a	263	53	53	Screened in 3rd tranche Not Viable
SICA&I	CFC-113 Methy Chloro.	n.a	n.a	n.a	n.a	Screened in 3rd tranche Not Viable, Ineligible technology
SE "Krasnoyarsk Engineering" (Krasnoyarsk)	CFC-113	n.a	50	25	15	Screened in 3rd tranche Not Viable, Ineligible technology
JSC "Optimap" (Moscow)	CFC-113	4,400,000 Units	41	6	6	Screened in 3rd tranche Not Viable
JSC "Miass Machine Building	CFC-113	n.a	10	3	3	Proposed in 3rd tranche
SOLVENT SECTOR TOTALS			524	188	252	
"Spetsavvtomatika" (St. Petersburg)	Halon 2402	300 Systems	n.a	n.a	n.a	Screened 3rd tranche sub-project Not Viable
"Prozhtehknika"	Halon 2402 Halon 1211 Halon 1301	35,000 Portable Ext.	n.a	n.a	n.a	Screened 3rd tranche sub-project Not Viable
"Vniitransmash" (St. Petersburg)	Halon 2401 Halon 1301	n.a	n.a	n.a	n.a	Screened 3rd tranche sub-project Ineligible sub-project
I.T. "Spetsavtomatika" (Moscow)	Halon 2401 Halon 1301	n.a	n.a	n.a	n.a	Screened 3rd tranche sub-project Ineligible sub-project
"Aspekt" (St. Petersburg)	Halon 2401 Halon 1301	n.a	n.a	n.a	n.a	Screened 3rd tranche sub-project Ineligible sub-project
"Mosspezavtomatika" (Moscow)	Halon 2401	n.a	n.a	n.a	n.a	Screened 3rd tranche sub-project No Sub-project submitted
State Museum "Hermitage" (St.Petersburg)	Halon 1211 Halon 1301	n.a	n.a	n.a	n.a	Screened 3rd tranche sub-project Rejected as ineligible by OORG
JSC "Respirator" (Orekhovo-Zuevo)	Halon 2402	4,000 Systems	600	n.a	n.a	Screened 3rd tranche sub-project Not Viable
FIRE PROTECTION SECTOR TOTALS			600	n.a	n.a	

recently been identified. The Country Program preparation documents[23] estimated overall solvent consumption to be 5,035 MT ODP in 1992. In 1995, sector consumption[24] was estimated at 3,980 MT ODP (CFC-113 - 1,200 MT ODS, CTC - 2,500 MT ODS, MCF - 300 MT ODS). However, actual solvent production in 1996 based on regulatory reporting was 1,640 MT ODP (CFC-113 - 1,120 MT ODS, CTC - 676 MT ODS) which likely better reflects actual demand and its continued decline. Using production volumes as a basis for predicting demand, this would have been 458 MT in 1998. In particular, activity in the electronics sector has been low with the collapse of major military markets and the largest traditional CFC-113 consumption applications appears to be in the manufacture of refrigeration compressors which, as noted above, is at a very low level. As a consequence, identification of specific users has been limited (Table 6.5). This Project has only identified ten traditional users outside of the refrigeration sector with a current consumption of approximately 260 MT ODP. Of these, the majority do not appear viable and involve very low consumption. One large consumer (70 MT ODP) who operates in the aerospace industry internationally has elected to seek an essential use exemption following the practice and advice of Western partners. Another large consumer (80 MT ODP) in the dry cleaning business is a new application, not eligible for project support, but which will be subject to supply constraints and regulatory action after 2000. Ultimately, only two sub-projects in this sector are being proposed for the third tranche, although it is recognized that a modest level of residual ODS use will continue to exist likely among small volume users in the manufacturing and electronics industries. On this basis, 300 MT ODP in annual residual demand after 2000 is forecast. In making this forecast, it should be noted that this is approximately half of the more liberal average annual consumption predicted in the draft Federal Program after 2000, but reasonably consistent with the banking quotas being implemented by SCEP. In summary, residual ODS usage in this sector will continue to exists, likely in strategic military applications and in small electronics and metal cleaning applications. As such, this sector should be targeted in a residual ODS management program and may provide potential beneficiaries for a small grant program.

28. **Fire Protection Sector.** Halon is widely used in both portable and stationary fire protection systems in Russia. Halon 2402 accounts for approximately 90% of usage, being used exclusively in domestically manufactured systems. The remaining halons in service are Halon 1211 and Halon 1301 which are characteristically contained in imported systems. The Country Program preparation documentation[25] indicated that new 1992 consumption was 900 MT ODS (5,450 MT ODP) made up of Halon 1211 (50 MT ODS), Halon 1301 (50 MT ODS), Halon 2402 (800 MT ODS). Of this, 740 MT ODS was used for new equipment and 160 MT ODS was used for servicing existing installations. The major applications were naval (22%), aviation and space (21%), pipelines (20%), and civilian

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23 *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

24 *Russia ODS Phase-Out Projects for the Solvent, Halons and Non-Insulating Foams Sector, ICF Incorporated*, January 1997.

25 *Phase-out of Ozone Depleting Substances in Russia*, COWI, August 1994

marine and land transport (17%). Subsequent project identification studies[26] indicated that consumption had fallen to 400 MT ODS in 1995. It was also indicated that the total stock of halons in the country was between 12,000 and 15,000 MT ODS. Regulatory data on Halon 2402 production indicated that only 152 MT ODS was produced in 1996 and fell to 80 MT ODS in 1998 which likely best reflects demand for new material. Sub-project identification work for the third tranche has identified a number of enterprise specific potential phase-out opportunities covering new consumption applications and system conversions (Table 6.5). However, detailed screening of these indicated that most involved ineligible investments to develop new technology for large scale systems and/or were not viable due to low production activity. For the third tranche, only one sub-project was proposed in the sector which involves a demonstration conversion of a fire protection system in a museum (State Museum "Hermitage"). However, this was rejected on eligibility grounds by the OORG reviewer. According to the draft Federal Program, the country's requirements after the 2000 will be met by a banking system, based on existing service infrastructure and utilization of material recovered from stocks in unused systems. Given the low levels of new Halon 2402 production and the minimal consumption requirements for newly manufactured domestic fire protection equipment, it is likely that such stocks are currently satisfying a significant part of present demand and, if developed as a more formalized banking system, could replace the requirement for new material after 2000.

29. **Consumption Summary and Forecast ODS Residual Use.** Table 6.6 provides a summary of estimated domestic consumption for 1992/1993, 1996 and 1998 with a projection for 2000 and 2001.. Overall consumption has declined from 40,666 MT ODS in the 1992/93 period to 7,165 MT ODS in 1998. This is substantially less than the 1998 consumption of 12,070 MT ODS conservatively forecast in the second tranche Project Document[27], indicating more rapid phase-out than anticipated. The total consumption forecast for 2000 is 4,570 MT ODS and the forecasted residual demand in 2001 declines to 2,520 MT ODS.. The highest residual consumption that is likely sustainable is for CFC-12 in the refrigeration servicing sector which accounts for approximately 80% of the residual requirement.

30. **ODS Production Sector.** Russia has historically been one of the world's largest producers of ODS materials. Within seven producing facilities including research facilities, a production capacity of 143,200 MT ODS theoretically exists which accounts for 47% of the nominal capacity outside compliant Article 2 countries. Actual production, excluding CTC feedstocks, peaked in 1990 at 118,000 MT ODS but was reduced to 66,515 MT ODS in 1992. Since that time, production has continued to decline as illustrated in Table 6.7 which is based on data collected by SCEP and reported to the MP Secretariat for the years

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26 *Russia ODS Phase-Out Projects for the Solvent, Halons and Non-Insulating Foams Sector*, ICF Incorporated, January 1997.

27 *Global Environment Facility, Russian Federation Ozone Depleting Substances Phase-Out Project, Project Document: Second Tranche*, The World Bank, Report No. 17391-RU, February 1998

1995 through 1997 and, for 1998, on unofficial data reported directly by producing, enterprises as part of Special Initiative preparation work. From 1995 to 1998, overall production declined from 44,865 MT ODS to 12,464 MT ODS, inclusive of permitted exports. Production for domestic use in 1998 is estimated at 10,383 MT which is somewhat higher than estimated domestic consumption of 7,070 MT ODS (Table 6.6). Permitted exports were 3,954 MT ODS in 1997 and 1,038 MT ODS in 1998. Of this, 1,660 MT ODS (1997) and 704 MT ODS (1998) were exported to other CIS countries, principally Belarus and Ukraine. The remainder was exported directly to Article 5 countries or were transit cargoes to OECD countries supported by documentation from the importing countries relating to their re-export to Article 5 countries.

TABLE 6.6

SUMMARY OF ACTUAL AND FORECAST ODS CONSUMPTION BY SECTOR

SECTOR	ODS MATERIAL	ODS CONSUMPTION/DEMAND (MT)				
		1992/93	1996 (Note 1)	1998 (Note1)	2000 (FORECAST)	2001 (FORECAST)
Aerosol	CFC 11/12	17,850	7,830	2,685	1,163	110
Domestic Refrigeration	CFC-11, CFC-12, CFC-113, HCFC-22 HCFC-141b	3,600	664	553	127	20 Note 5
Commercial Refrigeration	CFC-11, CFC-12, CFC-113, HCFC-22 HCFC-141b	346	163	77	45	15
Industrial Refrigeration	CFC-11, CFC-12, CFC-113, HCFC-22 HCFC-141b	335	50	25	25	25
Refrigeration Servicing	CFC-12, HCFC-22	8,300	4,150 Note 2	3,000 Note 8	2,500 Note 6	2,000 Note 6
Non-Insulating Foam	CFC-11, CFC-12	4,300	500	270 Note 7	270 Note 7	50
Solvents	CFC-113, TCA, MCF	5,035	1,676 Note 3	475 Note 8	360 Note 9	300 Note 9
Fire Protection (Halons)	Halon 2402, Halon 1301, Halon 1211	900	170 Note 4	80 Note 8	80	0 Note 10
TOTALS		40,666	15,203	7,165	4,570	2,520

NOTES:

1. Unless otherwise qualified, based on enterprise specific consumption data provided to ICP " Ozone"..
2. Assumes 50% of 1992 demand
3. Based on 1996 production less 120 MT ODS used in refrigeration sector.
4. Based on 1996 production data
5. Assumes conversion of residual consumers to HCFC's
6. Assumes progressive reduction in new demand as recycling is implemented, Equipment is retired and transitional drop-ins are introduced.
7. Includes a 50MT allowance for unidentified residual consumers.
8. Based on 1998 production
9. Based on consumption known from major consumers plus 100 MT allowance for unidentified consumers.
10. Halon Banking assumed to replace new requirements.

31. The phase-out of ODS production is being pursued both through the regulatory system within Russia and international assistance. Beginning in 1996, SCEP has established a system of annual quotas that set annual production limits for each producer which decline such that total phase-out will occur in the year 2000, consistent with the Country Program commitment. Table 6.7 provides the quota established by enterprise for 1996 through 1999 along with actual production for 1995 through 1998. It will be noted that an additional quota has been added in 1999 specifically to allow major producers of CFC-11, CFC-12 and CFC-113 to bank material as a reserve for sale on a commercial, but regulated, basis after the committed closure of all production facilities in 2000. As discussed in more detail in Section VII, the planning of this is proceeding as part of the Special Initiative preparation work.

32. In 1996, total world ODS production based on MP Secretariat data[29] was approximately 160,000 MT. 68% of this was produced in Article 5 countries. Estimates for 1998 suggest that overall production has declined to 115,000 MT with 78% produced in Article 5 countries. Despite the significant decline in Russia's ODS production, its portion of overall global production has been generally maintained since 1990, being approximately 11% in 1998 Following the major drop in production in OECD countries after 1996[30], Russia is the major producer among Article 2 countries, accounting for an estimated 49% of residual production in such countries and assuming the majority of residual production is directed to exports to Article 5 counties and permitted under the MP, Russia is also a major exporter among Article 2 countries. However, the country has committed to completely close down production facilities in 2000 and, as has been done by some other Article 2 countries, to give up its rights to continue production for export to Article 5 countries at that time. Russia also continues production of CTC for feedstock and of transitional substances, specifically HCFC-22 and HCFC-142b. The former is particularly important in eliminating near-term CFC-12 requirements in the domestic refrigeration sector. Table 6.8 provides a summary of production and exports of these substances since 1994. In the case of transitional substances, production is well within the limits permitted under the Copenhagen Amendment of the MP, and while not bound by this amendment, Russia has undertaken to adhere to these limits as part of its Special Initiative commitment.

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29 *Production and Consumption of Ozone Depleting Substances: 1986 - 1996*, UNEP Ozone Secretariat, November 1998.

30 Private Communication, Michael Harris, Ozone Operations Resource Group, World Bank, February 1998.

TABLE 6.7

ACTUAL PRODUCTION (1995-1998) AND PRODUCTION QUOTAS (1996-1999) BY PRODUCING ENTERPRISE

ODS MATERIAL	PRODUCING ENTERPRISE	1995 ODS PRODUCTION (MT)	1996 ODS QUOTAS (MT)	1996 ODS PRODUCTION (MT)	1997 ODS QUOTAS (MT)	1997 ODS PRODUCTION (MT)	1998 ODS QUOTAS (MT)	1998 ODS PRODUCTION (MT) Note 7	1999 ODS QUOTAS (MT)	
									DOMESTIC CONSUMPTION	RESIDUAL DEMAND BANKING
CFC-11/12	JSC "Halogen"		16,000		7,000		3,500	3,070	1,900	3,000
	JSC "Kaustik"		8,000		4,000		3,000	2,870	1,900	3,000
	JSC "Chimprom"		9,000		5,000		3,100	5,974	1,900	3,000
	JSC "Altaichimprom"		2,000		1,000		300	0	100	0
	Sub-Total	37,256	35,000	15,862	17,000	14,286	9,900	11,914	5,800	9,000
CFC-113	JSC "Chimprom"		3,125		1,000		500	150	300	700
	JSC "Kirovo-Chepetsk"		2,500		1,000		500	308	300	700
	Sub-Total	2,568	5,625	1,120	2,000	658	1,000	458	600	1,400
CFC-115	RSC "Applied Chemistry"	20	0	20	82	0	75	0	0	0
Halon 2402	JSC "Galogen"		33		300		255	80	160	0
	JSC "Kirovo-Chepetsk"		25		0		0	0	0	0
	Sub-Total	181	58	152	300	162	255	80	160	0
CFC-13	JSC "Tekhnoroz"	25	120	20	90	75	30	12	18	30
CTC	JSC "Chimprom"	2,486	727	676	600	0	500	0	420	0
MCF	JSC "Chapayevsk"	2,029	12,400	0	930	0	310	0	0	0
Recycled ODS	RSC "Applied Chemistry"	300	N/A	300	N/A		N/A	0	0	0
	TOTALS	44,865	53,930 (Note 1)	18,150	21,002 (Note 2)	15,181 (Note 3)	12,070 (Note 4)	12,464 (Note 6)	6,998 (Note 5)	10,430

NOTES:

1. Excludes 6,782 MT reserved for export and emergency domestic use under special SCEP permits.
2. Excludes 14,176 MT reserved for export and emergency domestic use under special SCEP permits.
3. Includes 3,954 MT in permitted exports.
4. Excludes 15,920 MT reserved for export and emergency domestic use under special SCEP permits.
5. Excludes 8,700 MT reserved for export and emergency domestic use under special SCEP permits.
6. Includes 1,038 MT in permitted exports.
7. Estimated from unofficial enterprise information.

TABLE 6.8
PRODUCTION OF TRANSITIONAL SUBSTANCES AND CTC (1994-1997)

SUBSTANCE	YEAR	PRODUCTION MT	USED AS FEEDSTOCK MT	DOMESTIC END USE MT	IMPORTS MT	EXPORTS MT
HCFC-22	1994	14,761	11,383	3,351	0	27
	1995	16,077	12,957	1,280	23	1,840
	1996	12,528	11,200	1,115	191	213
	1997	5,476	4,082	1,378	0	16
HCFC-142B	1994	194	0	163	0	31
	1995	194	0	186	0	8
	1996	71	50	14	0	7
	1997	15	0	15	0	0
CTC	1994	38,331	35,265	0	0	3,067
	1995	31,082	28,596	0	0	2,487
	1996	17,582	16,906	482	11	194
	1997	17,784	14,798	0	0	2,986

33. In summary, the orderly closure of Russia's ODS production capacity is proceeding in a manner consistent with its international obligations and its own needs through the transitional period. Recognizing that some residual ODS usage will be required after production closure, a major emphasis in the funding proposed in the Project's proposed third tranche is support for initiatives required to manage and minimize this usage. In this regard, it is also pointed out that the exposure of other CIS countries presently dependent on Russian ODS supply needs to be addressed within the phase-out programs being undertaken in them.

VII. PROPOSED THIRD TRANCHE

34. This section summarizes the scope of the proposed third tranche, including the specific components and sub-projects put forward for grant funding. The amount of funding potentially available for the third tranche, based on actual implementation results from the previous two tranches (Sections IV and V) is US$31.3 million Consistent with the second tranche Project Document and its endorsement by the GEF CEO in January, 1998, the scope of the proposed third tranche has been expanded beyond major consumers in the aerosol and refrigeration sectors to include all consumption sectors and support for production phase-out. The original justification for the GEF's acceptance of this change in scope has been strengthened since this decision was made. As is more fully described in Section VI, phase-out of consumption continues to occur more rapidly than originally predicted. Similarly, the need to address both residual consumption and closure of production capacity on a coordinated basis has become more focused with the implementation of formal bans on ODS production, new consumption, and import and export in 2000.

35. The overall approach adopted in preparing the third tranche has been based on pursuing three strategies supportive of fulfillment of the Country Program. These are: i) developing consumption phase-out investment opportunities within viable enterprises in all consumption sectors; ii) supporting ODS production closure through the Special Initiative; and iii) identifying institutional and financial management tools for residual ODS management after 2000. The first involves the funding of thirteen consumption phase-out investment sub-projects valued at US$14.2 million, inclusive of agency fees. The second involves a US$8.5 million contribution to the Special Initiative Trust Fund, primarily directed to compensation of enterprises for ODS production closure. The third, involving proposed grant funding of US$8.6 million, is directed at a combination of technical assistance and two programs to address specific residual ODS management opportunities. These are a Small Grants Program (US$5.8 million) to be established for funding small residual ODS consumers after the year 2000 and the development of a Halon Banking Program (US$1.5 million). The funding assistance in each of these areas

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[31] *Project Document: Ukraine GEF ODS Phase-out Project*, World Bank, May, 1998

TABLE 7.1
OVERALL PROJECT SUMMARY INCLUDING PROPOSED THIRD TRANCHE

ENTERPRISE	SECTOR	PROPOSED SUB-PROJECT DESCRIPTION	APPRAISED ODP USE (MT/YR.)	INCREMENTAL INVESTMENT COST (US$)	INCREMENTAL OPERATING COST (SAVINGS) (US$)	TOTAL SUB-PROJECT COST (US$)	GEF GRANT (US$)	COST EFFECTIVE NESS (US$/KG ODP)
JSC "Arnest"	Aerosol	CFC to HAP Propellant Conversion	2,456	15,786,000	(1,894,000)	13,892,000	5,650,000	2.30
(Nevinnomysk)								
Agency Fee						169,500	169,500	
Technical Assistance	Institutional	Country Program Implementation				748,000	748,000	
		2nd Tranche Sub-Project Preparation						
		PIU Support						
FIRST TRANCHE SUB-TOTALS			2,456	15,786,000	(1,894,000)	14,809,500	6,567,500	
JSC "Sibiar" (NDCP)	Aerosol	CFC to HAP Propellant Conversion	3,971	14,213,180	(475,000)	13,738,180	8,746,000	2.20
Novosibirsk)								
JSC" Chimprom"	Aerosol	CFC to HAP Propellant Conversion	1,769	8,044,316	(221,640)	7,822,676	5,092,000	2.88
(Volgograd)								
JSC "Harmonia"	Aerosol	CFC to HAP Propellant Conversion	2,585	8,592,685	(504,881)	8,087,804	6,252,000	2.42
(Mosbytchim - Moscow)								
ANOP	Commercial	CFC-12 to HFC-134a Refrigerant Conversion	32	4,281,859	246,329	4,528,188	882,000	8.74
"Marikholodmash (Yoshkar-Ola)	Refrigeration	CFC-11 to Cyclopentane Foam Blowing Conversion						(Note 1)
Agency Fee						629,160	629,160	
Technical Assistance	Institutional	Country Program Implementation				526,000	526,000	
		2nd Tranche Sub-Project Preparation						
SECOND TRANCHE SUB-TOTALS			8,357	35,132,040	(955,192)	35,332,008	22,127,160	
JSC "Torvary I Lekaratva"	Aerosol	CFC to HAP Propellant Conversion	167	900,500	(56,968)	843,532	724,000	4.34
(Perm)								
JSC "Altaivitaminy"	Medical	CFC to HAP Propellant Conversion	53	966,900	0	966,900	631,400	11.96
(Biisk)	Aerosol							
JSC "Iceberg"	Domestic	CFC-12 to HFC-134a Refrigerant Conversion	115	690,800	491,407	1,182,207	690,800	6.03
(Smolensk)	Refrigeration	CFC-11 to HCFC-141b Foam Blowing Conversion, CFC-113 Replacement						
JSC "Iskra"	Commercial	CFC-12 to HFC-134a Refrigerant Conversion	12	360,525	164,432	524,957	293,500	15.21
(Moscow)		Refrigeration						
JSC "Kholodmash"	Commercial	CFC-12 to HFC-134a Refrigerant Conversion	183	2,480,534	(113,161)	2,367,373	2,255,000	12.32
(Yaroslavl)		Refrigeration						
Combine Torgtekhnika	Refrigeration	CFC-12 Recovery/Recycling Capacity	83	2,238,645	2,786,024	5,024,669	2,239,000	26.98
(Ekaterinburg)	Servicing	Retrofit Capability						
Pyatigorsk Torgtekhnika	Refrigeration	CFC-12 Recovery/Recycling Capacity	19	1,144,381	419,084	1,563,465	1,144,400	60.23
(Pyatigorsk)	Servicing	Retrofit Capability						
Kemerovatorgtekhnik	Refrigeration	CFC-12 Recovery/Recycling	68	1,701,543	2,322,449	4,023,992	1,704,000	25.06

a		Capacity						
(Kemerovo)	Servicing	Retrofit Capability						
JSC "Plastic"	Non-Insulating	CFC-11 Conversion to Pentane and	172	3,093,860	(896,683)	2,197,177	2,169,000	9.21
(Syzran)	Foam	CO2 Blowing of Rigid and Integral Foam						(Note 2)
JSC "Stroidetal"	Non-Insulating	CFC-12 Conversion to CO2/Butane	79	872,500	(74,645)	797,855	786,700	6.26
(Moscow)	Foam	Blowing of Extruded Polyethylene Foam						(Note 3)
JSC "Nelidovo"	Non-Insulating	CFC-12 Conversion to CO2/Butane	51	993,850	(47,953)	945,897	655,000	8.22
(Nelidovo)	Foam	Blowing of Extruded Polyethylene Foam						(Note 4)
Design Bureau "Salut" (Moscow)	Solvent	Replacement of CFC-113 with vapor degreasing systems using non-ODS Solvents	24	694,100	50,000	744,100	450,000	19.73
Miass Machine Building Plant (Zlatoust)	Solvent	Replacement of CFC-113 with non-ODS solvent for cleaning mechanical parts	3	212,300	17,250	229,550	63,000	19.73
Agency Fee						414,174	414,174	
Special Initiative Trust Fund	Production Sector	GEF Contribution to World Bank Special Initiative Providing Compensation for ODS Production Closure	N/A	N/A	N/A	N/A	8,500,000	N/A
Small Grants Program	All Sectors	Fund Allocation to Provide Small Grants to Residual Consumers after Production Closure in support of Country Program Residual ODS Management Plan	N/A	N/A	N/A	N/A	5,750,000	N/A
Halon Banking Management Program	Fire Protection	Development of a Detailed Business and Implementation Plan to Identify, Access, Regenerate and Reuse Halons to Maintain Existing Fire Protection Infrastructure	N/A	N/A	N/A	N/A	1,500,000	N/A
Technical Assistance Program	Institutional	Regulatory Framework for Residual ODS Management	N/A	N/A	N/A	N/A	150,000	N/A
		Regulatory Enforcement Capacity Upgrading	N/A	N/A	N/A	N/A	150,000	N/A
		Public Awareness/Small Grant Fund Promotion	N/A	N/A	N/A	N/A	200,000	N/A
		Residual Consumption Phase-out Sub-project Preparation Support	N/A	N/A	N/A	N/A	400,000	N/A
		Transitional Substance Phase-out Plan and Alternatives Identification	N/A	N/A	N/A	N/A	300,000	N/A
		Copenhagen Amendment Ratification Support	N/A	N/A	N/A	N/A	100,000	N/A
THIRD TRANCHE SUB-TOTALS			1029	16,350,438	5,061,236	21,825,848	31,269,974	
PROJECT TOTALS			11,842	67,268,478	2,212,044	71,967,356	59,964,634	

Note 1: Safety Costs of US$602,000 Allowed

Note 2: Safety Costs of US$581,460 Allowed

Note 3: Safety Costs of US$260,700 Allowed

Note 4: Safety Costs of US$240,100 Allowed

is described in more detail below. The total grant funding, inclusive of agency fees on investment disbursements, proposed for the third tranche is US$31.3 million including applicable agency fees. Table 7.1 summarizes the allocation of third tranche funds within the context of the overall Project. On this basis, the original allocation of US$60.0 million for the project will be utilized. The following sub-sections describe the proposed funding assistance in each of these areas.

A. CONSUMPTION PHASE-OUT SUB-PROJECTS

36. **Sub-Project Identification:** Over the course of the Project, substantial effort has been devoted to the identification of ODS consumers in all sectors. In total, the Project has screened over eighty separate enterprises that have been identified as traditional consumers of ODS (Tables 6.1 through 6.5). This includes all consumers identified during Country Program preparation, the subsequent overall preparation of the Project and first tranche, second tranche preparation, and most recently third tranche preparation. In addition, they include those identified by the Inter-Agency Commission working groups and by economic ministries, regional administrations, and industry associations in the course of public consultation and promotion of the GEF grant funding opportunity. As a basis for selecting those investment sub-project opportunities for the third tranche, ICP "Ozone" has made contact with all traditional consumers to validate their status, potential eligibility and possible interest in participation in the third tranche. This work, as reported in Section VI, has verified the accelerated decline in ODS consumption among major traditional users and served to identify the remaining major phase-out investment opportunities in viable enterprises across all sectors. This was the basis for the screening and detailed preparation work described below and ultimately the specific sub-projects proposed for third tranche funding. On this basis, it is concluded that the third tranche will substantively exhaust such opportunities for GEF funding and upon implementation can claim to have exceeded its initial objective of completing ODS consumption phase-out in the two high consumption sectors originally selected, by achieving this objective with virtually all major consumers, irrespective of sector. Having said, this it is also recognized that residual ODS usage, typically distributed among small consumers in sectors such as refrigeration servicing and solvents, will remain and transitional support to address its elimination will be required.

37. **Third Tranche Consumption Investment Sub-Project Preparation:** Based on the identification work undertaken by ICP "Ozone", potentially eligible enterprises maintaining ODS consumption were assigned for screening and detailed preparation to a number of consultants on a sectoral basis. In total, four such assignments, funded from second tranche technical assistance resources, have been completed as input into the development of the third tranche investment sub-project proposals. They covered blocks of potential sub-projects in the aerosol, refrigeration, refrigeration servicing, non-insulating foam, solvent and fire protection sectors. Each assignment utilized a two phase preparation methodology. The first stage involved the collection of sufficient financial, consumption and technical information to screen the enterprise as potentially viable, committed to participation, and having a sub-project with enough technical substance to

warrant detailed preparation effort. Based on the screening report covering the block of assigned potential sub-projects, ICP "Ozone", in consultation with the World Bank, selected those that would move to detailed preparation. The second stage involved undertaking a detailed financial viability assessment of the enterprise, inclusive of its history, business scope, markets, production levels and trends and financial performance. The consumption of ODS and proposed phase-out options were also evaluated and the proposed sub-projects documented consistent with MPMF standards related to format, information requirements and incremental cost eligibility. The formal sub-project documents produced were then submitted for OORG[32] review and finalization.

38. **Proposed Consumption Phase-Out Investment Sub-Projects:** In total, sixty three potential investment sub-projects underwent the above initial screening process. Of these, fifteen were selected for detailed preparation. Thirteen have received OORG clearance and have been evaluated as being financially viable, subject to verification at appraisal. A further twelve were identified as potential candidates for consideration by the Small Grants Program proposed as part of the third tranche. Of the thirteen sub-projects being formally proposed for grant funding in the third tranche, all are being proposed by enterprises or organizations that are 100% Russian owned, all but two have primarily private ownership, and none export more than 10% of their products. The actual sub-projects include two sub-projects in the aerosol sector, one sub-project in the domestic refrigeration sector, two sub-projects in the commercial refrigeration sector, three sub-projects in the refrigeration servicing sector, three sub-projects in the non-insulating foam sector, and two sub-projects in the solvent sector. All are proposed for grant funding conditional on being positively appraised, jointly by SCEP and the World Bank, using the same procedures undertaken and documented for the first and second tranche. Total proposed grant funding for consumption investment sub-projects is US$13.8 million (excluding agency fees).

39. In proposing these sub-projects, several general issues are noted that represent general qualifications respecting the final assessment of financial viability of the beneficiary enterprises and eligibility for the grant levels proposed. These are discussed as follows:

a) Application of Taxes: All sub-project costs are presented net of taxes, specifically VAT and import duties. Russia, unlike other GEF beneficiary countries in the Former Soviet Union, has not provided an exemption of these levies on GEF grant funded purchases. As these expenses are ineligible incremental costs, the appraisal of the sub-projects on previous tranches and the final evaluation of enterprise viability has included these as enterprise contribution, something that has proved to be a major factor in viability and final funding decisions. Recently, an administrative procedure has been

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[32] The Ozone Operations Resource Group (OORG) is an internationally recognized group of sector experts which undertakes technical reviews of all GEF and Montreal Protocol Multilateral Fund (MPMF) ODS phase-out projects implemented by the World Bank.

established that considers application for the refund of these taxes on a contract by contract basis upon application to the Inter-Agency Commission on Cooperation with International Financial Economic Organizations. This mechanism has allowed rebates on the first tranche sub-project. SCEP is continuing to seek a more general exemption procedure. It is anticipated that this will become a major issue in the appraisal of a number of the proposed sub-projects given the generally low liquidity of the Russian industrial sector. In the absence of a change in the current practices, the World Bank's appraisal of these sub-projects will likely be forced, in many cases, to condition sub-grant effectiveness with demonstrating that sufficient cash is secured and dedicated for at least import duty payments in order to ensure that equipment is delivered and the sub-project's implementation is sustainable.

b) ODS Bank Access: The majority of sub-projects proposed for the third tranche will not be fully implemented until after the projected closure of ODS production in the second half of 2000 under the Special Initiative. As a consequence, they will have to make provision to either bank material themselves or demonstrate the capacity and resources to access the material banked for commercial sale by major suppliers under the current quota system. At appraisal, the World Bank will assess these needs based on the final sub-project implementation schedules and, where applicable, require Sub-Grant agreement conditionality on effectiveness that demonstrates sufficient, but not excessive, supplies to sustain the present operation until phase-out. The resources required for this will be included as enterprise contribution in evaluating financial viability.

c) Safety Costs: The three sub-projects proposed in the non-insulating foam sector involve the conversion, at least in part, to flammable hydrocarbons as a blowing agent. This requires a significant increase in incremental investment costs to provide adequate safety provisions. In similar applications associated with domestic refrigeration, these costs may be included in the sub-grant cost effectiveness calculation with the consequence that a higher sub-grant may be allowable within the MPMF threshold cost effectiveness. In proposing, these three sub-projects the enterprises and preparation consultants have applied the same calculation and this has not been challenged by the OORG reviewer who has also made the clearance conditional on a safety audit. In proposing, these sub-projects on this basis, this exception to MPMF practice is noted and direction from the GEF on this point is requested. In the absence of this, it is anticipated that some of the enterprises involved would have difficulty accepting the sub-projects and the opportunity to completely phase-out a significant residual source of ODS consumption sector would be at risk.

d) Grant Cost Effectiveness: Where a MPMF cost effectiveness threshold has been established, this has generally been used as the maximum limit in grant funding. However, the proposed sub-project in the medical aerosol sector

exceeds the MPMF aerosol cost effectiveness threshold. This exception is being support based on the unique application and a technical justification supporting the need for higher thresholds in these particular applications. This has been explicitly support by the OORG reviewer. Given the past adherence of the GEF to threshold limits, these situations are noted and direction as appropriate is requested.

40. The following provides a summary description of each sub-project with some commentary on the context in which they are proposed and the appraisal issues that will likely have to be addressed. Technical Annex A provides formal sub-project cover sheets and summaries of applicable to each.

41. **JSC "Tovary I Lekarstva"** is a manufacturer of consumer aerosol products located in Perm. It was originally part of JSC "Halogen", a large basic chemical combine which is also one of the major ODS producers involved in the Special Initiative. JSC "Halogen" still retain a 70% ownership position in JSC "Torvary I Lekaratva". The enterprise has a production capacity of 20,000,000 cans per year with production peaking at approximately 15,000,000 cans per year in the early 1990's. Current production is much less, in the range of 1,000,000 cans per year, although recent trends show an improvement in sales and increase in ODS consumption. Based on an average of the last three years, annual consumption was 167 MT. In proposing this sub-project, the enterprise has recognized current market reality and is proposing conversion of substantially less capacity than historically utilized and will remove all excess capacity currently capable of using CFC's. The proposed sub-project involves the conversion from the use of CFC11/12 mixtures to HAP, the accepted technology option almost universally adopted in such conversions. The investment involves the replacement of two filling lines with a single double table line, upgrading of an existing relatively modern filling line for HAP, development of a small HAP tank farm, molecular sieves, road transport equipment for HAP supply, fire protection systems and technical assistance including engineering, procurement support and a safety audit. The total sub-project cost is US$ 843,531 net of operating cost savings and applicable taxes. The proposed sub-grant is US$724,000 and the cost effectiveness is $4.34/kg. ODP which is within the MPMF threshold of $4.40/kg. ODP. The sub-project implementation schedule calls for phase-out in early 2001.

42. The significance of this sub-project is that it is the last operational consumer aerosol producer in Russia, not yet committed to conversion. Its implementation will also remove a captive market for a major ODS producer, something that supports the closure of production facilities under the Special Initiative. The major issues anticipated to be addressed at appraisal and in Sub-Grant Agreement conditionality are: i) verification of the financial viability of the enterprise which, while improving, is marginal; and ii) the need to backstop CFC supply requirements for approximately six months after closure of production facilities in order that it can continue operation. With respect to both issues, the majority shareholder (JSC "Halogen") will likely have to demonstrate corporate commitment and financial capacity to sustain the aerosol

enterprise during sub-project implementation through the provision of CFC supplies from its banking quota and financing of its contribution requirements.

43. **JSC "Altaivitaminy"** is a pharmaceutical manufacturer located in Biirsk, Western Siberia. The enterprise produces seven medical aerosol product lines, five of which use CFC as propellant and a sixth, while using nitrogen, is filled on the same equipment. While rated production capacity is nominally 5,000,000 fillings per year, this has historically been in the range from 1,000,000 to 2,000,000. 1998 production was 1,816,000 fillings with a CFC consumption of 53 MT. The proposed sub-project involves the conversion from the use of CFC11/12 mixtures to HAP for two foam product lines. The others (inhalers) will be converted to pumps. The proposed sub-project is directed exclusively to the HAP conversion, although this will potentially permit utilization of alternative substitute technologies, namely HFC-134a or dimethyl ether (DME) as a propellant. All these technologies are commercially proven and internationally accepted for ODS phase-out. The investment involves the replacement of two filling lines with a new double table line, development of a small HAP tank farm, molecular sieves, fire protection systems, and technical assistance including engineering, procurement support and a safety audit. The total sub-project incremental cost is US$966,900, net of applicable taxes. The proposed sub-grant is US$631,400 and the cost effectiveness is $11.91/kg. ODP which significantly exceeds the MPMF cost effectiveness threshold of $4.40/kg. ODP. The sub-project implementation schedule calls for phase-out in early 2001.

44. This sub-project is being proposed on an exception basis since it exceeds the MPMF cost effectiveness threshold. The basis for this exception is that the enterprise represents the only domestic supplier of the medical products involved and will be the only sub-project undertaken in the sector in Russia In presenting the sub-project, the enterprise and preparation consultant also provided information that supported the use of a higher cost effectiveness threshold for medical aerosols. This was based on the accepted threshold being applicable to the production of larger cans in much higher volumes as is characteristic of consumer aerosol applications, as opposed to the medical aerosol applications where similar basic investments are required for lower ODS consumption levels. These arguments were noted by the OORG reviewer who explicitly indicated acceptance of them in this particular case.

45. Notwithstanding the above, a number of issues remain to be addressed at appraisal and through Sub-Grant Agreement conditionality. While screening indicates that the enterprise is financially viable, this will have to be verified by detailed analysis at appraisal, particularly in respect to their capacity to undertake the conversion of other lines to pumps. It is anticipated that the Sub-Grant Agreement would have to contain conditionality related to the pump conversion. The enterprise will also require demonstration of arrangements for access to ODS supplies after production closure. Such access will be required in any case for at least a short period, since the conversion to HAP under the sub-project will not occur until into 2001. Some uncertainty about this target phase-out date also exists since conversion will require the receipt of regulatory

approvals for the new propellant, the acquisition of which will also be addressed at appraisal and in subsequent conditionality. A final issue that will have to be addressed at appraisal is the need to leave one existing filling line in operation to allow the continued filling with nitrogen. In this regard, monitoring and verification measures will have to reflect the retention of equipment likely capable of conversion back to CFC use.

46. **JSC "Iceberg"** is a relatively small domestic refrigerator manufacturer, located in Smolensk, having a nominal capacity of 213,000 units per year. While operating at low capacity in recent years, its production is currently rising based on a product line tailored to the market and the general resurgence of demand for domestic products associated with the high cost of imports. In 1998, 52,300 units were produced and this is anticipated to further increase in 1999. The proposed sub-project addresses the conversion of refrigerant from CFC-12 to HFC-134a, the conversion of foam blowing from CFC-11 to HCFC-141b, and the substitution of a non-ODS solvent for CFC-113 where these applications are not being eliminated through discontinuing compressor production. The proposed sub-grant funded investments cover the purchase of equipment for refrigerant and foam blowing conversions. The former involves charging units, leak detectors, vacuum pumps and recovery and recycling equipment for both production and service facilities. The latter covers two foaming dispensers along with transfer and positioning equipment and molds. The enterprise contribution will cover installation, plant modifications, environmental approvals and engineering costs. The total sub-project incremental cost is US$690,800, net of taxes and incremental operating costs, and will be supported by a proposed US$690,800 sub-grant. Based on the average consumption in years 1993, 1994 and 1995 the project cost effectiveness is US$6.03/kg. ODP which is well below the MPMF threshold of US$13.76/kg ODP. The use of 1995 as a reference year for initiating phase-out is justified on the basis of initial engineering and trial investments made at that time which will be verified at appraisal.

47. It is noted that the proposed conversion utilizes technologies the selection of which have some potential policy implications to the GEF. HFC-134a is a high Global Warming Potential (GWP) substance whose use in domestic refrigeration is being discouraged in some countries where hydrocarbon based refrigerant are increasingly favored. However in this case, the use of HFC-134a is considered the only alternative for several reasons. The production facilities are located in a residential area where the storage and use of flammable materials is restricted. Additionally, current Russian regulations[33] prohibit the use of flammable refrigerants in domestic refrigeration applications. The proposed use of HCFC-141b involves a transitional substance, not normally supported by GEF funding. However, in this case the conversion to cyclopentane is not possible due to the above noted locational considerations as well as its affordability. The enterprise sees this technology selection as a first step in full

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[33] GOST 60335-2-24, clause 22.106 says: "There should not be used flammable refrigerants in the refrigerating system of domestic appliances with compressors. This requirement does not apply to thermal regulators in which there is 0.5 g of flammable gas"

conversion to one of the non-flammable, non-ODS alternative such as HFC-245fa which is beginning to be available in Western countries.

48. The significance of this sub-project in the third tranche primarily relates to its being the last sustaining ODS consumer in the domestic refrigeration sector and conversion will effectively eliminate CFC usage in the sector. However, it is understood that appraisal will have to verify the rationale presented for technology selection noted above. In addition, the enterprise's financial viability needs to be carefully evaluated. Screening analysis indicates this is marginal, although improving on the strength of increased sales. As with other sub-projects, the issue of access to an ODS Bank for a period into 2001 will also need to be assured, something that will have to be accounted for in the financial viability analysis.

49. **JSC "Iskra"** is a manufacturer of commercial compressors and condensing units. It has a capacity of 2,500 units annually but is operating substantially below that level. In 1998, it produced 510 units in 13 models. These utilize both CFC-12 and HCFC-22. The proposed sub-project provides for the conversion of all production, currently using CFC-12, to HFC-134a. HCFC-22 based models will be retained with the intention of being eventually phased out when suitable replacements for low temperature applications are available. The proposed grant will finance a range of production and servicing equipment required for the CFC-12 conversion, including oil refining and charging units, refrigerant charging equipment, calorimeters, and cleaning equipment. Enterprise contribution will be directed to installation and plant modifications, product trials and technical assistance. The total incremental cost of the sub-project is estimated to be US$360,525, net of taxes and incremental operating costs, of which US$293,500 is to be sub-grant funded. The sub-project cost effectiveness is US$15.21/kg ODP, equal to the MPMF threshold.

50. The selection of technology is considered appropriate based on its general use in such commercial applications and is consistent with other GEF funded sub-projects in the sector. In terms of appraisal issues, these primarily related to verification of financial viability, which while apparently sound, needs to be sufficient to cover enterprise contributions, including banking of CFC-12 for a short period since the implementation of the sub-project will extend into 2001.

51. **JSC "Kholodmash"**, located in Yaroslavl, is the largest manufacturer of commercial compressors and condensing units in Russia and the sole producer of units in the range from 500 to 3,200 watts cooling capacity. The enterprise is currently undertaking a large scale modernization involving conversion from its current use of CFC-12 and HCFC-22 to HFC-134a and R-404a refrigerants in its existing product lines and the introduction of a R-600 compressor line. The bulk of this investment is being financed by the enterprise, domestic public sector sources, and a concessionary loan from a foreign lender. The overall investment is calculated to be US$51.2 million most of which is now committed. The proposed sub-project is directed at the conversion of current CFC-12 compressor lines to HFC-134a. The specific incremental investments involved include a range of refrigerant charging equipment, testing and QA capacity, leak

detectors, compressor manufacturing tooling, and servicing equipment. The overall sub-project incremental cost is US$2,480,534, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$2,255,000. The cost effectiveness is US$12.32/kg. ODP which is less than the MPMF threshold of US$15.21/kg ODP applicable to the commercial refrigeration sector.

52. The importance of this sub-project relates to being in a unique supply position for a range of compressors widely used in Russia and for which an on going demand exists. The selection of HFC-134a as a replacement technology for CFC-12 in these applications is consistent with experience elsewhere. The main issues that will have to reviewed at appraisal relate to: i) confirmation of incremental investment costs; ii) enterprise viability; and iii) provision of transitional ODS supplies after production closure. The proposed sub-project is complementary to the major modernization being undertaken, making the determination of true incremental costs for the CFC-12 phase-out less clear than it normally would be. Recognizing the impact that the recent financial crisis may have had on the overall modernization, the sustainability of this program needs to be assessed at appraisal.

53. **JSC "Torgtekhnika"** is a regional refrigeration servicing enterprise in Sverdlovsk Oblast in the heavily industrialized Urals Region. Its operations consist of a central maintenance operation in Ekaterinburg and seventeen branch operations in various cities and towns in the Oblast. Affiliated with it are a number of small independent enterprises in Sverdlovsk and surrounding oblasts. It is a privatized enterprise based on the original state commercial mechanical maintenance organization established in a network throughout the Former Soviet Union. While most of these organizations have broken up into small private businesses, Combine Torgtekhnika has largely maintained its structure and remains the primary refrigeration servicing and equipment repair operation in Sverdlovsk Oblast and, for compressor repair, for Perm, Kurgan, Orenburg and Tumen Oblasts within the Urals. The scope of the enterprise's current refrigeration business encompasses the on-site servicing of refrigeration equipment in the food retail and service sector, industrial installations, and for budget organizations. It currently maintains an inventory of 40,000 pieces of equipment. It operates a large repair facility in Ekaterinburg where compressors and condensing units are refurbished and catering equipment is repaired and assembled. CFC-12 consumption in all operations in 1997 was 180 MT.

54. The proposed sub-project involves the development of a recovery and re-use capacity within the service operations, inclusive of reclaim, decontamination and re-distribution capacity and technician training. Also within the scope of the sub-project is the provision of a basis for conversion of existing equipment being refurbished to non-ODS refrigerants (HFC-134a) where applicable and to "drop-in" alternatives such as HCFC-22 and a locally produced commercial blend based on HCFC-22. Incremental investments are required for: i) service technician equipment in the form of recovery and charging machines, portable leak detectors, test kits, scales, cylinders, and tools; ii) branch recycling facilities at service centers in the form of recycling and recovery units,

storage cylinders, and testing equipment; iii) central storage and refrigerant facilities in Ekaterinburg consisting of a reclaim unit, storage cylinders, scales and specialty pumps; iv) condensing unit refurbishing line upgrading involving the addition of oil and refrigerant recharging equipment suitable for non-CFC refrigerants and circuit flushing and drying equipment; and v) training center equipment to support the upgrading of service technicians qualifications to operate with new refrigerants and implement recovery and re-use practices. The overall sub-project incremental cost is US$2,288,645, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$2,239,000. The cost effectiveness is US$26.98/kg ODP.

55. The significance of this sub-project, like the two similar sub-projects also proposed in the third tranche, is that it offers both a significant phase-out opportunity and a demonstration of the kind of network required nationally for managing residual ODS requirements for refrigerant after production closure in 2000. It is based on the dual strategy of capturing existing CFC-12 for re-use, and developing the capacity to undertake accelerated conversion of existing equipment. It will also be supportive of overall residual ODS management efforts through the provision of storage and re-distribution capacity as part of its commercial operations. In terms of appraisal and conditionality, the major issue will be evaluation of the economic basis for the proposed recovery and re-use scheme to ensure that it is sustainable Satisfaction that sufficient incentive, in terms of both supply constraint and differential pricing mechanisms, exists to induce individual technicians to recover material is a prerequisite to sustaining such an investment and will be addressed through sub-grant conditionality. The safe destruction of unusable CFC-12 will also have to be addressed, potentially through a linkage to the production closure plans and utilization of incineration capacity available at major production facilities.

56. **JSC "Pyatigorsktorgtekhnika"** is a regional refrigeration servicing enterprise in Pyatigorsk in Stavropol Oblast in the North Caucasus region. Its operations consist of a central maintenance operation in Pyatigorsk and thirteen branch operations in various cities and towns in the region. It is a privatized enterprise based on the original state commercial mechanical maintenance organization established in a network throughout the Former Soviet Union which has largely maintained its structure and remains the primary refrigeration servicing in Stavropol Oblast and for compressor repair, for neighboring Republics and Oblasts in the region. The scope of the enterprise's current refrigeration business encompasses the on-site servicing of refrigeration equipment in the food retail and service sector, industrial installations, and for budget organizations. It currently maintains an inventory of 6,000 pieces of equipment and annually overalls approximately 600 to 1,000 compressors annually. It operates a large well equipped repair facility in Pyatigorsk where compressors and condensing units are refurbished and catering equipment is repaired and assembled. CFC-12 consumption in all operations in 1997 was 44 MT.

57. The proposed sub-project involves the development of a recovery and re-use capacity within the service operations, inclusive of reclaim, decontamination and re-

distribution capacity and technician training. Also within the scope of the sub-project is the provision of a basis for conversion of existing equipment being refurbished to non-ODS refrigerants (HFC-134a) where applicable and to "drop-in" alternatives such as HCFC-22 and a locally produced commercial blend based on HCFC-22. Incremental investments are required for: i) service technician equipment in the form of recovery and charging machines, portable leak detectors, test kits, scales, cylinders, and tools; ii) branch recycling facilities at service centers in the form of recycling and recovery units, storage cylinders, and testing equipment; iii) central storage and refrigerant facilities in Pyatigorsk consisting of a reclaim unit, storage cylinders, scales and specialty pumps; iv) condensing unit refurbishing line upgrading involving the addition of oil and refrigerant recharging equipment suitable for non-CFC refrigerants and circuit flushing and drying equipment; and v) training center equipment to support the upgrading of service technicians qualifications to operate with new refrigerants and implement recovery and re-use practices. The overall sub-project incremental cost is US$1,165,381, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$1,144,400. The cost effectiveness is US$60.23/kg ODP. The sub-project's significance, along with appraisal and conditionality issues are as described for Combine Tortechnika above.

58. **JSC "Kemerovotorgtekhnika"** is a regional refrigeration servicing enterprise in Kemorova in the Kusbas Region of South Western Siberia. Its operations consist of a central maintenance operation in Kemerova and twelve branch operations in various cities and towns in the region. It is a privatized enterprise based on the original state commercial mechanical maintenance organization established in a network throughout the Former Soviet Union which has largely maintained its structure and remains the primary refrigeration servicing and equipment repair operation in the region. The scope of the enterprise's current refrigeration business encompasses the on-site servicing of refrigeration equipment in the food retail and service sector, industrial installations, and for budget organizations. It currently maintains an inventory of 58,000 pieces of equipment. It operates a large repair facility in Kemerova where compressors and condensing units are refurbished and catering equipment is repaired and assembled. CFC-12 consumption in all operations in 1997 was 80 MT.

59. The proposed sub-project involves the development of a recovery and re-use capacity within the service operations, inclusive of reclaim, decontamination and re-distribution capacity and technician training. Also within the scope of the sub-project is the provision of a basis for conversion of existing equipment being refurbished to non-ODS refrigerants (HFC-134a) where applicable and to "drop-in" alternatives such as HCFC-22 and a locally produced commercial blend based on HCFC-22. Incremental investments are required for: i) service technician equipment in the form of recovery and charging machines, portable leak detectors, test kits, scales, cylinders, and tools; ii) branch recycling facilities at service centers in the form of recycling and recovery units, storage cylinders, and testing equipment; iii) central storage and refrigerant facilities in Kemorovo consisting of a reclaim unit, storage cylinders, scales and specialty pumps; iv) condensing unit refurbishing line upgrading involving the addition of oil and refrigerant

recharging equipment suitable for non-CFC refrigerants and circuit flushing and drying equipment; and v) training center equipment to support the upgrading of service technicians qualifications to operate with new refrigerants and implement recovery and re-use practices. The overall sub-project incremental cost is US$1,753,543, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$1,704,000. The cost effectiveness is US$25.06/kg ODP. The sub-project's significance, along with appraisal and conditionality issues are as described for Combine Tortechnika above.

60. **JSC "Plastic"** is a major manufacturer of automotive components located in Syzran. The enterprise produces interior components for major domestic automotive manufacturers from integral skin and rigid foams by using CFC-11 as a blowing agent. The proposed sub-project covers the conversion of existing production operations to the use of pentane for integral foams and CO_2 for rigid foams. The distribution between these two products is 66% and 34% respectively. Incremental investments are required for CO_2 and pentane handling systems, injection heads and blending tanks, for existing foaming machines, filling turntables, gas detection equipment, plant modifications and technical and project management assistance. The introduction of pentane for integral foam production necessitates a significant increase in incremental costs (US$581,460) associated with safety related equipment and plant modifications. The overall sub-project incremental cost is US$2,191,177, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$2,169,000. The cost effectiveness is US$9.21/kg. ODP which is less than the MPMF threshold applicable to integral and rigid foam conversions based on prorating according to the proportion of production of these products.

61. The principal appraisal and conditionality issues associated with this sub-project relate to technology selection, and provision of ODS to sustain the operation after production closure. The technology issue involves the selection of CO_2 technology for rigid foams which, while being offered commercially, is not considered sufficiently proven by the OORG reviewer without a trial demonstration before commitment to sub-grant disbursement. At appraisal, the verification of trials that have reportedly been initiated will be undertaken. In the absence of these or should they not prove successful, the proposed sub-project must be modified for use of HCFC-141b on a transitional basis. In this case, the written undertaking from the enterprise to complete the sub-project at its own expense will be required. The above conditions represent the basis for the qualified clearance of this sub-project provided by the OORG reviewer. As a condition of Sub-Grant Agreement effectiveness, the appraised sub-project will have to be cleared unconditionally by the OORG reviewer. In terms of financial viability, the enterprise's performance was quite good prior to the August 1998 financial crisis and it appears to have maintained its production since then, something that may reflect an expansion of the Russian automotive sector as it becomes more competitive against imports. However, the sub-project's implementation period will extent up to twelve months past the projected closure of Russian ODS production facilities, which will require the enterprise to stock ODS in advance or have access to commercial stocks from the national banking program.

62. **JSC "Stroidetal"** is a manufacturer of extruded polyethylene (EPE) building materials located in Moscow. The enterprise produces EPE sheets and pipe using CFC-12 as a blowing agent. Consumption from 1995 through 1997 averaged 79.3 MT. 1998 consumption was 39 MT. The proposed sub-project involves the conversion of the two existing extrusion lines to a CO_2/butane mixture. Incremental investments are required in CO_2 and butane handling and distribution systems, replacement of extrusion dies, gas detection and fire protection equipment. While a long term intention to use CO_2 only exists, this technology is not considered by the enterprise as sufficiently mature for use in their current application. The introduction of butane necessitates a significant increase in incremental costs (US$290,700) associated with safety related equipment and plant modifications. The overall sub-project incremental cost is US$798,205, net of operating cost savings and taxes, and supported by a proposed GEF sub-grant of US$786,700. The cost effectiveness is US$6.26/kg. ODP which is less than the MPMF threshold of US$8.22/kg ODP applicable to this sub-sector of the solvent sector.

63. The principle appraisal and conditionality issues relate to the inclusion of safety costs in the calculation of grant cost effectiveness and verification of the enterprise's financial viability. As noted above, US$290,700 in increment safety costs have been identified and the enterprise has requested inclusion of this in the determination of the eligible grant, which is a diversion from MPMF practice. In the absence of this the grant cost effectiveness would exceed the threshold cost effectiveness. The justification is the need to use flammable butane in the transition to CO_2 blowing technology. This has been endorsed by the OORG, inclusive of the requirement to undertake a safety audit. With regard to financial viability, the enterprise has been assessed as being relatively stable, but this was undertaken prior to the August, 1998 financial crisis in Russia. The enterprise is dependent on the domestic construction sector, particularly state housing which has been adversely affected by the country's financial situation. A decline in 1998 sales performance has been noted. It can be anticipated that the enterprise may have difficulty meeting even the modest contributions contemplated in the sub-project, something that would be made more difficult if a sub-grant reduction due to the disallowance of safety costs occurred.

64. **JSC "Nelidovo Plastic Plant"** is a manufacturer of plastic products located in Nelidovo (Tver Region). The enterprise produces EPE sheets and various consumer products using CFC-12 as a blowing agent. Consumption from 1995 through 1997 averaged 50.5 MT. However, 1998 consumption was only 29 MT. The proposed sub-project involves the conversion of the two existing extrusion lines to a CO_2/butane mixture. Incremental investments are required in CO_2 and butane handling and distribution systems, replacement of extrusion dies, gas detection and fire protection equipment. While a long term intention to use CO_2 only exists, this technology is not considered by the enterprise as sufficiently mature for use in their current application. The introduction of butane necessitates a significant increase in incremental costs (US$240,100) associated with safety related equipment and plant modifications. The overall sub-project incremental cost is US$945,897, net of operating cost savings and

taxes, and supported by a proposed GEF sub-grant of US$655,000. The cost effectiveness is US$8.22/kg. ODP which is equal to the MPMF threshold applicable to this sub-sector of the solvent sector.

65. The principle appraisal and conditionality issues relate to the inclusion of safety costs in the calculation of grant cost effectiveness and verification of the enterprise's financial viability. As noted above, US$240,100 in increment safety costs have been identified and the enterprise has requested inclusion of this in the determination of the eligible grant, which is a diversion from MPMF practice. In the absence of this, the grant cost effectiveness would exceed the threshold cost effectiveness. The justification is the need to use flammable butane in the transition to CO_2 blowing technology. This has been endorsed by the OORG, inclusive of the requirement to undertake a safety audit. In the case of financial viability, the enterprise has been assessed as being relatively stable, but this was undertaken prior to the August, 1998 financial crisis in Russia. The enterprise could benefit from the devaluation of the ruble through increased competitiveness in the domestic market. However some production decline has been noted in 1998 and the current capacity of the enterprise to meet its significant contribution obligations will be re-evaluated at appraisal.

66. **Design Bureau "Salut"** is part of the M.V. Khrunichev State Space Scientific-Industrial Center, located in Moscow, which is a large state owned manufacturer of aerospace equipment and systems for the domestic and international markets, particularly in connection with various space programs. It is financially stable and, subject to verification at appraisal, should be able to fulfill its obligations under the proposed sub-project. CFC-113 currently is being used for cleaning and degreasing of metal parts and assemblies, using jet cleaning, ultrasonic cleaning, pumping washout and wipe cleaning techniques. Substances that are removed include metal shavings, cooling liquid, sand, and paper towel fibers. Consumption of CFC-113 is stable and was 26 MT in 1998. The proposed project involves the replacement of existing CFC-113 based cleaning equipment with two lines of up to date solvent cleaning equipment with similar capacity, but with vapor loss controls and equipment for purifying and recycling solvent from the boiling sump. The replacement solvent will be an HFE–7100/trans 1,2 dichlorethylene azeotrope. The overall sub-project incremental investment cost is US$694,100, net of operating costs and taxes, and supported by a proposed GEF sub-grant of US$450,000. The cost effectiveness is US$19.73/kg. ODP which is equal the MPMF threshold applicable to CFC-113 phase-out in the solvent sector.

67. The significance of this sub-project is that it is being undertaken in a large consumer in this sector which has similar defense and aerospace linkages to at least one other major residual consumer that has elected to pursue essential use and transitional options. As such, it may serve as a demonstration for other major residual users. In terms of appraisal and conditionality issues, these will primarily relate to technical matters raised in the conditional clearance provided by the OORG reviewer. These relate primarily to finalization of the specific solvent selection, and demonstration of appropriate "zero solvent discharge equipment". Verification of 100% phase-out in the

operation, agreements on scraping existing cleaning lines and provisions made for transitional stocks of CFC-113 after production closure will also be addressed.

68. **Miass Machine Building Plant** is a manufacturer of heavy engineered equipment and industrial plant machinery located in Zlatoust, Chelyabinsk Region. It is a state owned enterprise, formally primarily involved in defense production, but now effectively converted to a range of civilian business lines, including food processing plant equipment, thermoelectric refrigeration systems, specialty optical devices, and process equipment for the oil and chemical sectors. It is financially stable and, subject to verification at appraisal, should be able to fulfill its obligations under the proposed sub-project. CFC-113 is currently used in an enterprise washing system to clean a range of large and small metal components and assemblies. Distillation capacity is available to recover solvents. The make up consumption for this system is currently 4 MT per year, which is drawn from an inventory (40 MT) of contaminated material that the enterprise has acquired and cleans in its own distillation system. The proposed sub-project involves the development of an expanded cleaning system that will allow cleaning of larger components using an HFE–7100/trans 1,2 dichloroethylene azetrope to replace CFC-113, although the possible use of other non-ODS will be evaluated, with the objective of identifying a domestic supplier. The overall proposed investment covers the manufacture and fabrication of the proposed system, along with engineering, technical evaluation and purchase of the initial charge of non-ODS solvent. The total investment costs is US$212,300. The proposed sub-grant of US$63,000 gives a cost effectiveness of $19.73/kg, ODP which corresponds to the MPMF cost effectiveness threshold.

69. This sub-project, while involving a small grant, is of significance in that it is likely representative of the kind of phase-out opportunities in this sector that would come to the proposed small grant fund capacity proposed to assist in residual demand management after 2000. Experience gained in processing it will be useful in planning and implementing this initiative. The principal issues that will be addressed at appraisal relate to various technical issues identified in the OORG reviewer's conditional clearance. These include relate to finalization of the specific solvent selection, and demonstration of appropriate "zero solvent discharge equipment". Verification of the overall investment's incremental component and evaluating the inventory of material maintained will also be addressed. Given the processing capacity for contaminated CFC-113, a possible opportunity to create recycling capacity in support of residual ODS management will be explored.

B. ODS PRODUCTION CLOSURE SUPPORT

70. **Special Initiative For ODS Production Closure**: As illustrated in the preceding sections, Russia remains a significant producer of ODS within a global context. Despite the significant actual production reductions in recent years, it maintains approximate 47% of the latent global capacity for such production. It is also apparent that addressing the overall issue of ODS phase-out requires coordination of both the production and

consumption aspects of the issue. In recognition of this, in 1996 the World Bank initiated the Special Initiative as a complementary companion project to this GEF consumption phase-out project. This effort was directed at assembling bilateral funding to compensate producing enterprises for the permanent closure of production capacity applicable to Annex A and Annex B controlled substances as defined in the MP. By early 1998, preliminary commitments for US$17 million in such funding were obtained. In addition, the GEF had indicated agreement in principle to the contribution of up to US$10 million in support within the overall framework of the US$60.0 grant funding available to the Russian Federation under this Project. On this basis, the World Bank invited the Russian Federation to undertake the joint preparation of the Special Initiative and its presentation to donor countries. Subsequently, commitments in principle in the form of signed protocols were obtained from all seven producing enterprises respecting their participation. In October 1998, the Russian Federation hosted a donor's meeting in Moscow under the chairmanship of the Chairman of SCEP. As documented in the final Prospectus and the Protocol Agreements that resulted from this meeting, all parties agreed to proceed with the detailed preparation and appraisal of the Special Initiative. These two documents are contained as Annex 2 and Annex 3 respectively, in Section VIII.

71. **Funding Requirement:** The Special Initiative contemplates funding of US$27 million, to be assembled in a Trust Fund administered by the World Bank. US$24.7 million of this is to be directed to compensation payments to seven enterprises, producing Annex A and Annex B controlled substances for end use, in return for permanent closure of their production facilities. The allocation of this funding among the enterprises has been agreed to between the Government and will be given effect by a formal Resolution developed under the auspices of the Inter-Agency Commission and issued under the authority of the Minister of Economy. The compensation payments will be disbursed on the basis of 30% of each enterprise's allocation being paid upon the signing of Sub-Grant Agreements by all producing enterprises, acceptable to the World Bank. The remaining 70% will be disbursed upon verification of the permanent closure of all seven production facilities, again to the satisfaction of the World Bank. The remaining funding is directed to: i) technical assistance to SCEP, supporting institutional strengthening and technology transfer opportunities (US$0.5 million); ii) agency fees to the CPPI for processing and implementation, including financing of independent monitoring and verification capacity (US$1.0 million); and iii) World Bank supervision fees, including expert reviews, and Trust Fund administration (US$0.8 million).

72. The Special Initiative Trust Fund involves bilateral contributions from ten countries in an aggregate nominal amount of US$19 million[34], subject to exchange rate variation for contributions made in national currencies. To ensure the ultimate availability of the full US$27 million and to compensate for any exchange rate

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[34] Austria (US$0.2 million, Denmark (US$2.0 million), Finland (US$1.0 million), Germany (US$1.0 million), Italy (US$0.4 million), Japan (US$2.0 million), Norway (US$2.0 million), Sweden (1.0 million), United Kingdom (US$3.4 million), United States (US$6.0 million).

adjustments, it is proposed that the GEF contribution be set at US$8.5 million for purposes of reserving third tranche funds in this submission. The Trust Fund account has been opened by the World Bank and Trust Fund Agreements are expected to be established with all countries by the end of the second quarter of 1999. It should be noted that several donors have explicitly condition their contribution to confirmation of the GEF contribution as part of the third tranche. In this regard, the GEF Secretariat, while not participating in the donor's meeting, did review the Prospectus and has confirmed the incremental nature of the proposed Special Initiative activities and affirmed in principle their eligibility for GEF funding, subject to approval within the third tranche.

73. **Government Commitment**: In proposing the Special Initiative, the Government of the Russian Federation has reaffirmed its commitment to fulfill the country's international obligations. More specifically, it has undertaken to : i) implement the adoption of Government resolutions banning ODS production, new consumption, import and export in and after the year 2000, ii) enforce the above resolutions and others governing ODS use, including exercising its legal rights to force closure upon non-compliant enterprises; iii) accept a repayment obligation in the Grant Agreement governing the Special Initiative in the event that production closure does not occur or is resumed; iv) provide exemptions for enterprise compensation payments from direct taxation; v) facilitate elimination of residual ODS consumption through import control mechanisms, provision of transitional stocks, support accelerated conversion to ODS substitutes, implementation of economic instruments in favor of non-ODS usage, and implementation of ODS recycling and recovery initiatives; and vi) adhere to the provisions of the Copenhagen Amendment respecting compliance with the limitations on HCFC's and their ultimate phase-out. As evidence of this commitment to date, the underpinning Government Resolution banning ODS production has been approved by all Government institutional stakeholders and has been presented in final form for formal enactment by the Government. This is contained in Annex 4 of Section VIII. This enactment is expected to occur by the spring of 1999, consistent with the understanding that it and the companion resolutions banning new consumption, import and export will be conditions of the Special Initiative Grant Agreement effectiveness.

74. **Monitoring and Verification**: The technical basis for implementing the Special Initiative will be the detailed enterprise specific closure plans and the associated monitoring/verification procedures. The general scope of these was established and agreed to at the donor's meeting as defined in Annex 4 of the final Prospectus (Section VIII Annex 2). Recognizing that each will be unique to the various producing facilities, the detailed documentation is currently being developed for each enterprise by the enterprises with the support of an international consultant under the direction of ICP "Ozone" and the World Bank The Terms of Reference applicable to this work is contained in Section VII Annex 5. The detailed closure plans and monitoring/verification procedures will be subject to independent review by an international group of experts, known as the Special Initiative Technical Review Group (SITRG), which has been established by the World Bank under the chairmanship of the OORG Production Sector Advisor and is made up of three members selected by donors. Clearance of this

documentation by the SITRG will be a prerequisite for formal appraisal, undertaken jointly by World Bank and SCEP. The SITRG will also review appraisal reports and the final agreed to closure plans and monitoring procedures prior to negotiation of the Grant Agreement. The closure plans and monitoring/verification procedures, agreed at appraisal, will be made legally binding upon the enterprises through inclusion in the Sub-Grant Agreements, all of which must be accepted by the World Bank prior to any disbursement of initial compensation payments. SCEP and the World Bank will be jointly responsible for the monitoring and verification process, with the detailed work being undertaken by an independent international consulting firm. The Terms of Reference applicable to this work are contained in Section VIII Annex 5. The principle product of this work will be Closure Verification Reports for each enterprise, all of which shall be subject to clearance by the SITRG prior to disbursement of final compensation payments. Post closure monitoring will also be provided for.

75. **Implementation Arrangements:** In proposing the inclusion of the GEF contribution to the Special Initiative, the World Bank and the Russian Federation recognize that careful coordination of implementation arrangements will be required. In this regard, both projects will be the responsibility of SCEP as implementing agency, with direct project management responsibility being assigned to CPPI. World Bank supervision will be provided by a common team responsible for both projects. The mechanism proposed for distribution of funds is that, after GEF Council approval and upon signing of the Special Initiative Grant Agreement, the Russian Federation will initiate a withdrawal application from the GEF Consumption Phaseout Project Trust Fund authorizing the disbursement of the GEF contribution into the Special Initiative Trust Fund. No agency fees will be applicable to this disbursement within the GEF Project. Upon deposit in the latter Trust Fund, it will be available for disbursement along with other contributions as a pooled fund, in accordance with the Special Initiative Grant Agreement once it is effective. Recognizing that the proposed contribution contains a contingency provision respecting coverage of foreign exchange variation in the amount of US$0.5 million, any excess funds beyond US$27.0 million will be refunded to the GEF upon receipt of all donor contributions, not denominated in US$.

76. **Implementation Schedule:** The current schedule for implementation calls for submission of closure plans and associated monitoring and verification procedures in March 1999. Assuming clearance in April 1999, appraisal will be undertaken in May 1999, followed by negotiations in June 1999 and Grant effectiveness by September 1999. Completion of closure is anticipated by July 2000.

77. **GEF Participation:** The utilization of available resources in this Project's third tranche to support the comprehensive elimination of Annex A and Annex B ODS production is required for the Special Initiative to proceed. Recognizing the ultimate conditionality that the approval of the GEF Council is a prerequisite to the World Bank and Russian Federation proceeding with the Special Initiative, the basis for its continued preparation has been the support in principle provided by the GEF Secretariat noted above and the undertaking of Special Initiative donor countries to support its inclusion in

the third tranche through their GEF Council representation. As is conveyed in this submission, the coordination of orderly consumption phase-out with the planned closure of ODS in production facilities is necessary to ensure the sustainability of the overall objective, that being the elimination of ODS use in the Russian Federation. In this context, the participation of the GEF in production closure is both complementary to and consistent with the basic objectives attached to the GEF's funding in the ODS sector, both in Russia and in other countries in which consumption phase-out funding is being provided. In terms of cost effectiveness, the permanent closure of latent ODS production capacity in Russia under the Special Initiative will be achieved for less than US$0.20/kg. ODP. Based on actual production in 1995, the year that the Special Initiative was first proposed, the cost effectiveness would be US$0.63/kg, ODP. It is anticipated that this level of cost effectiveness would be below that encountered in other countries that may request support for production closure from the international community. It is also noted that the proposed third tranche funding allocation of US$8.5 million is less than originally contemplated due to the subsequent commitment of additional bilateral funding.

C. RESIDUAL ODS MANAGEMENT

78. During 2000, the major consumers of Annex A and B ODS in Russian Federation will have eliminated the use of these substances through both conversion to non-ODS technologies and rationalization of overall industrial production capacity in key consumption sectors. At the same time, availability of ODS will be sharply curtailed with the permanent closure of ODS production capacity. At this point, Russia will have substantively reached a level of ODS phase-out generally comparable to other Article 2 countries and will be in compliance with its current international obligations under the MP. However, residual ODS usage will continue after this and a need exists to manage these requirements, both with a view to ensuring that economic and social disruption is avoided, and facilitating the its orderly elimination. In addition, the country still needs to address the phase out of transitional substances and complete the public policy processes associated with ratification of more recent amendments to the MP. These imperatives are increasingly recognized at a policy level, as reflected in the focus on residual ODS requirement management in the draft Federal Program[35], and the subsequent inclusion of special ODS production quotas in 1999 to provide for the banking of CFC-11, CFC-12 and CFC-113 by major producers. The latter represents an initial step in planning for post production closure ODS requirements by ensuring that some stocks are available on a commercial but regulated basis after production facilities are permanently closed in 2000.

79. However, it is also recognized that Russia still needs a comprehensive set of management tools, both regulatory and operational, to effectively control and administer residual ODS usage and ensure its eventual elimination. Support in developing these

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[35] *Phase-out of Production and Consumption of ODS in the Russian Federation in 1998-2000*, Draft Federal Program, December 1998.

tools, along with assistance in maintaining progress toward full parity with other Article 2 countries is being proposed in the third tranche. The scope of this assistance covers the development and implementation of two programs directed to specific residual ODS management needs, namely: i) a Small Grants Program to provide financing of residual consumption phase-out investments in small consumers; and ii) a Halon Banking Program aimed at establishing a system of recovery, regeneration and re-use of halons until suitable alternatives are available and affordable. It also covers a number of specific technical assistance initiatives related to: i) filling out the regulatory system to adequately control residual ODS use and trade; ii) enhancing public awareness related to the issue, impacts and final phase-out; iii) support for planning the eventual phase-out of transitional substances; iv) support in the identification, evaluation and implementation of alternatives; and v) institutional assistance in moving toward ratification of the Copenhagen Amendment.

80. **Small Grants Program:** While phase-out of all major consumers, either by conversion or closure will largely be completed by the end of 2000, it is estimated that a residual annual demand for new ODS of between 2,000 and 3,000 MT will remain. The sectoral analysis provided in Section VI above indicates that this will be primarily in widely dispersed small consumers, typically consuming up to 20 MT/ year. It is anticipated that approximately 80% of this demand is for CFC-12 used in refrigeration servicing. The direct consumers are the many small private enterprises that now operate as successors to the former regional servicing organizations which have disintegrated during the economic transition period. Residual demand for CFC-113 in the solvent sector also remains, principally for industrial cleaning applications with enterprises that are emerging out of the military production conversion processes. Potential consumers may also appear in small manufacturers of refrigeration and fire protection equipment, and non-insulating foams, although the identification work to date has largely exhausted opportunities in financially viable enterprises in these sectors. Experience with sub-project preparation to date indicates that many of these small consumers are only just becoming aware of impending ODS supply constraints For this reason, it is anticipated that the demand for small scale phase-out investments will increase in the near future.

81. In response to this, it is proposed to allocate a portion of the third tranche resources for the provision of small sub-grants to such consumers for a period of up to three years after the ban on new production, consumption and import/export comes into effect. The basic principals proposed for this Small Grants Program (SGP) will be as follows:

a) The overall financial allocation for the SGP would be US$5.8 million, inclusive of agency fees;

b) Sub-Grants would typically be in the range of US$50,000 to US$250,000;

c) The SGP would be open to financially viable ODS consumers presenting prepared sub-projects involving eligible incremental investments as defined by MPMF criteria;

d) The availability of the SGP would be communicated nationally through the SCEP regional Environment Committees, the Inter-Agency Commission working groups, industry associations and networks, marketing and distribution organizations operated by existing ODS producers, and the print media as part of the overall public awareness initiative proposed as part of the proposed third tranche technical assistance program (described below);

e) The SGP would be supported by the availability of a sub-project preparation facility provided as part of the third tranche technical assistance program (described below);

f) Solicitation and selection of sub-projects would be undertaken though an auction process by which consuming enterprises would tender sub-project proposals for evaluation;

g) The competitive selection of specific sub-projects would be based primarily on the cost effectiveness of the proposed phase-out investment, but selection criteria would have provision for social impact mitigation and other documented indirect benefits;

h) The detailed eligibility criteria, sub-project preparation specifications, auction procedures, and selection criteria will be developed by ICP "Ozone" and be subject to OORG clearance, followed by appraisal and "no objection" by the World Bank;

i) It is anticipated that at least two auctions will be held, the first being in early 2000 and subsequent ones held at approximately six month intervals;

j) The amount of grant funding allocated for the first auction would be determined based on the amount of interest expressed during the initial promotion of the SGP. This is anticipated to be at least US$2.0 million based on the sub-project identification undertaken during the third tranche consumption sub-project preparation work. As illustrated in Table 6.4, ten small regional refrigeration servicing enterprises with annual consumption levels of 10 to 30 MT of CFC-12 have been identified, each of which could typically warrant phase-out investments in the range of US$200,000 to US$250,000 for recovery and recycling equipment;

k) On the basis of the auction response, a short list of candidate sub-projects would be developed in accordance with the selection criteria noted above. Individual sub-projects would then be subject to appraisal and signing of a

Sub-Grant Agreement with SCEP. Appraisal documentation and Sub-Grant Agreements would be subject to approval by the Inter-Agency Commission and "no objection" by the World Bank; and

l) World Bank procurement procedures as set out in the Grant Agreement would apply to all contracting financed by the SGP.

82. SCEP would be the designated implementing agency for the SGP within the existing supervision framework for administering both the Federal Program and the Project described previously. In particular, the Inter-Agency Commission would be a key forum for the identification of residual demand phase-out opportunities and as the approval authority for major decisions on the operation of the SGP. Within SCEP, the direct administrative and implementation responsibility for the SGP would be assigned to CPPI during the term of the Grant Agreement, after which it will be transferred to a successor project implementation organization within SCEP. This successor organization may be the NPAF or National Environmental Fund both of which offer potential co-financing capacity for selected sub-projects. Provision within the SGP will also be made for specific "windows" that could accommodate bilateral grant or loan resources. In this regard, the opportunity of a partnership with the Nordic Environmental Finance Corporation is currently being explored by ICP "Ozone" and the NPAF. Project financial support for the operation of the SGP will be limited to a 3% agency fee charged on actual disbursements. During the term of the Grant Agreement, it is proposed that disbursements made for sub-projects funded under the SGP would occur by the same procedures that are operating for the current consumption phase-out investment sub-projects. Should the operation of the SGP be required beyond the term of the Grant Agreement, the remaining undisbursed GEF resources within the SGP for which demonstrated eligible phase-out investment opportunities have been identified will be transferred to the successor organization, conditional on the World Bank's satisfaction of their capability to operate as a financial intermediary.

83. Given the conceptual and as yet unproved nature of the SGP, conditioning of the GEF's support for this initiative is appropriate. More specifically, a detailed implementation proposal based on the above principles should be presented, and subjected to OORG clearance as well as "no objection" procedures by the World Bank. The schedule agreed to for this process involves the presentation of a detailed proposal and business plan to the World Bank by July 1999 and completion of clearance and "no objection' by October 1999. Furthermore, SCEP should document the response to the public awareness initiative to be undertaken among residual consumers as a basis for demonstrating demand for the SGP and present the invitation documentation for the first auction by January 1, 2000. The first auction should occur in the first quarter of 2000. As a final condition, it is recommended that at least 50% of the SGP should be committed by December 31, 2000. In the absence of achieving this. the continued commitment of the remaining SGP resources should be reviewed.

84. **Halon Banking Program**: A significant long term source of latent residual ODS requirements is the requirement to maintain existing halon charged fire protection infrastructure. As noted in Section VI, Russia currently has a large stock of halons in existing systems, approximately 90% of which is Halon 2402 which is a unique fire protection agent only produced in Russia. However, current demand for new Halon 2402 appears to be relatively low, based on current production data. This and the fact that a significant number of existing fire protection systems are associated with dormant or decommissioned installations and equipment, particularly military, suggest that the country's ongoing requirements can be supplied by development of a banking system. As part of the residual ODS management component of the third tranche, it is proposed to provide funding for the development and implementation of such a system.

85. National responsibility for fire protection in Russia lies with the Ministry of Interior. The All Russian Research Institute for Fire Protection (VNIIPO) in Moscow supports this Ministry in the development and implementation of fire protection policy, including coordination of halon alternative evaluation and representation on the Inter-Agency Commission Halon Working Group. Such alternative fire suppression agents currently under evaluation include a range of hydroflurocarbon and flourocarbons such as HFC-125, HFC-227, perflurocycloutane, perfluorobutane, and trifluoroiodomethane. Three organizations are active in the recovery and regeneration of halons: the All Russian Research Institute for Civil Aviation (Moscow), JSC "Ozone" (St. Petersburg) and the State Institute for Applied Chemistry (GIPKh). GIPKh is also involved in the development of halon replacement technology. Finally, a national network of servicing enterprises that were part of the state "Spetsavtomatic" organization provide maintenance capability for these systems. One of the largest of these is JSC "Mosspezavotomatila" serving the Moscow and Ivanov regions.

86. Within the third tranche, it is proposed to support the development and implementation of a national halon banking program. The scope of this support would cover the regulatory, institutional, business and operational aspects of establishing a banking system that would fully utilize existing halon stocks in the maintenance of fire protection infrastructure, until they can be replaced by non-ODS alternatives. This support, involving US$1.5 million, would be provided through a frame work consulting contract, utilizing both local and foreign expertise to design such a system and to support its implementation over a two year period. Based on the initial preparation work undertaken by ICP "Ozone", the specific tasks envisioned to be included in this work are:

a) Examine regulatory implications and define regulatory requirements associated with establishment and operation of a national halon banking system, particularly with reference to the overall framework of ODS control regulation and specific licensing requirements applicable to ODS consumers and potential bank operators;

b) Develop a national inventory of individual fire protection applications utilizing halons for purposes of registering and licensing them, prioritizing

them in social and economic terms, and assessing the role that they may play in a banking system, either as consumers or sources of halon;

c) Identify and undertake a capacity assessment of all service and regeneration facilities with the objective of screening and identifying candidate organization that could serve in various administrative and/or operational capacities for an eventual system, inclusive of technical and management capability and financial viability;

d) Review international experience related to the establishment and operation of halon banks, and arrange, on a selective basis, foreign study opportunities for key counterparts involved in implementation of the Russian halon banking system;

e) Examine and recommend administrative control and economic (pricing) instruments that could be employed in the operation of the banking system, that would both ensure the availability of halon stocks to critical fire protection applications and which maintain economic incentives for the eventual phase-out of the material when suitable alternatives are available;

f) Develop a detailed design for the system based on the conceptual model of establishing a Central Halon Banking Office and regional halon banking capacity capable of recovery, transport, storage, regeneration and re-charging halon, inclusive of estimated capital and operating resource requirements, recommendations respecting the location of the Central Halon Banking Office and institutional reporting relationships that would govern its operation[36];

g) Develop a business plan for the operation of the system inclusive of: i) proposed contractual relationships between the Central Halon Banking Office, regional banking operators, halon suppliers, and halon consumers; ii) marketing and promotional requirements; iii) pricing policies; iv) logistics plans; and v) reporting requirements;

h) Support the establishment of the Central Halon Banking Office, inclusive of: i) providing computer equipment and data management technology; ii) development of operating budgets and long term funding mechanisms; and iii) providing training as may be required to develop the appropriate administrative, financial, technical and business planning capacity to sustain its operation;

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[36] The current arrangements under discussion within the Inter-Agency Commission and SCEP involve the Central Halon Banking Office being under the jurisdiction of SCEP, but located within VNIIPO.

i) Support the establishment of at least four operational banking operations, within existing service enterprises, in priority regions[37], and potentially within state institutions[38] with specific sectoral needs. This support will include: i) assistance in defining capital requirements, operating budgets and the basis for service charges; ii) assistance in identifying financing for capital requirements, one source of which could be the proposed Small Grants Program; iii) support in operational management optimization; and iv) providing training in banking operations as may be required; and

j) Develop a plan for the disposition of redundant or unusable halons, including identification of technical options for its secure storage, and, ultimately, its safe destruction.

87. **Technical Assistance Program:** The final aspect of the overall residual ODS management component proposed for the third tranche is support of a series of technical assistance assignments covering various institutional and technical support needs identified as being required for Russia's final transition to parity with other Article 2 countries. In each case, these will be provided under consulting contracts, employing both local and foreign expertise. The following provides a summary description of each of these assignments.

88. **Regulatory Framework for Residual Demand Management**: This assignment is intended to support the development and implementation of several specific regulatory initiatives identified within the Federal Program as being required to complete the overall regulatory framework required for comprehensive control of ODS. These specific initiatives are: i) establishment of the detailed regulatory procedures, inclusive of ODS pricing mechanisms and economic incentives for non-ODS substitution, that will govern the operation and eventual closure of ODS distribution after production closure generally, and specifically in relation to material banked in advance of closure; ii) strengthening the licensing controls applied to closed production facilities, residual ODS consumers, bank operators, and recyclers; iii) developing reporting formats that will support the above detailed regulatory initiatives at the national and regional level; and iv) integrating the distribution and consumption of ODS into the formal state ecological control and expertise system, particularly in relation to the monitoring of permanent closure of production facilities and major consumers.

89. **Regulatory Enforcement Capacity Upgrading:** This assignment will be directed to upgrading the enforcement capacity in agencies administering the basic ODS regulatory framework, particularly at the regional and local level. The initial part of the assignment will involve a detailed evaluation of enforcement capacity, capability and

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[37] Initial preparation work identified seven priority regions: Moscow, St. Petersburg, Murmansk; Novorossiysk-Rostov, Kaliningrad; Omsk-Novosibirsk; and Far East.

[38] Interest has been expressed by the Ministry of Defense, Ministry of Civil Aviation, Ministry of Atomic Energy and Ministry of Interior.

effectiveness in relationship to the basic controls now in place related to import and exports, licensing of consumption and internal ODS trade. Based on this, a program of training will be developed. It will be based on the "train the trainer" principle and be followed up with broader based training for both SCEP regional staff and the staff of the State Customs Committee. The assignment will also provide resources for key enforcement equipment such as portable analytical devices for detection of ODS and basic computer and data management capacity utilized for reporting purposes.

90. **Public Awareness/Small Grants Promotion Program:** It is recognized that the effectiveness of the ODS phase-out program and particularly the ability to manage residual ODS usage after the cessation of ODS production and new consumption will require that these measures be well known, both to the industrial sectors affected and the general public. This assignment is intended to support a significant expansion of the modest initiatives undertaken in this area to date. It will cover a general information program on the status and progress of Russia's ODS phase-out efforts, with a particular emphasis on its importance in global environmental terms and on the need for the general public to understand its implications. It will also support a directed program aimed toward remaining small consumers of ODS as a direct support mechanism in identifying beneficiaries for the Small Grants Program. As a final initiative within this assignment, a system of ODS free product certification will be developed, based on international practice, particularly that adopted in the European Union.

91. **Residual Consumption Phase-out Sub-Project Preparation Support:** This assignment is intended to organize a pool of local and foreign expertise in ODS phase-out technology and in the documentation of specific phase-out investment sub-projects. This is envisioned to be a competitively selected joint venture between a foreign consulting firm and a local institute or consulting firm that would offer access to such expertise. It would also involve the establishment of a locally based resource center that would serve as a clearing-house for ODS phase-out technical information. This service capability would operate over the remaining term of the Project with a mandate to identify residual consumption phase-out opportunities and provide technical and document preparation assistance in presenting them for funding. While a primary source of this funding will be the Small Grants Program, it would not be limited to this and would extend to identification of bilateral and conventional financing sources. Similarly, it would not be constrained to the types of phase-out investments normally eligible under this Project.

92. **Transitional Substances Phase-out Plan and ODS Alternative Identification:** In many areas, local technological development of ODS substitutes has fallen behind that evolving in other industrialized countries. This has resulted in promotion of ODS substitutes that are either unproved or involve transitional substances, the adoption of which only represents a short-term solution. This assignment would address a general need in Russia to support critical evaluation of long-term options in pursuing ODS free technology development and to initiate planning for the eventual phase-out of transitional substances. It would involve the identification of the current state of the art in alternative technologies across all major consuming sectors and recommend a course that would be

best suited to Russia's needs. In particular, factors such as local production capability of appropriate substitutes, ability to obtain local certification of technologies and access to technology transfer opportunities would be evaluated. Associated with this would be development of a plan for the eventual phase-out of transitional substances, recognizing the short-term need for these but insuring that the country can maintain its international commitments. As in the case of the consumption phase-out sub-project preparation facility, this assignment would ideally be undertaken jointly by a foreign consulting firm and local technology center of expertise in the field.

93. **Copenhagen Amendment Ratification:** This assignment would be directed at supporting the process within the Government of the Russian Federation for ratification of the Copenhagen amendment, which Russia has undertaken to work toward. It would provide local and foreign expertise to examine the implications of ratification and to develop detailed plans that would allow the country to be in compliance with the amendment.

VIII. TECHNICAL ANNEXES

Annex 1

Proposed Consumption Sub-Project Summaries

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**JSC "Tovari I Lekarstva"** - Substitution of CFC 11 and CFC 12 for HAPs	
SECTOR/SUB-SECTOR COVERED	Aerosols	
ODS USE IN SECTOR (YEAR)	17,850 MT (1992), 7,830 MT (1996), 2,685 MT (1998) general aerosol products	
SUB-PROJECT IMPACT	167 MT. CFC 12 per year	
SUB-PROJECT DURATION	Two years	
TOTAL SUB-PROJECT COST	Incremental Investment Cost w/10%Contingency	US$ 900,500
	Operating Cost Savings	US$ 56,968
	Total Sub-Project Cost	US$ 843,531
PROPOSED FINANCING	GEF Sub-Grant	US$ 724,000
	Enterprise Contribution:	US$ 119,531
SUB- GRANT COST EFFECTIVENESS	US $ 4.34/kg	
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING AGENCY	State Committee on Environmental Protection	

Project Summary

JSC "Tovari I Lekarstva" ("TiL") is a company formed in 1997 by JSC "Halogen" of Perm, to continue the manufacture of domestic chemicals including aerosols. It has 100% Russian capital. Aerosols and other products are filled, and only self filling is done – no contract filling is done. Hair spray, insecticides, and deodorants are the principal products.

The company has one modern Western manufactured automatic machine that can be repaired, and two Russian made automatic machines that cannot. It is proposed to replace these two machines with one new one, and to supply a water bath, and some auxiliary equipment.

The company needs a complete tank farm for HAPs, and molecular sieves to clean them, pumps and compressors to handle them. Bulk storage tanks are needed, and a transport truck for HAPs and various trailers must also be supplied. A full fire fighting system is necessary to replace the rather rudimentary equipment that they have now for working with non-flammable CFCs.

Prepared by: COWI consult (Geno Nardini) Date: January 12, 1999
Reviewed by: Harry McCain Date:: February 3, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**JSC "Altaivitaminy"** - Substitution of CFC 12 with HAPs and mechanical pumps	
SECTOR/SUB-SECTOR COVERED	Pharmaceutical Aerosols	
ODS USE IN SECTOR (YEAR)	17,850 MT (1992), 7,830 MT (1996), 2,685 MT (1998) general aerosol products	
SUB-PROJECT IMPACT	53 MT CFC 12 per year	
SUB-PROJECT DURATION	Two years	
TOTAL SUB-PROJECT COSTS	Incremental Investment Cost w/10% Contingency	US$ 966,900
	Operating Cost Savings:	US$ 0
	Total Sub-Project Costs	US$ 966,900
PROPOSED FINANCING	GEF Sub-Grant	$ 631,400
	Enterprise Contribution:	$ 335,500
SUB-GRANT COST EFFECTIVENESS	US$ 11.91/kg	
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING AGENCY	State Committee on Environmental Protection	

Project Summary

Altaivitaminy ("AV") is a large manufacturer of pharmaceuticals that also makes pharmaceutical aerosols. They are located in Biysk, East of Novosibirsk (about 350 km) in southern Siberia. AV has 100% Russian capital. Only pharmaceutical aerosols are filled, and only self filling is done – no contract filling is done.

The company has two Russian made automatic machines that cannot be repaired. They need a new machine, a water bath, safe filling room, a tank farm, a gas chromatograph for quality control of hydrocarbon propellants, molecular sieve filters, and some other matters.

AV reserves the right to convert some CFC based aerosols to mechanical pumps – a more expensive conversion – and to continue to use some CFCs in MDIs (where essential use exemptions exist), but will stop using CFCs completely for their established non-MDI aerosols.

Prepared by: COWIconsult (Geno Nardini) Date: January 20, 1999
Reviewed by: Harry McCain Date: February 3, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation		
SUB-PROJECT TITLE	**JSC "Iceberg"** - Conversion from CFC-11 to HCFC-141B, and CFC-12 to HFC-134A in the manufacture of domestic refrigerators and freezers		
SECTOR/SUBSECTOR	Domestic Refrigeration		
ODS USE IN SECTOR	3,600 MT ODP (1992), 664 MT ODP (1996), 553 MT ODP (1998)		
SUB-PROJECT IMPACT	Phase-out of 64.42 MT CFC-11, 19.14 MT CFC-12 AND 46.26 MT CFC-113 per year (Average 1993-95)		
SUB-PROJECT DURATION	30 months		
TOTAL PROJECT COSTS	Incremental Investment Costs w/10% Contingency		US$ 690,800
	Incremental Operating Costs		US$ 491,407
	Total Sub-Project Costs		US$ 1,182,207
PROPOSED FINANCING	GEF Sub-Grant:	US$ 690,800	
	Enterprise Contribution:	US$ 491,407	
SUB-GRANT COST EFFECTIVENESS	US$6.03/ kg.ODP		
IMPLEMENTING AGENCY	The World Bank		
NATIONAL COORDINATING AGENCY	State Committee on Environmental Protection		

PROJECT SUMMARY

This project covers the replacement of CFC-11 used as foam blowing agent by HCFC-141b and CFC-12 used as refrigerant by HFC-134a as well as phase-out of CFC-113 used as solvent for domestic refrigerators and freezers at JSC "Iceberg". HCFC-141b is considered interim technology and Iceberg will convert into non-ODS, e.g. HFC-245fa, at their own expenses.

Investment costs relate to evacuation and charging equipment, leak detectors, high pressure PU foam dispensers and fixtures/molds. Further charging stations, leak detectors and recovery units are foreseen for the service department. Finally costs for test and trials as well as certification are included. Incremental operating costs are not requested.

JSC "Iceberg" started preparation for conversion in 1995 (engineering and prototyping) and hence, ODS consumption as well as baseline equipment during this period is used as basis for eligibility assessment. The ODS consumption and incremental operating costs is based on pre July 1995 figures.

Prepared by:	COWIconsult (Ole Nielsen)	Date:	February 1, 1999
Reviewed by:	Dr. Lambert Kuijpers/ Dr. Mike Jeffs	Date:	February 11 and 25, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation		
SUB-PROJECT TITLE	**JSC "Iskra"** - Conversion from CFC-12 to HFC-134A in the Manufacture of Commercial Refrigeration equipment		
SECTOR/SUBSECTOR	Commercial Refrigeration		
ODS USE IN SECTOR	346 MT ODP, (1992), 167 MT ODP (1996), 77 MT ODP (1998)		
SUB-PROJECT IMPACT	Phase-Out of 19.31MT CFC-12 per Year (Average 1996-98)		
SUB-PROJECT DURATION	27 Months		
TOTAL SUB-PROJECT COSTS	Incremental Investment Costs w/10% Contingency		US$ 360,525
	Incremental Operating Costs		US$ 86,131
	Total Sub-Project Costs		US$ 446,656
PROPOSED FINANCING	GEF Sub-Grant	US$ 293,500	
	Enterprise Contribution	US$ 153,156	
SUB-GRANT COST EFFECTIVENESS	US$15.21/ kg. ODP		
IMPLEMENTING AGENCY	The World Bank		
NATIONAL COORDINATING AGENCY	State Committee on Environmental Protection		

PROJECT SUMMARY

This project covers the replacement of CFC-12 used as refrigerant by HFC-134a/HFC-404A for commercial refrigerating appliances produced at JSC "Iskra". The enterprise produce refrigerating compressors (hermetic and open-type) as well as condensing units or complete refrigerating systems at the factory in Moscow.

Investment costs relate to evacuation and charging equipment (oil and refrigerant), leak detectors, flushing units, retrofit of test installations, molds for production of compressor parts as well as tools for machining. Further leak detectors are foreseen for the service department. Finally costs for test and trials as well as technical assistance are included. Incremental operating costs are not requested.

Prepared by:	COWIconsult (Ole Nielsen)	Date:	February 1, 1999
Reviewed by:	Dr. Lambert Kuijpers	Date:	February 11, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation
SUB-PROJECT TITLE	**JSC "Kholodmash"** - Phase-out of Production of CFC-12 based Compressors & Condensing Units
SECTOR COVERED	Commercial Refrigeration
ODS USE IN SECTOR	346 MT ODP, (1992), 167 MT ODP (1996), 77 MT ODP (1998)
SUB-PROJECT IMPACT	Phase-out of 183 MT CFC-12
SUB-PROJECT DURATION	30 months
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency US$ 2,480,534 Incremental Operating (Savings) US$ 133,161 Total Sub-Project Cost US$ 2,347,373
SUB-GRANT COST EFFECTIVENESS	US$12.32 per kg ODP
PROPOSED FINANCING	GEF Sub-Grant: US$ 2,255,000 Enterprise Contribution: US$ 92,373 Complementary Enterprise Investment: Direct: US$13,042,000 Foreign Loan: US$35,970,000
IMPLEMENTING AGENCY	The World Bank
NATIONAL COORDINATING BODY	State Committee on Environmental Protection

PROJECT SUMMARY

This project will lead to the phase-out of a total of 183 MT of CFC-12 which is associated with the production of compressors and condensing units at JSC "Kholodmash" in Yaroslavl. The project is partly implemented with the introduction of HCFC-22 and small scale use of HFC-134a in 1996. The project will finance refrigeration equipment and machine tool attachments to enable an HFC based compressor design to be produced at the factory. Incremental operating costs are calculated but not included. The equipment requested for GEF funding is complementary to a larger factory re-equipment project being supplied on a turnkey basis.

Prepared by:	COWIconsult (David Gibson)	Date:	August, 1998
Reviewed by:	Dr. Lambert Kuijpers	Date:	September 15, 1998

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**Combine Torgtechnika:** Refrigerant Recovery, Recycling and Retrofit Capacity for Sverdlovsk Oblast	
SECTOR COVERED	Commercial Refrigeration Servicing	
ODS USE IN SECTOR	8,300 MT ODP (1992), 4,150 MT ODP (1996), 3,000 MT ODP (1998)	
SUB-PROJECT IMPACT	Phase-out of ODP 83 MT CFC-12	
SUB-PROJECT DURATION	30 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 2,288,645
	Incremental Operating Costs	US$ 2,786,024
	Total Sub-Project Cost	US$ 5,074,669
SUB-GRANT COST EFFECTIVENESS	US $26.91 per kg. ODP	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 2,239,000
	Enterprise Contribution:	US$ 50,000
	Enterprise Customer Contribution for Estimated Inventory Conversion:	US$ 2,785,669
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

This sub-project will lead to the phase-out of a total of 83.2 MT of CFC-12. The sub-project involves the recovery and re-use of refrigerant used for service This entails the provision service tools and training in addition to equipment for the recovery and recycling of refrigerant. Provision is also made for retrofitting to HFC-134a where appropriate by modifying one of three condensing unit re-furbishing lines at the Ekaterinburg service center. The use of an HCFC-22 based "drop-in" CFC-12 substitute is proposed for use on equipment where retrofit to HFC-134a would not be appropriate.

Prepared by:	COWIconsult (David Gibson)	Date:	August, 1998
Reviewed by:	Dr. Lambert Kuijpers	Date:	September 15, 1998

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**Pyatigorsktorgtechnica:** Refrigerant Recovery, Recycling and Retrofit Capacity for Stravropol Oblast	
SECTOR COVERED	Commercial Refrigeration Servicing	
ODS USE IN SECTOR	8,300 MT ODP (1992), 4,150 MT ODP (1996), 3,000 MT ODP (1998)	
SUB-PROJECT IMPACT	Phase-out of ODP 19 MT CFC-12	
SUB-PROJECT DURATION	30 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 1,165,381
	Incremental Operating Costs	US$ 419,084
	Total Sub-Project Cost	US$ 1,584,465
SUB-GRANT COST EFFECTIVENESS	US$60.23 per kg. ODP	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 1,144,400
	Enterprise Contribution:	US$ 21,000
	Enterprise Customer Contribution for Estimated Inventory Conversion:	US$ 419,065
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

This sub-project will lead to the phase-out of a total of 18.9 MT of CFC-12. The sub-project involves capacity development for recovery and re-use of refrigerant used for service. This entails the provision service tools and training in addition to equipment for the recovery and recycling of refrigerant. Provision is also made for retrofitting to HFC-134a where appropriate by modifying one of three condensing unit re-furbishing lines at the Pyatigorsk service center. The use of an HCFC-22 based "drop-in" CFC-12 substitute is proposed for use on equipment where retrofit to HFC-134a would not be appropriate.

Prepared by:	COWIconsult (David Gibson)	Date:	August, 1998
Reviewed by:	Dr. Lambert Kuijpers	Date:	September 15, 1998

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**Kemerovatorgtechnica:** Refrigerant Recovery, Recycling and Retrofit Capacity for the Kemorova Oblast	
SECTOR COVERED	Commercial Refrigeration Servicing	
ODS USE IN SECTOR	8,300 MT ODP (1992), 4,150 MT ODP (1996), 3,000 MT ODP (1998)	
SUB-PROJECT IMPACT	Phase-out of ODP 68 MT CFC-12	
SUB-PROJECT DURATION	30 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 1,753,543
	Incremental Operating Costs	US$ 2,322,449
	Total Sub-Project Cost	US$ 4,075,992
SUB-GRANT COST EFFECTIVENESS	US$25.06 per kg. ODP	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 1,703,543
	Enterprise Contribution:	US$ 50,000
	Enterprise Customer Contribution for Estimated Inventory Conversion:	US$ 2,322,449
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

This sub-project will lead to the phase out of a total of 67.74 MT of CFC-12. The sub-project involves capacity development for recovery and re-use of refrigerant used for service This entails the provision service tools and training in addition to equipment for the recovery and recycling of refrigerant. Provision is also made for retrofitting to HFC-134a where appropriate by modifying the condensing unit re-furbishing line at the Kemorovo service center. The use of an HCFC-22 based "drop-in" CFC-12 substitute is proposed for use on equipment where retrofit to HFC-134a would not be appropriate.

Prepared by:	COWIconsult (David Gibson)	Date:	August, 1998
Reviewed by:	Dr. Lambert Kuijpers	Date:	September 15, 1998

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**JSC " Plastic"** - Replacement of CFC-11 for blowing of integral skin and rigid polyurethane foam automotive components with CO_2 and pentane	
SECTOR COVERED	Non-Insulating Foam	
ODS USE IN SECTOR	4,200 MT ODP (1992), 599 MT ODP (1996), 270 MT ODP (1998) - CFC-11, CFC-12	
SUB-PROJECT IMPACT	172.4 MT ODP CFC-11 (Average 1995-1997)	
SUB-PROJECT DURATION	24 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$3,093,860
	Incremental Operating Savings	US$ 896,683
	Total Sub-Project Cost	US$ 2,191,177
SUB-GRANT COST EFFECTIVENESS	US $9.21 per kg. ODP (includes US$581,460 in safety costs)	
PROPOSED FINANCING	GEF Sub-Grant:	US$2,169,000
	Enterprise Contribution:	US$ 22,177
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

The sub-project will phase-out 172.4 MT of CFC-11 in the manufacture of automotive components manufactured from integral skin and rigid foams by using pentane for integral skin foam and CO2 for rigid foams Incremental investment costs cover CO_2 and pentane handling systems, injection heads and blending tanks, for existing foaming machines, filling turntables, gas detection equipment, plant modifications and technical and project management assistance. Incremental investment costs include US$581,460 in safety costs including a safety audit required by the OORG.

Prepared by: ICF-EKO, Alex Karputkin, Date: September, 1998
Reviewed by: Mike Jeffs Date: September 5, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**JSC " Stoidetal"** - Replacement of CFC-12 for foam blowing of extruded polyethylenr products with CO_2 /butane	
SECTOR COVERED	Non-Insulating Foam	
ODS USE IN SECTOR	4,200 MT ODP (1992), 599 MT ODP (1996), 270 MT ODP (1998 - CFC-11, CFC-12	
SUB-PROJECT IMPACT	79.3 MT ODP CFC-12 (Average 1995-1997)	
SUB-PROJECT DURATION	15 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 872,850
	Incremental Operating Savings	US$ 74,645
	Total Sub-Project Cost	US$ 798,205
SUB-GRANT COST EFFECTIVENESS	US $6.26 per kg. ODP (includes US$290,700 in safety costs)	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 786,700
	Enterprise Contribution:	US$ 11,505
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

The sub-project will phase-out 79.3 MT of CFC-12 in the manufacture of blowing extruded polyethylene building materials by replacing it with a CO_2/butane mixture in foam blowing operations. Incremental investment costs cover CO_2 and butane handling systems, modification of existing extrusion equipment, replacement of dies, plant modifications and technical and project management assistance. Incremental investment costs include US$290,700 in safety costs including a safety audit required by the OORG..

Prepared by: ICF-EKO, Alex Karputkin, Date: September, 1998
Reviewed by: Mike Jeffs Date: September 5, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**JSC " Nelidovo Plastic Plant"** - Replacement of CFC-12 for foam blowing of extruded polyethylenr products with CO_2 /butane	
SECTOR COVERED	Non-Insulating Foam	
ODS USE IN SECTOR	4,200 MT ODP (1992), 599 MT ODP (1996), 270 MT ODP (1998) - CFC-11, CFC-12	
SUB-PROJECT IMPACT	50.5 MT ODP CFC-12 (Average 1995-1997)	
SUB-PROJECT DURATION	15 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 993,850
	Incremental Operating Savings	US$ 47,953
	Total Sub-Project Cost	US$ 945,897
SUB-GRANT COST EFFECTIVENESS	US$8.22 per kg ODP (includes US$240,100 in safety costs)	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 655.000
	Enterprise Contribution:	US$ 290,897
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

The sub-project will phase-out 50.5 MT of CFC-12 in the manufacture of blowing extruded polyethylene sheeting and consumer goods by replacing it with a CO_2/butane mixture in foam blowing operations. Incremental investment costs cover CO_2 and butane handling systems, modification of existing extrusion equipment, replacement of dies, plant modifications and technical and project management assistance. Incremental investment costs include US$240,100 in safety costs including a safety audit required by the OORG.

Prepared by: ICF-EKO, Alex Karputkin, Date: September, 1998
Reviewed by: Mike Jeffs Date: September 5, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**"M.V. Khrunichev State Space Scientific-Industrial Center (Construction Bureau "Salut")"** - Conversion of Precision Cleaning Processes from CFC-113 to a non-ozone-depleting solvent	
SECTOR COVERED	Solvent Cleaning	
ODS USE IN SECTOR	CFC-113, TCA, MCF - 5,035 MT ODS (1992), 1,676 MT ODS (1996), 475 MT ODS (1998)	
SUB-PROJECT IMPACT	28.5 MT ODP CFC-113 (Average of 1996-98)	
SUB-PROJECT DURATION	24 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 693,100
	Incremental Operating Cost	US$ 50,000
	Total Sub-Project Cost	US$ 744,100
SUB-GRANT COST EFFECTIVENESS	US$19.73 per kg ODP	
PROPOSED FINANCING	GEF Grant:	US$ 450,000
	Enterprise Contribution:	US$ 294,100
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

30 MT/yr of CFC-113 used for cleaning small machined parts, piping, and large fuel tanks will be phased out by replacing the existing cleaning equipment with modern vapor degreasing equipment providing a high degree of solvent vapor containment and recovery and reuse of solvent. A non-ozone depleting solvent such as HFE-7100 will be used instead of CFC-113.

Prepared by:	Arthur D. Little, Inc., John T. Dieckmann,	Date:	December 1998
Reviewed by:	Joe R. Felty	Date:	March 2, 1999

SUB-PROJECT COVER SHEET

COUNTRY	Russian Federation	
SUB-PROJECT TITLE	**Miass Machine Building Plant–Miassky Mashinostroitelny Zavod (MMZ)** - Conversion of Precision Cleaning Processes from CFC-113 to a non-ozone-depleting solvent	
SECTOR COVERED	Solvent Cleaning	
ODS USE IN SECTOR	CFC-113, TCA, MCF - 5,035 MT ODS (1992), 1,676 MT ODS (1996), 475 MT ODS (1998)	
SUB-PROJECT IMPACT	3.2 MT ODP CFC-113	
SUB-PROJECT DURATION	24 months	
TOTAL SUB-PROJECT COST	Incremental Investment Costs w/10% Contingency	US$ 212,300
	Incremental Operating Costs	US$ 17,250
	Total Sub-Project Cost	US$ 229,550
SUB-GRANT COST EFFECTIVENESS	US$19.73 per kg ODP	
PROPOSED FINANCING	GEF Sub-Grant:	US$ 63,136
	Enterprise Contribution:	US$ 166,414
IMPLEMENTING AGENCY	The World Bank	
NATIONAL COORDINATING BODY	State Committee on Environmental Protection	

PROJECT SUMMARY

4 MT/year of CFC-113 used for cleaning small machined parts, piping, and large tanks and shell and tube heat exchangers will be phased out by replacing the existing cleaning equipment with modern vapor degreasing equipment providing a high degree of solvent vapor containment and recovery and reuse of solvent. A non-ozone depleting solvent such as HFE-7100 will be used instead of CFC-113.

Prepared by:	Arthur D. Little, Inc., John T. Dieckmann,	Date:	December 1998
Reviewed by:	Joe R. Felty	Date:	March 2, 1999

Annex 2

Prospectus: Special Initiative for ODS Production Closure in the Russian Federation

Prospectus:

Special Initiative for ODS Production Closure in the Russian Federation[39]

Overview

The purpose of this document is to describe a project, being proposed by the Government of the Russian Federation (GoR), aimed at the permanent elimination of ozone depleting substances (ODS) production capacity in Russia. This project is being prepared in association with the International Bank for Reconstruction and Development (IBRD) and is known as the Special Initiative for ODS Production Closure in the Russian Federation (hereafter the «Special Initiative»). The project is to be funded by contributions from donor countries and the Global Environment Facility (GEF), administered through an IBRD Trust Fund. It will be implemented in accordance with a Grant Agreement between the IBRD and the Russian Federation. The project will provide compensation to Russian ODS producing enterprises for permanently eliminating ODS production in accordance with Russia's international obligations.

This document provides a description of the project as proposed by the Government of the Russian Federation for prospective donors' attention. It includes: i) background on the history and current situation respecting ODS production in Russia; ii) commitments and actions of the Government of the Russian Federation respecting ODS phaseout; iii) the mechanisms for determining compensation payment for individual enterprises; iv) linkages to other ODS phaseout initiatives, namely the GEF ODS Consumption Phaseout Project; v) the legal structure envisaged for transfer and disbursement of funding; vi) implementation arrangements; and vii) production shutdown verification and monitoring procedures. It has been prepared on the basis of project preparation activities undertaken by the State Committee for Environmental Protection of the Russian Federation (SCEP) and the Center for Project Preparation and Implementation of International Projects on Technical Assistance (CPPI), with the support of the IBRD. This project preparation work was initiated in 1996 and given formal effect in February 1998 upon receipt of advice from the IBRD of the potential availability of funding from bilateral donor countries and the GEF. This document updates and supersedes a previous document, entitled 'Project Prospectus: Special

[39] Prepared by the State Committee of the Russian Federation for Environmental Protection (SCEP)with the assistance of the International Bank for Reconstruction and Development (IBRD).

Initiative for ODS Production Phaseout in the Russian Federation' which was prepared by the IBRD, with the support of the US Trade and Development Agency. This earlier document described initial preparation stages for purposes of soliciting expressions of interest to this problem from prospective donors. This Prospectus in its original form was presented to obtain confirmation of funding commitments by the donors at a 'round- table' meeting held by SCEP in Moscow on October 7, 1998 and has been revised to reflect agreements reached at this meeting.

A number of other background documents that may be useful in the context of this Special Initiative are available from SCEP upon request. These include:

- Protocol of Intentions between SCEP, Investment Center of the Ozone Depleting Substances Phase-out Projects (ICP 'OZONE') and ODS producing enterprises (July 1998);
- Russian Federation: Ozone Depleting Substances Consumption Phaseout Project. Project Document. Global Environment Facility. World Bank Report No. 15326-RU (May 1996);
- Russian Federation: Ozone Depleting Substances Consumption Phaseout Project. Second Tranche. Project Document. Global Environment Facility. World Bank Report No. 17391-RU (February 1998).

These documents have been provided to representatives of all donors as part of the Background Information Binder prepared for the 'round-table' meeting.

Project Description

1. The funds from the Special Initiative (at least US$17 million from bilateral donors, and up to US$10 million reallocated from the third tranche of the GEF ODS Consumption Phaseout Project) will be used to directly compensate the seven Russian producers of ODS for permanently closing down their ODS production capacity, as well as covering project administration costs and supporting technical assistance. It is envisaged that some producers may convert their facilities to the production of ODS substitutes, while others will dispose of or convert their process equipment to other applications. Prior to any disbursement under the Special Initiative, the Inter-Agency Commission on Ozone Layer Protection[2] and SCEP shall approve comprehensive plans for permanently closing ODS production capacities at each enterprise which will also be subject to review by independent experts and appraisal by the IBRD acting on behalf of the donors. The activities supported by the Special Initiative will result in elimination of approximately 140,000 MT of ODS production capacity. It is intended that all ODS production capacity will be permanently eliminated in the Yr. 2000.

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[2] The Inter-Agency Commission on Ozone Layer Protection (IAC) was established in accordance with the Resolutions of the Government of the Russian Federation dated 03.06.92 and 20.05.97 to ensure fulfillment of Russia's obligations under the Vienna Convention on Ozone Layer Protection and the Montreal Protocol on Substances that Deplete the Ozone Layer. The decisions taken by the IAC within its competence are obligatory for all federal executive bodies represented in the IAC as well as for institutions subordinate to these bodies.

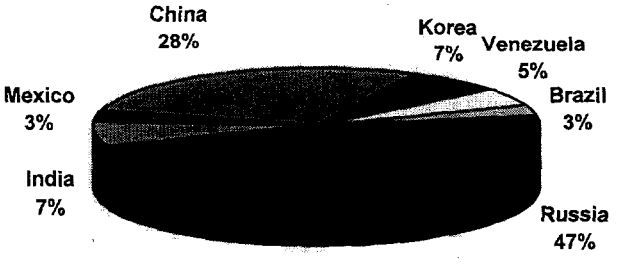
2. The Inter-Agency Commission on Ozone Layer Protection (IAC) and SCEP propose to use production capacities of each enterprise, current production levels and closure plans as the basis for allocating payments among the ODS producing enterprises from the Special Initiative funds. Sub-grant amounts, thus determined, will be subject to final negotiation of Sub-Grant Agreements with the enterprises. Disbursements to ODS producing enterprises will be made in two parts. An initial payment, agreed upon with each enterprise, will be made upon signing of the Sub-Grant Agreements between the SCEP and all seven ODS producers, and obtaining 'no objection' of these Sub-Grant Agreements from the IBRD. The appraised and agreed to enterprise specific closure plans for permanent elimination of production capacity will be a binding part of these agreements. The IBRD will also undertake in accordance with its procedures an independent review of these plans prior to appraisal. The advance payment to each producing enterprise shall be 30 percent of the agreed compensation amount in the Sub-Grant Agreement and it will be made after Sub-Grant Agreements with all the enterprises are signed. The final installment of 70 percent will be paid upon the complete and permanent elimination of ODS production capability in all producing enterprises, upon confirmation by each enterprise of elimination of ODS production capability and independent verification, acceptable to SCEP and the IBRD, inclusive of clearance through the independent technical review process established by IBRD..

Background

Russia's ODS Production, Consumption and Exports

3. The Russian Federation was historically one of the world's major producers and consumers of ODS. In 1990, when Russian ODS production reached its peak, it accounted for approximately 15-20 percent of global production. Russia's production at present supplies a declining domestic market as well as the requirements of a number of the countries of the former Soviet Union and some developing country markets. Exhibit 1 illustrates that the Russian phaseout in production of ODS will theoretically eliminate approximately half of the existing worldwide production capacity outside of industrialized nations compliant with the Montreal Protocol. Russia's actual current production (estimated at 15,900 MT/y) now represents some 11 percent of global production of regulated ODS. The production of ODS in Russia occurs at seven production sites, located in various regions. Their location is shown on the map (Exhibit 2). The specific ODS substances which are produced in Russia and which are covered by the Special Initiative are CFC-11, CFC-12, CFC-13, CFC-113, Halon 2402, Halon 1301 and Halon 1211.

Exhibit 1
Estimated CFC Production Capacity
Outside Compliant Industrialized Nations



Estimated Total: 290 - 300 Thousand Tons

Exhibit 2
CFC Production Sites in the Russian Federation

Russia's Plans and Commitments to Phase Out ODS

4. As the successor state to the Soviet Union, which ratified the Montreal Protocol on Substances that Deplete the Ozone Layer in 1988, the Russian Federation fully acknowledges and accepts its responsibilities under that international accord to eliminate the use of ODS. The Russian Federation subsequently ratified the London amendments to the Protocol in 1992. It is also working toward formal ratification of the Copenhagen amendments. In this regard, Russia will maintain voluntary compliance with the Copenhagen amendments in relation to the production of HCFCs, noting that its current production is substantially below current compliance levels. In 1995, it adopted a formal Country Program of priority measures for the phaseout of ODS production and consumption as well as the control of imports and exports all in accordance with the requirements of the London amendments. The activities on phaseout of ODS production and consumption was given legal effect by Resolution of the Government of the Russian Federation No. 526, dated May 26, 1995, setting the year 2000 for ODS production and consumption phaseout. The formal control of imports and exports of ODS in accordance with its international obligations was instituted by a further Government Resolution No. 563, dated May 8, 1996. Effective in calendar year 1996, the SCEP following this Resolution instituted a system of production quotas applicable to each producing enterprise which are annually reduced until complete phaseout is achieved in 2000. Russia believes that it is a party in good standing to the Montreal Protocol and is current with its reporting and financial obligations.

5. Currently, the Government of the Russian Federation is finalizing its activities on formal approval and adoption of the Federal Task Program 'ODS Production and Consumption Phaseout in the Russian Federation in 1998-2000' and future measures required to ensure compliance with its international obligations and to mitigate the economic and social impacts of phaseout. This work along with refinement of more detailed legal regulatory control mechanisms of ODS and enforcement

requirements is being implemented within the framework of technical assistance provided under the GEF ODS Consumption Phaseout Project. In addition, a draft of the Government Resolution specifically covering the ODS production phaseout in 2000, has been prepared and submitted for approval within the Government. It is envisaged that this Resolution along with another one on banning ODS new usage and exports/imports will be formally signed prior to signing the Grant Agreement with the IBRD. These Government Resolutions will provide the Government of the Russian Federation with full authority to close any ODS producing facility and to ban the initiation of new ODS production of substances addressed in the Special Initiative, an authority that it is committed to use. It is understood that enactment of these Resolutions will constitute a condition of Grant effectiveness.

6. All ODS producing enterprises have reconfirmed their commitment to eliminate production capacity by signing a Protocol of Intentions with the SCEP on participation in the Special Initiative. Copies of the signed Protocols have been provided to donors and the GEF. In addition, the Government of the Russian Federation is committed to take appropriate regulatory action related to the closure of any other ODS producing facilities in accordance with the above mentioned Government Resolutions.

7. The Government of the Russian Federation recognizes the importance of managing the relatively small but socially and economically significant residual consumption demand that will exist after the permanent closure of domestic ODS production capacity in 2000. The Federal Task Program 'ODS Production and Consumption Phaseout in the Russian Federation in 1998-2000' will be the basis for addressing this demand. It is envisioned that this will be accomplished over a transitional five year period by a combination of measures all of which the Government can indicated its commitment to. These are: i) the enactment and enforcement of effective import controls; ii) provision of transitional stocks of ODS to meet near term key demand; iii) accelerated conversion of residual consumers; iv) implementation of ODS pricing policies that ensure an economic incentive for residual consumers to convert to non-ODS technologies; and v) implementation of recycling and recovery initiatives as may be practical. The Government of the Russian Federation is currently undertaking the evaluation of various sources of credit and grant funding for purposes of financing the measures that are required for residual demand management. These include accessing available credit lines for purposes of financing strictly regulated ODS security banking measures and conversion of significant residual consumers. Subject to eligibility for GEF funding, it will also be proposed that funding available in the third tranche of the GEF ODS Consumption Phaseout Project will be used to support a sustainable, longer term, small grant program to address conversion of small widely distributed consumers, particularly in the refrigeration servicing and solvent sectors.

Current Situation in ODS Phaseout

8. Since 1990, both production and consumption of ODS in Russia have declined significantly. In 1990, production of ODS excluding carbon tetrachloride (used entirely as feedstock for production of other ODS and therefore not counted) peaked at estimated 117,930 MT of ODS. By 1992, production of ODS had fallen by 44 percent to 66,515 MT, and by 1997 had fallen to about 15,900 MT. Russian domestic consumption of ODS excluding carbon tetrachloride peaked at around 70,000 MT in 1990 and had fallen 48 percent to 36,665 MT by 1992, and to about 11,780 MT by 1997. Reductions in ODS use and production since 1990 are the result of both the overall decline of the manufacturing industry in Russia and the implementation of some ODS phaseout efforts. Further significant declines in consumption are forecast in 1998 and subsequent years as the benefits of phaseout investments made under the GEF ODS Consumption Phaseout Project continue to be realized. Domestic consumption in 1998 and 1999 is forecast to be approximately 9,000 MT and 6,000 MT, respectively.

After 2000 in the absence of continued phaseout initiatives, residual demand, in the solvent, refrigeration servicing and fire protection sectors is estimated to be 3,000MT- 4,000 MT per year, based on estimates obtained in the course of developing a draft of the Federal Task Program 'ODS Production and Consumption Phaseout in the Russian Federation in 1998-2000'. This demand will be managed through a combination of recycling initiatives, controlled sale of banked ODS and continued implementation of conversion of residual users to non-ODS technology.

9. Exports accounted for 41 percent of production in 1990. As of 1997, the percentage had fallen to about 27 percent. In absolute terms, the exports amounted to about 3,954 MT in 1997. While Russia recognizes international concern respecting credibility of illegal supplies of ODS of Russian origins into markets that have banned or imposed tight controls on the import of such substances, the legal imposition of rather tight export controls in Russia effectively responds to this concern, while mitigating the effects of ODS phaseout measures on other countries traditionally dependent on Russia for supplies. In 1997, 42 percent of the exports were made to other CIS countries, principally the Ukraine, and 13 percent were exported directly to Article 5 countries. The remaining exports were transit cargoes to OECD countries and are supported by documentation from the importing countries related to its re-export to Article 5 countries. With the closure of ODS production facilities as proposed under this Special Initiative, Russia will actually give up its rights to continue to produce and export ODS to Article 5 countries, including ODS stored in the ODS security banks.

Financial Framework of the Special Initiative

Elements of the Financial Program

10. The Special Initiative has been developed to partially defer the costs associated with specific efforts of the enterprises for ODS production phaseout that are required for Russia to meet its international commitments.. The Special Initiative shall provide grant funding amounting to US$27 million to directly compensate enterprises for permanent closure of production capacity and to ensure overall project implementation. The above mentioned funding sum is based on the amount initially proposed by IBRD in initial discussions with enterprises. It will also accommodate the addition of one of the biggest ODS producers in Russia - JSC 'Halogen' in the list of participating enterprises. Based on 1995 production levels (40,050 MT), which correspond to the year when the Special Initiative was first discussed by IBRD, the overall cost effectiveness of the grant is US$0.67/kg. The proposed overall funding (US$27 million) consisting of the Special Initiative dedicated funding by donors (at least US$17 million) and suggested reallocations from the third tranche funding of the GEF Consumption Phaseout Project to close any remaining financing gaps that would not be covered by additional donor pledges at the Moscow donors' meeting. It is understood that disbursement of donor contributions to the Special Initiative Trust Fund may be conditioned on GEF Council approval of its contemplated contribution. The GEF Secretariat has reviewed the current proposal. Based on the information included in this Prospectus it has confirmed the incremental nature of proposed activities and their eligibility for GEF support – in principle – within the US$60 million ODS phase out framework for Russia presented for GEF in October 1995. The Government of Russia intends to submit the formal request for GEF co-financing to the GEF in early 1999 so that it can be considered by the GEF Council at it's spring 1999 meeting. The request will be presented as an element to the third tranche of the Russia ODS Phase Out Project Program. The proposed allocation of the Special Initiative funding among the various project components is as follows:

- direct compensation payment to enterprises for permanent elimination of ODS production capacity of US$24.7 million;

- a technical assistance component managed and supervised by SCEP to support project implementation, provide institutional strengthening, and technology transfer opportunities to facilitate the introduction of product alternatives to the production sector, amounting to US$0.5 million;

- a Sub-Grant Agreements processing and implementation component of US$1.0 million to the local implementation agency (CPPI) who will provide environmental evaluation, and monitoring and verification support; and

- the IBRD costs for supervision, independent expert reviews, and Trust Fund administration costs over the lifetime of the project of US$0.8 million.

Legal, Processing and Implementation Framework of the Project

Legal Framework

11. The funds will be made available to the Russian Federation through a Grant Agreement signed by the IBRD and the Russian Federation in due order and supported by the establishment of a dedicated Trust Fund at the IBRD. The Russian Federation Project Executing Agency (SCEP) will then enter into individual Sub-Grant Agreements with each of the ODS producers.

Involved Parties and Their Roles

12. The same institutions and agencies which are implementing GEF ODS Consumption Phaseout Project will be responsible for various aspects of SI implementation. They are: *Inter-Agency Commission on Ozone Layer Protection* (IAC) was created to ensure inter-agency cooperation and coordination of the governmental activities under Russian Federation obligations under the Vienna Convention and the Montreal Protocol; *State Committee of the Russian Federation for Environmental Protection* (SCEP) is a designated governmental agency responsible for ensuring compliance of the Russian Federation to its obligations under the Vienna Convention and the Montreal Protocol and supervision of implementation of the GEF Consumption Phaseout Project; *Center for Preparation and Implementation of International Projects on Technical Assistance* (CPPI), established within the framework of the IBRD Environmental Management Project as an autonomous noncommercial institution, is designated in the Agreement between the SCEP and the CPPI on implementing the GEF Consumption Phaseout Project as the Project implementing body; *Investment Center of Ozone Depleting Substances Phase-Out Projects* (ICP 'OZONE'), established by the CPPI as a noncommercial CPPI institution, is created for implementation of the GEF Project as well as for preparation and implementation of other projects aimed at ODS production and consumption phaseout in Russia.

Mobilization of Funds

13. It is understood that all donor contributions to the Special Initiative will be made available as grants and deposited into a Trust Fund account at the Federal Reserve Bank (New York city) as arranged by the IBRD and that the timing of those contributions will vary according to the budget availability of the individual donors. However, it is assumed that the funds will be available for disbursement beginning in July 1999 until September 2000. A detailed disbursement schedule will be developed for inclusion in the Grant Agreement.

IBRD Trust Fund (TF)

14. It is understood that the IBRD has established a Trust Fund (TF) to manage the donor funds. The IBRD will be responsible for the administration and operation of the TF in accordance with TF agreements with each of the donors.

Project Grant to the Russian Federation

15. Grant Funds will be made available to the Russian Federation as a grant in accordance with terms and conditions agreed between the Russian Federation and the IBRD under a Grant Agreement. It is expected that grant funds under the SI will be untied. In accordance with the Grant Agreement all seven producing enterprises shall enter into Sub-Grant Agreements as a condition of any disbursements of enterprise compensation payments, and final disbursement of 70% of the total Grant amount will be conditioned to verification of permanent closure of all producing enterprises. In addition to the Government's commitment to fully enforce closure in accordance with the applicable Government Resolutions, the enactment of which shall be a condition of Grant effectiveness, it is understood that repayment obligations in the amount of the disbursed Grant payments will be included in the Grant Agreement in the event of failure of all enterprises to complete permanent closure of ODS production capacity, continued production from any other source in Russia, or the resumption of ODS production in the Russian Federation from any source in Russia.

Sub-Grants to Beneficiary Enterprises

16. SCEP will enter into individual Sub-Grant Agreements with each of the ODS producers following appraisal of the enterprise's detailed production closure plan jointly by the ICP 'OZONE' and the IBRD. These closure plans will be subject to review by international experts within the framework of the Ozone Operations Resource Group (OORG)[41] administered by the IBRD prior to appraisal. The Sub-Grant Agreements will specifically require adherence to the appraised production closure plan, as cleared by the OORG review process and make provision for repayment of sub-grant funds in the event of failure of the specific enterprise to complete permanent closure of ODS production capacity in accordance with this plan or the resumption of any ODS production at the enterprise. It will also outline the legal and regulatory actions that SCEP will initiate in the event of failure to fully eliminate production capacity. Finally, it will require unrestricted access of SCEP, ICP 'OZONE', IBRD, and expert consultant's employed by these organizations to facilities for purposes of monitoring and verification activities, subject only to reasonable commercial confidentiality and conflict of interest restrictions.

Project Implementation and Supervision

17. The IBRD will supervise project implementation on behalf of donors in accordance with its obligations to donors as the Implementing Agency. The IBRD will work with SCEP/ICP 'OZONE' to ensure that strict monitoring and verification procedures are put in place. This will include assistance in the development of Terms of Reference for monitoring and verification activities, and other technical assistance assignments. The IBRD will also carry out regular supervision of the project and

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41 The Ozone Operations Resource Group (OORG) is an internationally recognized group of sector experts which undertakes technical reviews of all GEF and Montreal Protocol Multilateral Fund (MPMF) ODS phaseout projects implemented by the World Bank.

will observe the implementation of monitoring and verification activities The IBRD will be responsible for reporting on a regular basis to the donors supporting the Special Initiative.

18. SCEP and IAC will supervise the overall implementation of the Special Initiative in the Russian Federation. ICP 'OZONE' will be directly implementing the Project, including the administration of Sub-Grant Agreements, establishment and operation of the Special Account, administration of withdrawal applications for disbursements to the various beneficiary enterprises, assistance in monitoring and verification activities, and reporting as required in the Grant Agreement. It will also provide advice to the beneficiary enterprises on reporting requirements that are applied to them.

19. SCEP places a high priority on the credibility of the Special Initiative in eliminating ODS production. Therefore, particular emphasis is to be placed on implementation of rigorous monitoring and verification of permanent production capacity closure. Utilizing resources provided for under the Project, a consultant team, including international and Russian experts, will be engaged to undertake this work. The monitoring and verification procedures to be used, which shall be subject to OORG review, will be modeled on internationally recognized procedures and are to be developed jointly with the IBRD and be based on the appraised closure plans adopted in each Sub-Grant Agreement. A general overview of the requirements to be included in the enterprise closure plans, and the monitoring and verification procedures, as agreed with the IBRD, are presented in Annex 4.

Environmental Aspects

20. The implementation of physical closure activities will be subject to the standard review procedures of SCEP' Department of State Ecological Control and Environmental Safety. This will involve a preliminary review of closure plans by local SCEP offices prior to implementation and conducting of a formal environmental expertise when these plans are fully documented It is anticipated that the first step will be undertaken prior to Sub-Grant Agreement signing and the final step immediately after Grant effectiveness. It is contemplated that support for the preparation of final documentation submitted for the state ecological expertise will be provided from the project's technical assistance component. The main environmental impact of the production closure will only be related to the disposal of some process equipment removed from operation. Based on experience with the GEF ODS Consumption Phaseout Project and other World Bank administered investment projects it is anticipated that all closure activities will be consistent with the «B» environmental assessment rating that has been assigned to this project by the World Bank.

ANNEX 1

Enterprise Profiles and Production Quotas

Altaichimprom (JSC Altaichimprom) is a chemical complex located in Slavgorod in south-central Siberia. It produces a number of different chemicals including CFC-11/12. It's total production capacity is 30,000 metric tons (MT) per year. It's total 1997 production was 384 MT while it's 1997 production quota was set at 1,000 MT.

Chimprom (JSC Chimprom (VOCCO)) is a large chemical complex located off the Volga river in Volgograd. It produces a wide range of chemicals and synthetic raw materials. It is active in the production of sodium hydroxide and other inorganic compounds, chlorine (and its derivatives), solvents, polymers, copolymers, plasticizers and extractants. Its ODS production capacity amounts to 18,000 MT of CFC-113 and 24,000 MT of CFC-11/12. Its 1997 production was 7,023 MT of CFC-11/12[4] and 243 MT of CFC-113 while the 1997 production quota was set at 5,000 MT of CFC-11/12 and 1,000 MT of CFC-113.

Halogen (JSC Halogen) is a large chemical complex located in Perm in the Urals. JSC Halogen produces a wide range of fluorocarbons, hydrofluoric acid, fluorine hydrogen, fluorocompaunds and fluoroplastics. The plant has the capacity to produce 30,000 MT per year of CFC-11/12 and 300 MT of halon 2402. Its 1997 production was 2,945 MT of CFC-11/12 and 161.5 MT of Halon 2402, while the 1997 production quota allocation was set at 7,000 MT of CFC 11/12 and 300 MT of halon 2402.

Kaustic (JSC Kaustic) is a large chemical complex located on the banks of the Volga River in Volgograd. The plant is active in basic inorganic and organic chlorine chemistry and produces sodium hydroxide, chlorine and its derivatives, calcium chloride, polyvinyl chloride and methyl chloride. Its CFC-11/12 production capacity is 30,000 MT per year. Its 1997 production of CFC-11/12 was 4,300 MT of CFC-11/12[4] while its 1997 production quota allocation was set at 4,000 MT.

Kirovo-Chepetsk Chemical Kombinat (JSC Kirovo-Chepetsk Chemical Kombinat named after B.P. Konstantinov) is a large chemical complex located in the north-east part of European Russia. The facility has production capacity of 5,800 MT per year for CFC-113 and of 1,030 MT for Halon 2402. Its 1997 production of CFC-113 was 415 MT, while its 1997 production quota for CFC-113 was set at 1,000 MT. Production capacity of 900 MT per year for CFC-114 b_2 was eliminated by the enterprise on its own initiative.

Redkino Test Factory (JSC Redkino Test Factory) is a grouping of small production facilities located in Redkino near Tver. The facility has CFC-13 production capacity of 200 MT per year. Its 1997 production was 75 MT of CFC-13 while its 1997 production quota was 90 MT.

Russian Scientific Centre of Applied Chemistry (RSC Applied Chemistry (GIPKh)) is a research institute which operates small scale production facility located in St. Petersburg. It has small scale production capacity of
30 MT for CFC-115 and of 80 MT for Halon 1301 and of 20 MT for Halon 1211. It also has recycling capabilities. GIPKh played an important role in the development of halogen chemistry in Russia and continues to be an important player in the development of replacement and new halogen chemistry

[4] Exceeding ODS production quotas was carried out from federal reserve on the basis of special decision of SCEP for meeting national internal requirements under the general quota system of the Russian Federation.

technology. It was the sole producer of halon 1211 and 1301 and as such will play an important role in supporting the phase out in the various applications. In 1997 at its pilot production facility there were recycled 30 MT of Halon 2402, 1 MT of Halon 1301 and 0.5 MT of Halon 1211, and also 182 MT of CFC-12.

ANNEX 2

Summary of Major Russian Regulatory *Enactments*

and Related Actions Designed to Control and Phase Out Ozone Depleting Substances

MEPNR[5] Letter to Parties of the Vienna Convention and Montreal Protocol (February 26, 1996)

- Confirms the Government's general commitment to ozone layer protection and desire to comply with the Vienna Convention and Montreal Protocol;
- States that the Inter-Agency Commission on Ozone Layer Protection (IAC) is the main coordinating governmental body of the ODS-related activities; notes that the CPPI acts as the Secretariat of the IAC;
- States that as of January 1, 1996, ODS consumption and production in Russia is subject to annual (diminishing) quotas; in addition to overall quotas for ODS production, specific quotas are established for each enterprise that produces ODS;
- States that ODS controls are implemented through quotas and licensing; the CPPI is to manage this licensing and quota system; local branches of the MEPNR are to regulate the above activities;
- As of January 1, 1996, the State Committee on Standards, Metrology and Certification issues standards and certification of ODS; underlying technical documents related to this effort is being finalized;
- All ministries and agencies of the Government are undertaking an inventory of their ODS and are preparing their needs until the year 2005, which information is to be completed by April 1, 1996;
- Notes that as of January 1, 1996, export of ODS will be controlled through necessary legal, organizational and administrative measures, including (a) complete prohibition of ODS if prohibited under Article 5 of the Montreal Protocol; (c) limited and licensed export of ODS to countries to CIS and prohibition of re-export, and (d) control of export of used ODS or ODS that are targeted for destruction.
- States that the system of control and regulations of ODS will be fully implemented by the end of 1997.

SPECIAL INITIATIVE FOR ODS PRODUCTION CLOSURE IN THE RUSSIAN FEDERATION

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5 Ministry for Environmental Protection and Natural Resources of the Russian Federation (MENPR). In accordance with the Decree of President of the Russian Federation «On the structure of Federal Executive Bodies» of August, 1996 N 1177 the MEPNR was transformed into the State Committee of the Environmental Protection (SCEP).

GOR Letter to the Parties to the Vienna Convention and Montreal Protocol (May 26, 1995)	• Confirms GOR commitment to the Vienna Convention and Montreal Protocol, refers to actions undertaken to meet Russia's obligations under international ozone agreements, and requests a 4-year extension to completely phase out production and consumption of ODS in Russia.
GOR Resolution No. 526 on priority measures to ensure compliance with the Vienna Convention and Montreal Protocol (May 24, 1995)	• Approves priority activities to comply with the country's obligations under the Vienna Convention and Montreal protocol, and appoints the MEPNR to carry out or coordinate these activities; requires that the MEPNR submit to the GOR a timetable for phase-out of ODS in the consumption and phase-out sectors; • Requires that governmental agencies and ministries finance in 1995 priority activities identified in the resolution; states that 1996 budgetary allocations shall be made for such activities as well; • States that as of January 1, 1996 export and import of ODS to/from countries that are parties to the Montreal Protocol are subject to special licenses; export and import of ODS to/from other countries is prohibited; the MEPNR, Ministry of Foreign Economic Relations, State Customs Committee, and other governmental agencies were to compile a list of such controlled substances; • State Committee on Statistics was to submit an annual report to MEPNR on ODS consumption and production; • State Committee on Standards, Metrology and Certification was to deal with standards and certification of ODS; • Requires governmental agencies to submit to the MEPNR an annual application for ODS production.
GOR Position Paper entitled «Achievable ODS Phase-out Schedule in the Russian Federation» (August 1994)	• Summarizes developments in ODS sector to date; • Refers to ODS Task Force to be established under the MEPNR; • Indicates that a GOR Order was being prepared to provide for sector specific bans on ODS consumption, establish production and import/export licensing regime, and establish trade restrictions in accordance with the Montreal Protocol's requirements.

SPECIAL INITIATIVE FOR ODS PRODUCTION CLOSURE IN THE RUSSIAN FEDERATION

GOR Resolution No. 875 governing the functioning of the Inter-Agency Commission for the Ozone Layer Protection (August 30, 1993)	• Provided that the Commission will be under the auspices of the MEPNR (formerly Ministry for Environmental Protection and Natural Resources); • Assigns the commission to coordinate governmental activities related to control of ODS, pursuant to Russia's obligations under International ozone agreements and in accordance with its country program.
GOR Resolution No. 378 on measures to ensure compliance with the obligations under Vienna Convention and Montreal Protocol (June 3, 1992)	• Created the Inter-Agency Commission for Ozone Layer Protection; • Requested that governmental agencies develop a draft program to implement Russia's obligations under the Vienna Convention and the Montreal Protocol, which program was to include a financing plan; • Stated that the Ministry of Finance is to annually allocate funds required by the Russian Federation to be contributed to the Multilateral Fund created under the Montreal Protocol.

ANNEX 3

Project Processing Plan

Part 1: Preparation Steps

I. Trust Fund for the Special Initiative

The Trust Fund for the Special Initiative will be used to partially compensate the seven Russian ODS producers for permanently closing down their ODS production operations, as well as to cover project administration costs and supporting technical assistance. It is envisaged that some producers may convert their closed capacity to the production of ODS substitutes, while others will leave theirs closed with unusable capacity permanently idled or reuse some process equipment in other applications.

The assumed funding[42] of the Trust Fund from bilateral donor and the GEF is as follows::

Austria:	USD	0.2 million
Denmark:		2.0 million
Finland:		1.0 million
Germany:		1.0 million
Italy:		0.4 million
Japan:		**2.0 million**
Norway:		2.0 million
Sweden:		1.0 million
United Kingdom:		3.4 million
United States:		6.0 million
Bilateral Donors:		19.0 million
GEF		8.0 million
Total:	USD	27.0 million

II. Summary of Key Steps in Project Processing

After the Donors' Meeting on October 7, 1998, project preparation and processing will be undertaken as follows:

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[42] The exact amount of some donor contributions are subject to exchange rates corrections where commitments have been made in national currencies. However, it is intended that the exact amount of the GEF contribution will be adjusted to fix the total Special Initiative funding at US$27 million.

A. Preparation of Proposed Closure Plans. Each enterprise will prepare a proposed Closure Plan using technical support from ICP Ozone and National Pollution Abatement Facility (NPAF) and a technical consultants hired under the second tranche of the GEF project. A general description of the Plan's requirements is provided in Annex 4.

B. Preparation of Detailed Monitoring and Verification Procedures. ICP Ozone using technical resources available under the GEF Consumption Phaseout Project will develop monitoring and verification criteria applicable to each enterprise's proposed Closure Plan.

C. Peer Review. A Technical Review Group will be established by IBRD within the framework of the OORG process in accordance with its established procedures, including those related to confidentiality and conflict of interest. It will consist of three independent technical experts agreed to by the donor countries and be chaired by the sitting OORG Production Sector Advisor. Prior to appraisal by IBRD, the Technical Review Group will conduct a peer review of the proposed closure plans and monitoring and verification criteria developed above and revisions will be incorporated as required. Subsequently, it will provide clearance of the appraised closure plans, and monitoring and verification procedures included in Sub-Grant Agreements, review periodic implementation monitoring reports, and provide clearance of final Closure Verification Reports prior to final disbursement. Recommendations of the Technical Review Group are anticipated to reflect a consensus, but where disagreement exists, the majority opinion shall govern. The chairman or his designate shall have the option of participating as an observer in the joint SCEP IBRD appraisal mission or in IBRD supervision missions visiting enterprises.

D. Appraisal. SCEP/ICP «OZONE» jointly with IBRD will appraise each enterprise's revised final Closure Plan, inclusive of monitoring and verification criteria and obtain agreement on the final closure plan for purposes of its adoption as part of the Sub-Grant Agreement.

E. Negotiation/Signing of the Grant Agreement.

F. Negotiation/Signing/Bank «No Objection» of Sub-Grant Agreements.

G. Signing/Bank «No Objection» of Project Implementation Agreement between the SCEP and CPPI

H. Grant Effectiveness.

Part 2: Legal Agreements and Main Covenants

With respect to the ODS production sector, we have listed below the proposed list of agreements. Confirmation will be obtained that the proposed parties can obligate themselves as proposed and are empowered to sign the agreements in question.

Trust Fund: Agreement between Donor Countries and the IBRD

This Trust Fund Administration Agreement will set forth the obligations of the parties. It will *inter alia* specify:

- amount of the contribution made by the Government of each Donor Country concerned;
- time frame for contribution to be made to the Trust Fund;
- obligation for the IBRD to establish, administer and operate the Trust Fund where the contributions from the Donor Countries will be deposited;
- purposes of the grant;
- authorized expenditures;
- applicable IBRD procedures (reference to Bank operational procedures);
- applicable IBRD fees.

Trust Fund Grant Agreement between the IBRD and the Russian Federation

The Trust Fund Grant Agreement between the Russian Federation as represented by its State Committee for Environmental Protection and other concerned Ministries, and the IBRD will set forth the respective obligations of the parties. It will *inter alia* specify:

- amount of the grant;
- time frame for disbursement of the grant;
- closing date of the grant;
- purposes of the grant;
- implementation of the project with due diligence;
- conditions of effectiveness
- condition of disbursement of the grant and authorized expenditures;
- passing-on by the Russian Federation of the grant in the form of sub-grants to ODS producing enterprises;
- disbursement and procurement procedures;
- financial reporting requirements;
- project implementation reporting requirements;
- auditing procedures;
- identification of ODS producing enterprises by name and identification of amount of sub-grant to each of them;
- suspension of the grant in case of non-performance;
- refunding of the grant in case of misuse.
- commitment by the Russian Federation respecting the enforcement of Government Resolutions and other necessary legal authorities related to the ban on ODS production, new ODS consumption and the import and export of ODS, and the closure of non-compliant facilities.
- confirmation that the compensation payments made to enterprises under the Special Initiative will not be subject to direct taxation.

Sub-Grant Agreements between the State Committee for Environmental Protection and the ODS Producing Enterprises

These Sub-Grant Agreements will *inter alia* specify:

- amount of the sub-grant;
- purposes of the sub-grant;
- implementation of the sub-project with due diligence;
- time frame for disbursement of the sub-grant;
- closing date of the sub-grant;
- conditions of disbursement of the sub-grant;
- disbursement procedures;
- authorized expenditures;
- suspension of sub-grant and enforcement of closure in case of non-performance;
- refunding of the sub-grant in case of misuse;
- technical auditing procedures (independent inspection of physical completion of production closure);
- implementation reporting requirements;
- completion reporting requirements;
- closure plans (environmental /technical aspects of closure).

Project Implementation Agreement between the State Committee for Environmental Protection and CPPI

This Project Administration Agreement between the State Committee for Environmental Protection and CPPI will outline the obligations and implementation responsibilities under the project. It will *inter alia* specify:

(a) Responsibilities of the State Committee for Environmental Protection:

- execution of the Trust Fund Grant Agreement on behalf of the Russian Federation;
- supervision and monitoring of the project's implementation as undertaken by the ODS producing enterprises;
- execution of Sub-Grant Agreements with ODS producing enterprises;
- ensuring compliance of implementation by each producing enterprise within this project, with applicable Russian laws and regulation from the aspect of environmental protection.

(b) Responsibilities of CPPI/ICP «OZONE»:

- provision of regular reports to the Ministry of Finance and Ministry of Economy;
- acting in the capacity of financial agent with respect to the disbursement of the grant funds in accordance with the provisions of the Grant Agreement and Sub-Grant Agreements;
- technical support to enterprises in development closure plans;
- establishment and operation of the Special Account for the project;
- negotiation and assistance in execution of Sub-Grant Agreements with the ODS producing enterprises;
- provision of monthly statements of Sub-Grant expenditures to the ODS producing enterprises and the State Committee for Environmental Protection;
- preparation of progress reports summarizing project implementation activities, milestones achieved, disbursements, all with references to agreed performance.

ANNEX 4

Description of Verification Procedure for ODS Production Closure in Russia

Introduction

This annex describes a procedure to define how closure will be achieved and to verify whether enterprises producing ozone-depleting substances (ODS) in Russia are properly fulfilling their obligation to permanently close ODS production capacity as provided for under a Grant Agreement between the Russian Federation and the IBRD covering the Special Initiative, and associated Sub-Grant Agreements between the Russian Federation State Committee for Environmental Protection and producing enterprises. The verification process for ODS production closure consists of the following elements, applicable to each enterprise:

- Development and documentation of a closure plan
- Development of enterprise-specific closure monitoring and verification criteria
- Appraisal of the closure plans, and monitoring and verification criteria
- Closure monitoring and verification

Each element is described in detail below:

Closure plan documentation

After the donor's meeting has confirmed funding for enterprise compensation, each producing enterprise will submit a detailed closure plan to ICP Ozone. Technical assistance, as may be required, will be provided by ICP Ozone/NPAF, from funding under the GEF Consumption Phaseout Project in preparing this documentation in a consistent manner. Proposed Closure plans will then be submitted to the IBRD for independent OORG review. Based on this review, they will be finalized for formal appraisal.

Recognizing that each enterprise closure plan will be unique to the specific production operations involved and business plans of the enterprise, the following defines the general information anticipated to be included:

1. Baseline Information on Existing ODS Production and Recycling Facilities

(a) general description of process technology employed and products produced;
(b) process flow sheet and materials balances;
(c) description of major items of process and materials handling equipment, including:
    - materials of construction
    - dimensions
    - capacity
(d) inventory of spare parts;
(e) site diagram showing location of and access to ODS producing facility;
(f) records of actual production levels each year since 1990, including year-to-date for the current year;
(g) description of the mode of operation and product slate: (continuous, intermittent, or «campaigned» operation: single or multiple product production);
(h) list of equipment suppliers;

(i) raw materials inputs and sources of supply; and
(j) statements of inventories of raw materials, crude and finished products, and any other relevant process intermediates.

2. Pre-Appraisal Closure Actions:

Where the enterprise has initiated capacity reduction or closure activities on its own initiative in anticipation of the country's ODS phaseout obligations, a full description of what actions have been taken and what closure results have been achieved is to be provided.

3. Closure Plan

The closure plan will describe the sequence of activities that will be followed to render inoperable the plant's current ODS production capacity in an environmentally sound manner The description of this sequence of activities will typically specify some or all of the following as applicable to the particular operation: i) production process units and equipment to be shut down; ii) materials handling, transfer and storage facilities that are to be decommissioned or disconnected; iii) the method of decommissioning and disconnection to be applied in i) and ii) above; iv) the disposition of critical pieces of equipment (i.e. dismantled partially, dismantled completely and destroyed, put into storage, re-used at some other site for a different product, used in the same location for a new product, or left in place but disabled in some way); v) schedule for closure activities; and vi) responsibility assignments for managing the process in the enterprise.

Monitoring and Verification Criteria

For each enterprise-specific closure plan, ICP Ozone, working with the enterprise and supported by consulting resources as required, will develop plant-specific monitoring and verification criteria based on the Closure Plan. These will be used in follow up independent monitoring after closure to confirm that full closure has indeed taken place. Examples of specific criteria include:

(a) sampling of storage tanks and checking whether vapor pressure agrees with its alleged contents;
(b) inspection of tank-cars and tank-trucks on site for carbon tetrachloride and hydrogen fluoride and other raw materials and catalysts;
(c) examination of plant production, raw materials receipt, and shipping records and determination of consistency;
(d) examination and sampling of packaged finished good inventory;
(e) checking for integrity of any blind flanges or other means used to disable critical equipment;
(f) sampling of in-process streams (if necessary);
(g) laboratory analytical records;
(h) examination of destroyed equipment, handling facilities and equipment re-deployed in other processes.

Closure Plan and Verification/Monitoring Criteria Peer Review and Appraisal

The enterprise-specific Closure Plans, and Monitoring and Verification Criteria developed above and signed off on by the enterprise will be submitted to the IBRD for peer review, within the framework of

the present OORG[6] process used for MPMF and GEF ODS sub-projects. Following this review and amendment as required by the reviewer(s), a formal appraisal of the proposed sub-grant will be undertaken by a joint SCEP/ICP «OZONE»/IBRD mission. This will be primarily directed at a detailed review of the final documents and the implementation arrangements proposed to carry out the plan and verification activities. One product of appraisal will be the final documentation related to the closure plan and monitoring and verification criteria to be formally included or adopted by reference in the Sub-Grant Agreement.

Closure Monitoring and Verification

The process of closure monitoring and verification will be undertaken by an independent consultant contracted by ICP Ozone using resources provided for under the GEF project. The basis for this work will be the agreed-to enterprise specific closure plans and monitoring and verification criteria above. These will either included directly into the Sub-Grant Agreements between SCEP and each enterprises or adopted by reference.

The first closure monitoring will be carried out when the plant management confirms that plant closure has been completed. The monitoring and verification consultant will draw upon the closure plan and list of plant-specific criteria to develop detailed monitoring procedures including identification of suitable evidence of compliance and the means to be used for collecting and analyzing, and comparing it against the criteria. Evidence will include but not be limited to:

(a) interviews with plant employees in the production, shipping, purchasing, accounting and management areas;
(b) inspection of the area where ODS production formerly took place, to check for signs of recent changes;
(c) review of accounting records;
(d) inspection of the sites where equipment and materials were disposed of.

This will be documented in a form that is suitable for review by SCEP, the IBRD and donors as they may request. Under the terms of the Grant Agreement, IBRD approval, based on review by the OORG Technical Review Group described in Annex 3 will be required for all enterprises prior to final disbursement of compensation payments.

In addition, provision will be made for unannounced closure monitoring. This will be subject to the same standards as above. The overall objective will be the same: that is, to determine whether the plant is properly complying with its closure obligation. However, unannounced monitoring may be less comprehensive and may focus on fewer criteria.

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[6] The Ozone Operations Resource Group (OORG) is an internationally recognized group of sector experts which undertakes technical reviews of all GEF and Montreal Protocol Multilateral Fund (MPMF) ODS phaseout projects implemented by the World Bank.

Annex 3

Special Initiative Donors Roundtable Meeting Protocol

SPECIAL INITIATIVE FOR ODS PRODUCTION CLOSURE IN THE RUSSIAN FEDERATION

DONORS ROUNDTABLE MEETING PROTOCOL OF AGREEMENTS

1. Background

The Special Initiative for ODS Production Closure was initiated by the Government of the Russian Federation and the International Bank for Reconstruction and Development (IBRD) in 1996 with an investigation of donor interest in such a project. In February 1998, the IBRD advised the Government of the Russian Federation that financial support was potentially available from bilateral donors and the Global Environmental Facility (GEF) to support the project. On this basis, the Government of the Russian Federation and the seven ODS producing enterprises in the Russian Federation confirmed their agreement in principle to permanently close ODS production capacity. The project was then documented in a Prospectus which outlined proposed closure requirements and commitments by both ODS producing enterprises and donors, and defined the basic principles by which compensation would be made to producing enterprises for permanent closure of their production facilities. This formed the basis for the Government of the Russian Federation to convene a "Donors Roundtable Meeting" on October 7, 1998 in Moscow under the Chairmanship of Mr. Viktor Danilov-Danilian (Chairman, State Committee of the Russian Federation for Environmental Protection) and involving all principle stakeholders. A list of participants at the meeting is appended in Annex A and minutes of the meeting may be found in Annex B, also appended.

2. Commitments

General -

All parties expressed their firm commitment to support the successful and expeditious implementation of this Special Initiative, based on a spirit of mutual trust and the high degree of project ownership demonstrated by the Russian Federation.

Consistent with the above, the meeting endorsed the Prospectus presented by the Russian Federation to the donors, subject to agreed modifications as noted in Part 3 below, which will be incorporated in a final prospectus document to be issued by the State Committee of the Russian Federation for Environmental Protection (SCEP).

Russian Federation -

The Chairman of the meeting stated, on behalf of the Government of the Russian Federation, that the Russian Federation is fully committed to meeting its international environmental obligations, and specifically those under the Montreal Protocol and Vienna Convention.

In this regard, the Russian Federation stated its full commitment to phasing out ODS consumption and to the permanent closure of ODS production. The Russian Federation also confirmed that this will be given effect by Government Resolutions banning ODS production, new consumption, import and export in and after the year 2000. In the appropriate Government Resolution and other government documents, provision will be made for exempting enterprise compensation payments made under the Special Initiative from direct taxation. The above Government Resolutions will be enacted as a condition of effectiveness applicable to the Grant Agreement for the Special Initiative with IBRD.

The Russian Federation stated its commitment to the enforcement of the provisions of the above resolutions by the State Committee for Environmental Protection, including if necessary utilization of its legal powers to affect closure of non-compliant enterprises. Consistent with this commitment, the Russian Federation accepts an obligation to repay funds made for closure compensation in the event that complete ODS production closure does not occur by the agreed date or in the event of its resumption at any point thereafter.

In order to facilitate residual demand following production closure, the Russian Federation confirmed its intention to: i) enact and enforce effective import controls; ii) provide for transitional stocks of ODS to meet near term key demand; iii) accelerate the phase-out of residual ODS consumers; iv) implement ODS pricing policies that ensure an economic incentive for residual consumers to convert to non-ODS technologies; and v) implement recycling and recovery initiatives wherever practical.

The Russian Federation confirmed that in order to assure the effectiveness of the Special Initiative in realizing the goals of the Montreal Protocol while ensuring provision of its own transitional requirements, Russia would fully participate in the longer term phase-out of HCFCs, as provided for under the Copenhagen Amendment to the Montreal Protocol, by voluntarily maintaining its compliance with the provisions of the Copenhagen Amendment respecting HCFCs, while working toward formal ratification of this Amendment.

ODS Producing Enterprises -

All seven ODS producers, namely: Altaichimprom, Chimprom, Halogen, Kaustic, Kirovo-Chepetsk Chemical Kombinat, named after B. P. Konstantinov, Redkino, and RSC "Applied Chemistry" (GIPKh), confirmed their commitment to and concurrence with the Special Initiative which was evidenced by their prior signing of Protocols of Intention. These protocols outlined the enterprise's obligations to prepare and implement verifiable ODS production capacity closure plans as per the procedures set forth in Annex 4 of the Prospectus. Chimprom, the only enterprise unable to attend, communicated its confirmation through the representative from Kaustic.

Donors -

The originally anticipated nine bilateral donor countries, namely: Austria, Denmark, Finland, Germany, Italy, Norway, Sweden, United Kingdom, and the United States, all confirmed their financial commitments as listed in Annex B, attached.

Japan, which had not made a pledge prior to the meeting, confirmed a commitment of US$2 million to the Special Initiative Trust Fund.

The total financial resources available for the Special Initiative remain as the targeted US$27 million with the anticipated value of the GEF contribution being set at approximately US$8 million, subject to adjustment for exchange rate variations where donor countries have made contributions in national currencies and possible additional contributions.

The GEF Secretariat has reviewed the Prospectus and affirmed by letter the eligibility - in principle - of the proposed activities for GEF support. The Government of Russia confirmed its intention to submit a formal request for GEF co-financing of the Special Initiative for consideration by the GEF Council in the spring of 1999.

Concurrent with the above, the donors affirmed their intention to actively promote, encourage and support an affirmative decision by the GEF Council when it considers this request.

IBRD -

Agreement was reached that the IBRD would be the trustee for the Special Initiative Trust Fund. The IBRD will be responsible for the administration and operation of the Trust Fund in accordance with Trust Fund agreements with each donor. Prior to any disbursements under the Special Initiative, IBRD will ensure that comprehensive plans for permanently closing all ODS production capacities at each enterprise are reviewed by the Ozone Operations Resource Group (OORG) This review process involving independent experts is regularly applied to GEF and Montreal Protocol Multi-lateral Fund ODS phase-out related projects. These plans will also be appraised by the IBRD acting on behalf of the donors.

The IBRD will supervise project implementation on behalf of the donors in accordance with its obligations to donors to ensure that strict monitoring and verification procedures are put in place. This will include provision of assistance to producing enterprises and Russian counterparts responsible for project implementation in the development of detailed monitoring and verification activities, and other technical assistance assignments. The IBRD will also carry out regular supervision of the project and will observe the implementation of monitoring and verification activities for a period of up to 5 years following production closure. The IBRD will be responsible for reporting on a regular basis to the donors supporting the Special Initiative.

3. Agreed Modifications of the Prospectus

Disbursement -

It was unanimously agreed by all participants - Russian Government, enterprises and donors - that the previously proposed three-payment scheme (25 percent/65 percent/10 percent) would be replaced by a two-payment scheme of an advance of 30 percent after Sub-Grant Agreements with all enterprises are signed and a final payment of 70 percent upon confirmation and verification of the complete and permanent elimination of ODS production capability at all producing enterprises.

Donor Participation -

In order to facilitate donor country participation in the review of: (1) enterprise closure plans, (2) enterprise verification and monitoring plans and procedures, and (3) final enterprise closure verification documentation, it was agreed that a donor panel consisting of participants from three donor countries plus a chairman would be established to act as a technical review group within the framework of the OORG. Selection of the OORG technical panel members will be agreed among the participating donors with the Chairman being the present OORG Production Sector Advisor. The OORG will conduct a technical review of the proposed closure plans, and monitoring and verification criteria developed above and revisions will be incorporated as required.

4. Suggested Considerations

A number of donors emphasized the need for complementarity with other international environmental conventions, such as the Kyoto Convention, in relation to the production and use of ODS substitutes.

It was further emphasized that ODS consumption phase-out and ODS production closure activities should be synchronized in their implementation in order to help minimize the residual environmental burden while optimizing economic and social adjustment.

The availability of technical capacity, in the form of consultants, operational experience, and complementary bilateral programs in the Russian Federation, and which originate in a number of donor

countries, should be utilized in the implementation of the Special Initiative and in ODS consumption phase-out activities

5. Technical Follow-up

OORG Technical Review Group-

Terms of reference for the OORG technical review group will be prepared by the IBRD in consultation with the OORG Production Sector Advisor. As is conventional with all OORG technical review and advisory procedures, participants in the technical review group will be bound by the standard IBRD confidentiality obligations and technical expert selection will be conditional upon compliance with the usual IBRD conflict of interest restrictions.

International Consultant Support-

The State Committee of the Russian Federation for Environmental Protection and IBRD will prepare a draft Scope of Work and qualification requirements applicable to international consulting firms, employing international and Russian experts, who will provide technical support for i) closure plan documentation; ii) enterprise specific monitoring and verification plans; iii) project appraisal; and iv) implementation of monitoring and verification activities. These consulting firms would be selected in accordance with World Bank Procurement Procedures.

6. Schedule of Next Steps

Project preparation and processing will be undertaken as follows:

TIME FRAME	PREPARATION AND PROCESSING ACTIVITIES
October - December 1998	**Preparation of Proposed Closure Plans** Each enterprise will prepare a proposed Closure Plan under the supervision of SCEP and with the support of technical consultants hired under the GEF ODS Consumption Phase-out Project.
October - December 1998	**Preparation of Detailed Monitoring and Verification Procedures** SCEP using technical assistance resources available under the GEF Consumption Phase-out Project will develop monitoring and verification criteria applicable to each enterprise's proposed Closure Plan.
January 1999	**OORG Peer Review** The OORG technical review panel will conduct a peer technical review of the proposed closure plans and monitoring and verification criteria and revisions will be incorporated as required.
March 1999	**Appraisal** SCEP jointly with IBRD will appraise each enterprise's revised final Closure Plan, inclusive of monitoring and verification criteria and obtain agreement on the final closure plan for purposes of its adoption as part of the Sub-Grant Agreement. A draft of the Sub-Grant Agreement will be presented by SCEP at appraisal.
March - May 1999	**Negotiation/Initialing of Sub-Grant Agreements** SCEP will complete negotiation of Sub-Grant Agreements including the allocation of compensation payments with each enterprise such that these can be presented to IBRD at Grant Agreement negotiations with a demonstration of enterprise agreement.
May, 1999	**Enactment of Government Resolutions** SCEP will complete the process of putting into force the Government Resolutions covering the ban on ODS production, new consumption, import and export
June, 1999	**Negotiation and Signing of the Grant Agreement**
June, 1999	**IBRD "No Objection" of Sub-Grant Agreements and Signing of Sub-Grant Agreements.**
July 1, 1999	**Grant Effectiveness**

Annex 4

Government Resolution Banning the Production of ODS

Unofficial translation

GOVERNMENT OF THE RUSSIAN FEDERATION

RESOLUTION

Dated May 5, 1999 No 490

City of Moscow

On strengthening measures of the state control over production and consumption of ozone depleting substances in the Russian Federation

With the purpose of ensuring compliance with the obligations undertaken by the Russian Federation under the Vienna Convention on Ozone Layer Protection of 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer of 1987, the Government of the Russian Federation has resolved:

1. To establish as of August 1, 1999 that on the territory of the Russian Federation production of ozone depleting substances, specified in the lists A and B of Attachment # 1 to the Regulations on procedures of exportation to and importation from the Russian Federation of ozone depleting substances and ozone depleting substances containing products (hereinafter referred to as ozone depleting substances), as adopted by the Resolution No. 563 of the Government of the Russian Federation dated May 8, 1996 (Collection of Laws of the Russian Federation, 1996, No. 20, art. 2353; 1997, № 8, art. 943; № 47, art. 5409) shall be carried out on the basis of quotas to be determined by the State Committee of the Russian Federation for the Environmental Protection jointly with the Ministry of Economy of the Russian Federation based on calculated rates, schedules and other requirements to the Montreal Protocol on Substances that Deplete the Ozone Layer (hereinafter referred to as Montreal Protocol).

At the same time production of ozone depleting substances as of July 1, 2000 can be permitted only in such cases when these substances are entirely used as feedstock for manufacture of other chemicals, or for essential uses exemptions, as stipulated for in the Montreal Protocol.

2. To ban since July 1, 2000 establishing of new facilities, producing ozone depleting substances.

3. To authorize the State Committee of the Russian Federation for Environmental Protection jointly with the Ministry of Finance of the Russian Federation and other federal bodies of executive power concerned to develop, within a period of 2 months, with account of the active legislative acts, a Program of urgent measures on ozone depleting substances production and consumption phase-out in the Russian Federation in 1999-2000, having provided for among others organization of systems of collection, storage, regeneration and recycling of ozone depleting substances, the production of which is regulated by the Montreal Protocol, as well as establishment of their reserves to ensure functioning of equipment being currently operational.

4. To authorize the State Committee of the Russian Federation for Environmental Protection, the Ministry of Finance of the Russian Federation, the Ministry of Economy of the Russian Federation, the Ministry of Foreign Affairs of the Russian Federation, jointly with other concerned federal bodies of executive power in order to ensure financing of the activities, as set out in item 3 of the Resolution, to develop and approve, within a period of 2 months, procedures on using the funds provided by the Global Environment Facility and other resources allocated for the implementation of the above said measures, and, in the first place, for the elimination and conversion of ozone depleting substances production facilities, and also to ensure control over the stipulated use of these funds.

5. To authorize the State Committee of the Russian Federation for Environmental Protection, the Ministry of Economy of the Russian Federation jointly with the Ministry of Science and Technologies of the Russian Federation and other concerned federal bodies of executive power to develop and adopt, within a period of 2 months, procedures on establishing and allocating quotas for production of ozone depleting substances on the territory of the Russian Federation.

Chairman of the Government of
the Russian Federation E. Prymakov

Annex 5

Terms of Reference: Closure Plan, Monitoring, and Verification Consulting Assignments

RUSSIA
Special Initiative for ODS Production Closure
in the Russian Federation

Terms of Reference

Closure Plan, Monitoring, and Verification Consulting Assignments

A. Introduction

1. This Terms of Reference has been prepared to describe a number of consulting assignments to be undertaken by international consulting firms (Consultants) during the preparation, implementation and post closure periods of the Special Initiative for ODS Production Closure in the Russian Federation (Special Initiative). A description of the Special Initiative is provided in a Prospectus Document issued by the State Committee of the Russian Federation for Environmental Protection (SCEP). This document was agreed upon at a donor's meeting in Moscow on October 7, 1998 where confirmation of project funding from bilateral donors was obtained. These consulting assignments cover assistance in: i) documentation of enterprise specific closure plans and monitoring and verification procedures; ii) technical support to the joint SCEP/World Bank appraisal and independent peer review activities; iii) undertaking monitoring and verification activities during and after permanent closure of ODS production capacity. With the exception of long term post closure monitoring, these assignments will be undertaken for the Government of the Russian Federation through SCEP which acts as the Special Initiative's overall implementing agency under the terms of the Grant Agreement with the World Bank covering the GEF ODS Consumption Phaseout Project (GEF Project). SCEP has assigned management responsibility for both the GEF Project and Special Initiative to the Center for Preparation and Implementation of International Projects on Technical Assistance (CPPI). Within CPPI, a dedicated project implementation unit (ICP Ozone) will be directly responsible for the work and contracting of required consulting services. ICP Ozone is also responsible for supervision of ODS phase-out investment activities as well as a range of technical assistance and institutional strengthening initiatives intended to support SCEP under the GEF Project. Long term post closure monitoring, beginning 12 months after the completion of closure and final compensation disbursement, will be contracted directly by the World Bank as part of its project supervision obligations and will extend for a period of four years. Consultant selection and contracting for all assignments will be accordance with World Bank Procurement Procedures.

B. Objectives

2. The overall objective of these consulting assignments is to provide SCEP and the World Bank with internationally creditable technical support capacity in undertaking the detailed preparation and implementation of the Special Initiative. The more specific

objectives are to: i) assist enterprises in documenting detailed closure plans in a consistent manner suitable for independent peer review and appraisal; ii) develop practical but comprehensive monitoring and verification procedures applicable for each enterprise specific closure plan; iii) support the expeditious submission of documentation from i) and ii) above for independent peer review, along with administration of any revisions as may be required; iv) provide effective technical support for the joint SCEP/World Bank appraisal of each enterprise closure plans and associated monitoring and verification procedures; v) assist SCEP in undertaking and documenting regular monitoring of closure implementation activities; vi) conduct comprehensive final verification of production closure at each producing enterprise, inclusive of assembling appropriate documentation and evidence acceptable to the World Bank; vii) undertake and document post closure verification as may be required; and viii) assist SCEP and the World Bank in the provision of information respecting closure activities to donors.

C. Previous Work

3. Documents providing relevant background to ODS phaseout initiatives in the Russian Federation, the Special Initiative, these particular assignments, and which will available to Consultants include:

a) Phaseout of Ozone Depleting Substances in Russia, (COWI, August, 1994);
b) Strategy and Projects for the CFC Production Industry in the Russian Federation to Confront the Phaseout of Ozone Depleting Substances, (ICF Incorporated, ICF/ECO and PMG Incorporated, December, 1995);
c) Global Environment Facility, Russian Federation Ozone Depleting Substances Consumption Phase Out Project, Project Document, (World Bank, Report No. 15326-RU, May 1996);
d) Global Environment Facility, Russian Federation Ozone Depleting Substances Consumption Phase Out Project, Project Progress and Second Tranche Appraisal Report, (World Bank, Report No. 17391-RU, February, 1998);
e) Donor Roundtable Meeting Protocol Agreements, Special Initiative for ODS Closure in the Russian Federation, (SCEP, October, 1998); and
f) Project Prospectus: Special Initiative for ODS Production Closure in the Russian Federation, (SCEP, October, 1998).

D. Scope of Work

4. The general scope of these assignments is to provide SCEP and the World Bank with the necessary technical support for the preparation, implementation and post closure monitoring of the Special Initiative. The assignments will begin upon confirmation of project funding by bilateral donors and extend over approximately two years during which closure activities will be completed and for a five year period after closure. They cover assistance in documenting closure plans, development of monitoring and verification procedures, administrative and technical support for independent technical

reviews undertaken directly by the World Bank and the OORG[43] independent peer review process, provision of technical support to appraisal missions, advice and assistance respecting finalization of project agreements, closure monitoring and verification activities, and post closure monitoring activities. The overall scope is divided into seven (7) parts as defined in the following paragraphs.

FIRST CONSULTING CONTRACT ASSIGNMENT

5. Part 1: Closure Plan Documentation: The Consultant will assist ICP Ozone and each of the seven beneficiary enterprises to fully document their detailed Closure Plans. While it is recognized that each enterprise will undertake the permanent elimination of its ODS production capacity in a manner consistent with its own business priorities, the required closure plans must contain the following components:

a) Enterprise Profile: A general overview of the enterprise and its business scope shall be documented. This shall include the following information:

   i) History and background of enterprise;
   ii) Legal structure, ownership and affiliations;
   iii) Description of the overall business and its physical assets;
   iv) Production capacities and utilization;
   v) Number of employees;
   vi) Age, investment history, and general technological status of the present physical plant;
   vii) Sources of raw material and semi-finished goods supply;
   viii) Current markets for products, including the geographical area served, principal customers and exports; and
   ix) Financial performance data.

b). Baseline Information Production and Facilities: The present plant capacity for the production of any controlled substances listed in Annex A and Annex B of the Montreal Protocol, and specifically CFC-11, CFC-12, CFC-13, CFC-113, Halon 1211, Halon 1301, and Halon 2402, shall be documented. This documentation shall apply to all operational commercial and pilot plant capacity, ODS recycling capacity, and to all capacity that is inactive, but for which production facilities remain intact:

   i) general description of process technology employed and products produced;
   ii) process flow sheets and mass balances;

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[43] The Ozone Operations Resource Group (OORG) is an internationally recognized group of sector experts which undertakes technical reviews of all GEF and Montreal Protocol Multilateral Fund (MPMF) ODS phaseout projects implemented by the World Bank.

iii) description of major items of process and materials handling equipment , including materials of construction, dimensions, capacity, and where applicable equipment suppliers and serial or other identification numbers;
iv) description of applicable process control systems;
v) inventory of spare parts;
vi) site diagram showing location of and access to ODS producing facility;
vii) records of actual production levels each year since 1990, including year-to-date for the current year;
viii) description of the mode of operation and product slate: (continuous, intermittent, or "campaigned" operation, single or multiple product production);
ix) raw materials inputs and sources of supply;
x) statements of inventories of raw materials, crude and finished products, and any other relevant process intermediates; and.
xi) regulatory authorities for operation and compliance records

c) Pre-Appraisal Closure Actions: Where the enterprise has initiated capacity reduction or closure activities on its own initiative in anticipation of the country's ODS phaseout obligations, a full description of what actions have been taken, when they were undertaken, and what closure results have been achieved is to be provided.

d) Closure Plan: The closure plan will describe the sequence of activities that will be followed to permanently render inoperable the plant's current ODS production capacity in an environmentally sound manner The description of this sequence of activities will typically specify some or all of the following as applicable to the particular ODS production operation:

i) production process units and equipment to be shut down;
ii) removal of process control systems;
iii) materials handling, transfer and storage facilities that are to be decommissioned or disconnected;
iv) the method of decommissioning and disconnection to be applied in i) and ii) above;
v) the disposition of critical pieces of equipment (i.e. dismantled partially, dismantled completely and destroyed, put into storage, re-used at some other site for a different product, used in the same location for a new product, or left in place but disabled in some way);
vi) environmental evaluation requirements, waste disposal and remediation actions (where applicable);
vii) schedule for closure activities; and
viii) responsibility assignments for managing the process in the enterprise.

6. Part 2: Development of Monitoring and Verification Procedures: Based on Part 1, the Consultant, jointly with ICP Ozone and each producing enterprise, will develop

proposed facility specific procedures and indicators that will allow creditable validation of closure progress and the permanent elimination of ODS production, inclusive of post closure monitoring. Examples of specific procedures and indicators that may be applicable are:

a) sampling of storage tanks and checking whether vapor pressure agrees with its reported contents;
b) inspection of tank-cars and tank-trucks on site for carbon tetrachloride and hydrogen fluoride and other raw materials and catalysts;
c) examination of plant production, raw materials receipt, and shipping records and determination of consistency;
d) examination and sampling of packaged finished good inventory;
e) checking for integrity of any blind flanges or other means used to disable critical equipment;
f) sampling of in-process streams (if necessary);
g) laboratory analytical records;
h) contemporaneous recording of closure activities by appropriate techniques such as but not limited to photographic, video, analytical, and electronic data recording methods;
i) examination and tracking of destroyed equipment, handling facilities and equipment re-deployed in other processes;
j) methods of post closure confirmation that production has not resumed; and
k) environmental site assessment procedures and regulatory compliance review.

7. Part 3 Independent Technical Review Support: The Consultant will be responsible for assembling the information and documentation assembled in Part's 1 and 2 above in a common format for submission by SCEP to the World Bank for purposes of a peer technical review to be undertaken by an international expert group (Special Initiative Technical Review Group) assembled within the framework of the OORG review process. This documentation will include a formal indication of agreement by the enterprise. During the review process, the Consultant will be available to respond to questions arising during this review process and to affect any revisions required for its clearance. The final product of Part 3 will be a complete set of closure plan, and monitoring and verification procedure documentation for each producing enterprise and agreed to by the enterprise. This documentation will provide the basic resource material for the joint SCEP/World Bank appraisal mission.

8. Part 4 Appraisal Mission/Agreement Preparation Support: The Consultant will provide technical support as required by SCEP in organizing and providing resources for the joint SCEP/World Bank appraisal of each producing enterprise's proposal for the permanent elimination of ODS production capacity. This will involve ensuring appropriate documentation is available, accompanying the mission if and where required, and providing input to appraisal reports as required. Technical support may also be required in the development and negotiation of Sub-Grant Agreements with each

enterprise, particularly in respect to the inclusion of appraised enterprise specific closure plans in these Sub-Grant Agreements.

SECOND CONSULTING CONTRACT ASSIGNMENT

9. Part 5 Closure Monitoring and Verification: Using the enterprise specific closure plans and monitoring and verification procedures, adopted in the Sub-Grant Agreements, the Consultant will support SCEP's monitoring of the closure activities. This will involve regular contact with enterprise counterparts, periodic site visits, undertaking specific monitoring verification tasks defined in the monitoring and verification procedures and preparation of regular status reports, all based on the milestones and indicators defined in the agreed to closure plan, and monitoring and verification procedures. This activity will culminate in a comprehensive verification site evaluation when the plant management confirms that ODS production closure has been completed. The monitoring and verification consultant will draw upon the closure plan and list of plant-specific indicators to identify, in advance, suitable forms of material evidence and information gathering that validates the permanent elimination of production capacity. This should include but not be limited to:

a) interviews with plant employees in the production, shipping, purchasing, accounting and management areas;
b) inspection of the area where ODS production formerly took place;
c) verification of equipment disposition, either by destruction, disabling or re-deployment;
d) sampling of product and raw material storage;
e) examination of environmental evaluation and regulatory compliance documentation and interviews with regulatory authorities;
f) recording of characteristic production parameters where facilities are converted to the other production applications;
h) review of accounting records; and
i) assembly of appropriate paper, photographic, video, analytical and electronic records.

10. Upon completion of the closure verification activities, the Consultant will document the final closure verification findings for each enterprise in a comprehensive report (the Closure Verification Report) and assemble all backup material and records for delivery and permanent retention by SCEP. These reports along with a formal statement by the enterprise, attesting to the permanent elimination of ODS production capacity and agreement with the report's findings, will form the basis for SCEP's submission to the World Bank for OORG review and subsequent disbursement request for compensation payment. Acceptance of the Closure Verification Report, including clearance by the Special Initiative Technical review Group, will be a requirement for disbursement of compensation payment installments under the project Grant Agreement. The Consultant should be prepared to accommodate amendments and additional re-verification activities

as a result of this review process. In addition, this report will be utilized by SCEP in its regulatory review of closure in compliance with the Government Resolution banning ODS production and revocation of applicable licenses, permits and quotas applicable to each enterprise. It will also form the baseline documentation on which post closure monitoring will be based.

11. The scope of Part 5 will also encompass the initial period of post closure monitoring, specifically the period for 12 months after the acceptance of the final Closure Verification Report, and disbursement of final compensation payments. During this period, the Consultant will periodically verify the integrity of closure actions and provide appropriate reports.

12. Part 6 – Long Term Post Closure Monitoring: The World Bank will maintain independent post closure monitoring activities as part as its normal supervision mandate for the project over a five year period after the disbursement of final compensation payments under the Special Initiative. In support of this, consulting support as required will be engaged by the Bank and incorporated into the World Bank's supervision of the project. It may also serve to support the regular regulatory enforcement inspections undertaken by SCEP. The detailed scope of this assignment in terms of activities undertaken, methods used and frequency of on site inspections will be enterprise specific and be developed based on the detailed closure plans and applicable Closure Verification Reports.

13. Part 7 - Supplementary Work Assignments: During the course of the above assignments, Consultants may be asked to undertake supplementary assignments work that are associated with the Special Initiative, and/or related ODS consumption phaseout initiatives within the GEF Project or implementation of Federal Program on ODS Phaseout. This flexibility is to be is provided for in recognition of the linkages that exist between the Special Initiative and both institutional and consumption phaseout activities. For example, this work may specifically include support of further institutional strengthening related to enforcement and licensing within SCEP at the national, regional and local levels. It may also relate to residual demand management programs undertaken under the Federal Program. For these reasons, the Consultant should be prepared to make a range of expertise available that may support such supplementary tasks.

14. In undertaking this work, Consultants are advised of the following:

a) the majority of project and enterprise documentation will be available only in the Russian language;
b) the amount and quality of information may be variable;
c) provision of local interpretation, translation, communications and logistics support will be the consultant's responsibility;
d) confidentiality agreements with enterprises respecting access to information may be required and must be respected;

e) all technical experts will be subject to scrutiny respecting potential commercial conflict of interest, including the review of individual CV's by the management of beneficiary enterprises; and

e) results and recommendations should be discussed with the enterprise in advance and copies of the Consultant's draft reports as defined herein will be provided to them in the Russian language upon submission to the client.

E. Consultant Qualifications

15. Consultants selected for these assignments will offer a multi-disciplinary team of technical experts. This must include internationally recognized production process expertise having direct familiarity with: i) the ODS production sector generally, ii) the specific technologies and facilities employed in the production of Annex A and Annex B substances under the Montreal Protocol, and iii) procedures and processes involved in the recent reduction in ODS production capacity within OECD countries. Equally important is expertise directly familiar with the Russian ODS production sector and the specific plants involved in this assignment. In addition, expertise specializing chemical process plant inspection procedures and various methodologies employed in the verification of facility decommissioning and/or conversion is required. Similarly, expertise capable of evaluating potential environmental impacts of facility decommissioning and conversion is required. The assignments require proven project management capability experienced in directing an integrated team of local and foreign experts, undertaking high profile projects of this nature. In this regard, direct experience undertaking GEF and/or Montreal Protocol Multi-Lateral Fund assignments is required within the project team generally and particularly within the project management capability offered. A proven track record in developing and presenting documentation for international peer review by international and bilateral donor agencies is a significant asset. Availability of expertise in the regulation of ODS production and consumption, and in consumption phase-out initiatives is also an asset.

16. Consultants undertaking these assignments should have broad experience working in Economies in Transition, particularly those countries in the Former Soviet Union. In this regard, consultant's are advised that local office facilities, availability of locally based technical experts, and full Russian language support capability will be essential for successfully undertaking this assignment.

LIST OF TABLES

OORG REVIEWS

O O R G / The World Bank - O z o n e O p e r a t i o n s R e s o u r c e G r o u p
GEF Project Proposal Review

February 3, 1999

TO: Tom Waltz FAX: 202-522-3258
OORG Administrator
Global Environment Coordination Division
S-2117

FROM: Harry B. McCain

1. **Country of origin:** Russia

2. **Project title:** Substitution of CFC 11 and CFC 12 for HAPs at the aerosol plant of Tovari I Lekarstva, Ltd.

3. **Sector/sub-sector:** Aerosols

4. **Relationship to country programme:** N/A

5. **Technology**

   (a) Hydrocarbon propellants have long been the preferred substitute for CFCs when used as an aerosol propellant. Hydrocarbon propellants are selected because of their zero ozone depleting potentials. The only environmental shortcoming of the hydrocarbon aerosol propellants (HAPs) is their flammability which can be correctly handled with the appropriate and now well established HAP technology. The U.S.A. has been using HAPs in aerosols instead of CFCs since 1978. In 1998 approximately 3.1 billion aerosol cans were filled with HAPs.
   (b) The technology for the use of HAPs as a substitute for CFCs in aerosol products is well established, permanent, and not transitional. There are no transitional technologies that could be used in the aerosol sector that would be appropriate.
   (c) It is totally feasible that the HAP technology required for this project can be transferred from the U.S., Western Europe and the present experience Tovari has had with aerosols as mentioned in the "Sector Background" of this report.

   I. No technology transfer agreement is required.
   II. There is no licensing agreement required.
   III. The reviewer agrees with the determination to use HAPs as a replacement technology for CFCs used as propellants in aerosol products.
   IV. HAP is the most cost effective technology for this conversion.

6. **Environmental impact**

   (a) This project will phase out 167 metric tons/year of CFCs (11/12). The cost effectiveness of this project is $4.37/kg U.S.
   (b) Costs are appropriate to minimize health and safety and other environmental impacts.

7. **Project costs**

(a) The total project cost for the GEF Fund Grant is $729,531.16.
(b) Many cost components are present that will facilitate the conversion to hydrocarbon aerosol propellants.
(c) Cost of equipment
  (i) The cost of existing equipment is addressed in a manner that is consistent with the reviewer's experience, except:
  Item (12) Automatic shutoff valves (2) $16,000 is really two automatic shutoff valves and systems. The cost should be $10,000
  (ii) The reviewer agrees with the finding that all of the base line equipment in the report should be acquired.
  (iii) No additional equipment requests are essential for the conversion.
  (iv) Modification of new equipment is not possible at Tovari I Lekarstva, Ltd.; therefore, new equipment will be required.
  (v) The scrapped equipment will be destroyed in this project.
  (vi) There will be minimum, if any, value to the scrapped or destroyed equipment
  (vii) With the installation of new equipment at Tovari I Lekarstva, Ltd., there will be no increase in production capacity.
(d) The training costs are appropriate for this project.
(e) Operating costs:
  (i) The operating costs are appropriate.
  (ii) The amount of $56,968.82 U.S. has been deducted for operating savings, leaving a net proposed grant amount of $729,531.18.
  (iii) The calculated savings is reasonable, based on the reviewer's experience with other projects.

8. **Implementation time frame**

The time frame of nine quarters is appropriate, assuming the prompt delivery of new equipment.

9. **Recommendations**

(a) This project is approved with modification. The modification is item (12) as shown in **7(c)(i) Cost of Equipment.**

UNOPS/UNDP Technical Reviewer: Harry B. McCain

Date Review Completed: February 3, 1999

O O R G / The World Bank - O z o n e O p e r a t i o n s R e s o u r c e G r o u p
GEF Project Proposal Review

February 3, 1999

TO: Tom Waltz FAX: 202-522-3258
OORG Administrator
Global Environment Coordination Division
S-2117

FROM: Harry B. McCain

1. **Country of origin:** Russia

2. **Project title:** Substitution of CFC 12 for HAPs and mechanical pumps at the aerosol plant of JSC Altaivitaminy

3. **Sector/sub-sector:** Non-MDI Pharmaceutical Aerosols

4. **Relationship to country programme:** N/A

5. **Technology**

(a) Hydrocarbon propellants have long been the preferred substitute for CFCs when used as an aerosol propellant. Hydrocarbon propellants are selected because of their zero ozone depleting potentials. The only environmental shortcoming of the hydrocarbon aerosol propellants (HAPs) is their flammability which can be correctly handled with the appropriate and now well established HAP technology. The U.S.A. has been using HAPs in aerosols instead of CFCs since 1978. In 1998 approximately 3.1 billion aerosol cans were filled with HAPs.

(b) The technology for the use of HAPs as a substitute for CFCs in aerosol products is well established, permanent, and not transitional. There are no transitional technologies that could be used in the aerosol sector that would be appropriate.

(c) It is totally feasible that the HAP technology and pump spray technology required for this project can be transferred from the U.S., Western Europe and the present experience JSC Altaivitaminy has had with aerosols as mentioned in the "Sector Background" of this report.

(i) No technology transfer agreement is required.

(ii) There is no licensing agreement required.

(iii) The reviewer agrees with the determination to use HAPs as a replacement technology for CFCs used as propellants in aerosol products.

(iv) HAP is the most cost effective technology for this conversion.

7. **Environmental impact**

(c) This project will phase out 53 metric tons (ODS)/year of CFC-12. The cost effectiveness of this project is $11.91/kg U.S. This cost effectiveness is greatly in excess of the $4.40 kg U.S. used as the standard for the aerosol sector. Annex 6 of this report requests an authorization threshold increase for this project and gives the

rationale. The reviewer has studied this carefully and agrees that the threshold for **this project only** should be raised.

(d) Costs are appropriate to minimize health and safety and other environmental impacts.

7. **Project costs**

(a) The total project cost of $631,400 is not affected by the incremental operating savings, leaving a requested grant amount of $631,400.

(b) Many cost components are present that will facilitate the conversion to hydrocarbon propellant and pump technology.

(c) Cost of equipment

(i) The cost of existing equipment is addressed in a manner that is consistent with the reviewer's experience.

(ii) The reviewer agrees with the finding that all of the base line equipment in the report should be acquired.

(iii) No additional equipment requests are essential for the conversion.

(vi) Modification of new equipment is not possible at JSC Altaivitaminy; therefore, new equipment will be required.

(vii) The scrapped equipment will be destroyed in this project.

(vi) There will be minimum, if any, value to the scrapped or destroyed equipment.

(viii) With the installation of new equipment at JSC Altaivitaminy, there will be no increase in production capacity.

(d) The training costs are appropriate for this project.

(e) Operating costs

(i) The incremental operating profits of $24,183 calculated over four years using the net present value system with a ten percent discount rate is far less than the cost increases for one year with pumps. Therefore, no operating savings are considered here.

(iv) The total project incremental cost of $574,000 plus 10% contingency, totals $631,400.

(v) The calculated savings is reasonable, based on the reviewer's experience with other projects.

8. **Implementation time frame**

The time frame of nine quarters is appropriate, assuming the prompt delivery of new equipment.

9. **Recommendations**

(b) This project is approved.

UNOPS/UNDP Technical Reviewer: Harry B. McCain

Date Review Completed: February 3, 1999

Country: **Russian Federation**
Firm: **ICEBERG - Domestic Refrigeration Equipment**
Type: **Conversion of CFC-12 Refrigerator Manufacturing to HFC-134a**
Date: **February 1999**

RTU-UNWB-LK-99037-dl

Scope
The project under review covers the conversion of CFC-12 based commercial refrigeration equipment manufacturing to HFC-134a; the foam part is not reviewed here.

1. Project Description
The project proposal describes the sector and enterprise background in an adequate manner. Details given on refrigerator models, on charges, on the use of compressors are in order and underscore the importance of the project.

The project description where it concerns leak detection and charging procedures is very detailed; no comments have to be made. The baseline given and the acquisition of new equipment in manufacturing processes is all considered necessary.

2. Technology
There are two substitutes to replace CFC-12, isobutane and HFC-134a. If the use of isobutane is prohibited, HFC-134a is the only choice. The phaseout of CFC-113 is considered to be possible as proposed.

3. Environmental impact
The environmental assessment, although short, is in order. The proposed HFC-134a has no ODP and acceptable other environmental aspects, which includes a global warming potential of 1300 (100 y time hor), which is about 15% of that of CFC-12. This emphasises emission reduction as proposed.

4. Project costs
Project costs are in order:
- Mass spectrometers may not be necessary, equipment with equal sensitivity will involve costs at the same level, therefore this is acceptable;
- Charging units, supply pumps, R & R units are necessary;
- Tests and trials, training and certification do not ask for comments.

5. Implementation time frame
No comments.

6. Operating costs
As observed in many refrigerator project proposals (not applicable for GEF).

7. Recommendations
The project, as proposed for ICEBERG, is supported.

Eindhoven, 99 02 11
Kuijpers, LJM

RUSSIA – ICEBERG TECHNOLOGY

The enterprise manufactures domestic refrigerators and freezers. It proposes to replace the CFC 11 which is currently used as a blowing agent for the rigid polyurethane foam by, as an interim measure, HCFC 141b. The enterprise is aware that the subsequent conversion to a zero ODP blowing agent will be at its own expense.

HCFC 141b is used by several refrigerator and freezer manufacturers - particularly those who do not want the expense of converting from CFC 11 to pentane. It has the advantage over currently available alternative blowing agents of offering insulating properties close to those of CFC 11.

The enterprise considered several options before making its technology decision. It rejected HFC 134a because of high operating costs, Cyclopentane because of high installation costs and the proximity of local housing makes it very unlikely that a permit to use it would be obtained and water (CO_2) because of poor foam properties. For the future, the zero ODP blowing agent candidates are HFC 245fa and HFC 365mfc.

The project involves the purchase of a two high pressure dispensers to replace the current low pressure units, new fixtures and moulds and isocyanate and polyol delivery pumps. Also included are provisions for trials and training.

The enterprise is aware that it may have to start the replacement of HCFC 141b within a few years and when the liquid HFCs become available. The phasedown of HCFC use starts in 2004 in developed countries but the situation in CEITs has not been separately clarified. The enterprise will have to convert to a zero ODP technology at its own expense.

There is no provision for upgrading the plastic liners. This is almost always required with HCFC 141b especially, as in this case CFC 11 is replaced on a molar basis by HCFC 141b. That is, comparatively high HCFC 141b levels are used (as in the USA). The costs of conversion of the liner making facilities and incremental operating costs will be borne by the enterprise.

SAFETY AND ENVIRONMENTAL ISSUES

The enterprise is aware that HCFC 141b has a residual ODP and will have to be replaced at its own expense.

The training should include safe handling of HCFC 141b.

PROJECT COSTS

The calculated grant effectiveness is well within the limit for this sub-sector. This is using a baseline of 1993 to 1996 when it is considered that the project was started. As seen in Annex 6 the production levels from 1996 to 1998 are considerably less.

The project is uses a 1994 equipment baseline and includes the replacement of the two low pressure dispensers by high pressure units. Using the same baseline, some of the moulds and fixtures will also be replaced. These expenditures are supported. The production area for cabinets and doors is going to be moved to a new location remote from the current isocyanate and polyol

storage's and pumps may be required to transfer the chemicals from drums. The modest expenditure proposed for the pumps is supported.

The incremental operational costs are well displayed and are supported

IMPLEMENTATION TIMEFRAME

This is acceptable.

RECOMMENDATION

Approval.

M Jeffs

26/02/99 gefrusic

O O R G / The World Bank - O z o n e O p e r a t i o n s R e s o u r c e G r o u p
GEF Project Proposal Review

Country: **Russian Federation**
Firm: **ISKRA - Commercial Refrigeration Equipment**
Type: **Conversion of CFC-12 Equipment Manufacturing to HFC-134a**
Date: **February 1999**

RTU-UNWB-LK-99038-dl

Scope
The project under review covers the conversion of CFC-12 based commercial refrigeration equipment manufacturing to HFC-134a.

1. Project Description
The project proposal describes the sector and enterprise background in an adequate manner. Details given on appliance models, on compressors and charges are in order. It would have been interesting if the proposal would have specified when specific appliance and compressor models have been developed.

Project description gives all the necessary details on oil charging, refrigerant charging, leak detection, cleaning, etc; no comments have to be made. The list with baseline equipment is OK.

2. Technology
The proposal gives a very short overview of alternatives for CFC-12 equipment, i.e. flammable hydrocarbons and HFC-134a as well as HCFC-22 and HCFC-blends. The reason why HCFCs are not being selected is OK. It can be approved that hydrocarbons are not selected taking into account the quantities to be applied (5 – 25 kg) and, in some cases, the open type of the product.

One question remains and that is whether all CFC-12 equipment can be converted to HFC-134a (lower temperature limit), or that e.g. R-404a for low temperatures has to be applied. It should be explicitly mentioned that this has been investigated.

3. Environmental impact
The environmental assessment, although short, is in order. The proposed HFC-134a is non-flammable, has no ODP and acceptable other environmental aspects, which includes a global warming potential of 1300 (100 y time hor), which is about 15% of that of CFC-12. It will ask for procedures to reduce emissions.

5. Project costs
Project costs are in order. It is difficult to judge upon the retrofit costs of a calorimeter, but the order of magnitude seems OK. It is not clear why HP-PU, fixtures/moulds and polyols are mentioned (delete).

It is not clear why technical assistance should cost US $ 30,000 for Russian research institutes. This needs to be specified.

5. Implementation time frame
No comments.

6. Operating costs

As observed in many commercial refrigeration project proposals. However, it is amazing to see how low the CFC-12 price is compared to HFC-134a. Anyhow, this part is not applicable to obtain GEF support.

7. Recommendations

The project proposal can be **supported**, **provided** that:

- It is specified that all CFC-12 equipment can be converted to HFC-134a with good results;
- Technical assistance has been specified in more detail;
- Some elements that deal with polyurethane will be deleted.

Eindhoven, 99 02 12
Kuijpers, LJM

Country: **Russian Federation**
Firm: **Yaroslavl Holodmash**
Type: **Conversion of CFC-12 Compressor / Condenser Units Manufacturing to non ODP solutions (HFC-134a)**
Date: **September 1998**

RTU-UNWB-LK-98227-dl

Scope
The project under review covers the conversion of CFC-12 compressor and condenser units manufacturing to the use of non ODP solutions (HFC-134a).

1. Sector and Enterprise Background
First remark: the project objective can never be helping Russia to achieve the 1999 freeze (first paragraph), since Russia is no Article 5(1) country and should have phased out. The description of the sector background is clear, in principle two larger manufacturers are still in operation, JSC Marikholodmash and JSC Holodmash.

It is clear what is meant by production and by the use of CFC-12 refrigerant. Many times it is mentioned that compressors are manufactured (which are not charged), many times one finds the definition "condensing units" which are charged with refrigerant.

In Annex 7, it is given that the vast majority is condensing units; it is therefore clear that virtually the entire market for commercial equipment is provided with condensing units.

There a constant decrease of the numbers of compressors and a fluctuation in the amount of refrigerant bought. This will also determine the amount of refrigerant phased out; it is correct to take a sort of average, or not only the peak year.

2. Project Description
The project proposal mentions that in 2002, after project completion, equipment will be on HFC-134a, R-404A, and (HC) R-600a, isobutane. It is clearly stated that 60% of the production consists of R-600a units which do not belong to the project described in the proposal. This is related to a Zanussi contract (USD 40 million) and a German loan. It is clear that the 600a manufacturing does not replace existing production, but is new manufacturing capacity.

It is also "straightforward" that there is a GEF grant needed for a small part of the production (less than 10%) to convert to a ozone friendly refrigerant (HFC-134a, which is the only possibility).

3. Technology
The proposal gives an overview of the possibilities of HFC-134a (with a GWP of 1300 for a 100 year time horizon). It is correct to state that flammable blends may not be applied in the type of equipment.

Considerations on HCFC-22, HCFC based blends and R-404A (difficult to consider) seem reasonably correct.

4. Environmental impact
The refrigerant proposed HFC-134a has no ODP and acceptable other environmental aspects (i.e. it has a certain global warming potential of 1300, being 15% of CFC-12).

5. Project costs
In the table, which presents the total costs at 56,258 million the Russian counterpart, the GEF part and the Concessional Loan is shown. In fact, where it concerns the project, a more clear description of the conversion process, plus a better description of the existing baseline equipment, and a proposal for new equipment would be preferable, but it is acceptable as is.

6. Implementation time frame
No comments.

7. Recommendations
The conversion project as proposed **is recommended.**

Eindhoven, 98 09 16
(Ozone Day)
Kuijpers, LJM

Country: **Russian Federation**
Firms: **Commercial Refrigeration Equipment Servicing at Sverdlovsk Oblast by Combine Torgtechnika**
Type: **Recovery and Recycling**
Date: **September 1998**

RTU-UNWB-LK-98226-dl

Scope
The project under review covers the installation of recovery equipment plus additional material in 220 workshops (or at service engineers with cars) at Sverdlovsk Oblast for the Combine Torgtechnika organisation. It also proposes a limited number of recycling centres (17 centres) and one reclaim centre.

Training will be a separate item within the framework of the project; the latter training project also involves the installation of recovery machines and charging units in the workshops (for HFC-134a also) (since a steadily increasing number of appliances that needs servicing will apply HFC-134a).

An important issue in this proposal is that a large number of equipment will be retrofitted to HCFC based blends; it is actually proposed that about 10% of all equipment present will be retrofitted in the first year. The amount involved in the recovery and recycling from the retrofitted equipment substantially influences the total ODS amount saved and the related cost effectiveness.

1. Sector and Enterprise Background

From the proposal the project objective is clear. The sector background given summarises the structure of the industries and the service company in the Sverdlovsk region (as well as in many Russian regions with former "oblast" organisation forms) in an adequate manner. The enterprise background is clear. Combine maintains 103,000 systems, and does not repair on an ad-hoc basis. This implies that (mentioned in the proposal) Combine is not involved in the maintenance or repair of another 15% being about 16,500 units; it should be assumed that the Combine organisation is aware where these units are installed and how they are maintained (as mentioned by new independent companies or in closed cities by special organisations). This is an important issue in the determination of the amounts to be recovered via retrofits.

2. Project Description

The project description is clear. It seems logical to establish a number of recovery units (engineers or workshops) and about one recycling centre per 12 recovery units. This number may even be decreased, but this is very much dependent on the infrastructure and the distances involved.

Where it concerns the price-setting of the recycled refrigerant, the observations made are valid. It will nevertheless be difficult in practice to get all the material recovered (and recycled) which is calculated due to the stimulus to re-use the refrigerant when doing a repair, on site.

The R&R units will not be obsolete in six years time, since they will be used for other (newq) refrigerants as well.

- The major element in the service consumption is the refrigerant replacement that is lost through leakage. A number of 73% is given. In Annex 5 preventative maintenance assumes 10.5% of the total charge to be used (the basis for this figure is unclear, but it seems acceptable) from which 10% is recoverable, which is acceptable.

- If 73% of the service consumption is through normal leakage then this amount can be reduced via training, after which better practices are applied and modern service equipment is used. It is acceptable to assume a 10% reduction.
- The number of repairs seems to be very high for Combine, 4000 open repairs on a total of 8480 units (a value of 50%, but it has to be accepted).
- The 60% conservative figure for the recovery efficiency as given in Annex 5 is acceptable.

3. Environmental Impact

The proposal will reduce the ODS emissions to the atmosphere which is important. It is furthermore so that the ODP ands GWP emissions are substantially reduced if the systems are retrofitted with an HCFC based blend with a much lower ODP and GWP (5% of the ODP and 15-20% of the GWP of the CFC-12 applied). The remarks on efficiency and less emissions can be supported.

No comments to the environmental assessment presented in Annex 4.

4. Implementation timeframe

No comments.

5. Project costs and calculation of recovered amounts

No comments to the project costs. The only question is whether one should use 17 recycling centres and whether the reclaim machine should cost $ 160,000. Where it concerns the cost for training, no comments.

Annex 5 gives a calculation of the amounts that can be recovered. Following comments:
- an "overall" average of 60% for the efficiency seems acceptable, this also holds for the 10% reduction via training.
- There is no explicit mentioning of the repair frequency in Annex 5; it seems to be very high (see above). It is difficult to judge the figure given certain economic circumstances.

The project proposal in Annex 2 looks at retrofit costs (which are in fact to be paid by the consumer). It also makes a calculation of the amount involved in retrofitting (10% of the inventory to be recoverable in the first year, total duration six years which is acceptable).

- Combine is involved in the maintenance of the larger part of all systems. During the retrofit period of six years it can be assumed that Combine TT will identify all units for retrofitting.
- The retrofit activity would imply that Combine would retrofit roughly **12,000 systems** in the first year. With 220 technicians involved in recovery it would imply 4-5 retrofits per month

per person (next to the normal service operation with recovery which is more complex than before) which is realistic, even if it would be doubled.

- The spreadsheet in Annex 8 gives a rough calculation of the amount phased out. If one would refine the model applied (retrofit efficiency, industrial equipment, what happens with the equipment serviced by other organisations where it concerns the need for refrigerant, averages per year could be adjusted) then the amount phased out in the first year would slightly change. However, other uncertainties still play a role which cannot be estimated. Therefore the figure given is OK.

6. Recommendations

The project proposal for the recovery and recycling by the Combine TT servicing organisation workshops has been studied and extensively discussed with the consultant involved. It has resulted in three updates of the project proposal.

It is clearly stated that this is a demonstration project and in so far, the uncertainties still present in the proposal are acceptable.

One should note that the cost effectiveness mentioned is a cost effectiveness per kg phased out in the first year and this factor CANNOT be compared to the standard CE-amounts used in conversion projects which are in kg per year.

■ The project proposal can be **supported / endorsed.**

Eindhoven, 98 09 16
(Ozone Day)

Kuijpers, LJM

Country: **Russian Federation**
Firms: **Commercial Refrigeration Equipment Servicing at Stavropolski Oblast by Pyatigorsk Torgtechnika (PYT)**
Type: **Recovery and Recycling**
Date: **September 1998**

RTU-UNWB-LK-98225-dl

Scope
The project under review covers the installation of recovery equipment plus additional material in 82 workshops (or at service engineers) at Stavropolski Oblast for the Pyatigorsk Torgtechnika organisation. It also proposes a limited number of recycling centres (13 centres) and one reclaim centre.

Training will be a separate item within the framework of the project; the latter training project also involves the installation of recovery machines and charging units in the workshops (for HFC-134a also) (since a steadily increasing number of appliances that needs servicing will apply HFC-134a).

An important issue in this proposal is that a large number of equipment will be retrofitted to HCFC based blends; it is actually proposed that about 7% of all equipment present will be retrofitted in the first year. The amount involved in the recovery and recycling from the retrofitted equipment substantially influences the total ODS amount saved and the related cost effectiveness.

1. Sector and Enterprise Background

From the proposal the project objective is clear. The sector background given summarises the structure of the industries and the service company (companies) in the Stavropolski region (as well as in many Russian regions with former "oblast" organisation forms) in an adequate manner. The enterprise background is clear; this also applies to the impacts of the economic recession. PYT maintains 5,300 systems and does not repair on an ad-hoc basis. This implies that (from a total of 13,460) PYT is not involved in the maintenance or repair of about another 8,200 units; it should be assumed is that the PYT organisation is aware where these units are installed and how they are maintained (as mentioned, possibly by new independent companies). This is an important issue where it concerns the retrofit of all the equipment in the oblast.

2. Project Description

The project description is clear. It seems logical to establish a number of recovery units (engineers or workshops) and about one recycling centre per 13 recovery units. This number of 13 may (should, see below) even be decreased, but this is very much dependent on the infrastructure and the distances involved.

Where it concerns the price-setting of the recycled refrigerant, the observations made are valid. It will nevertheless be difficult in practice to get all the material recovered (and recycled) which is calculated due to the stimulus to reuse the refrigerant when doing a repair, on site.

The R&R units will not be obsolete in six years time, since they will be used for other (new) refrigerants as well.

- The major element in the service consumption is the refrigerant replacement that is lost through leakage. A number of 84% is given. In Annex 5 preventative maintenance assumes 45% of the total charge to be used (basis for this figure is unclear, why different compared to other proposals)

It is assumed that this figure stems from experience, which seems reasonable.. The fact that 10% is recoverable seems acceptable.

- If 84% of the service consumption is through normal leakage then this amount can be reduced via training, after which better practices are applied and modern service equipment is used. In the proposal it is assumed that the consumption can be reduced by 10% due to training. This is OK.
- The 60% conservative figure given for recovery efficiency (average value) is a reasonable average.

3. Environmental impact

The proposal will reduce the ODS emissions to the atmosphere which is important. It is furthermore so that the ODP ands GWP emissions are substantially reduced if the systems are retrofitted with an HCFC based blend with a much lower ODP and GWP (5% of the ODP and 15-20% of the GWP of the CFC-12 applied). The remarks on efficiency and less emissions can be supported.

No comments to the environmental assessment presented in Annex 4.

4. Implementation timeframe

No comments.

5. Project costs and calculation of recovered amounts

No comments to the project costs. The only question is whether one should use 13 recycling centres (this is one recycling centre per six technicians) and whether the reclaim machine should cost US$ 160,000. Where it concerns the cost for training, no comments.

Annex 5 gives a calculation of the amounts that can be recovered. Following comments:

- an "overall" average of 60% for recovery efficiency seems reasonable;
- 10% for the amount recoverable from normal preventative maintenance may be OK, 10% reduction due to training is acceptable;
- There is no explicit mentioning of the repair frequency in Annex 5; it seems to be 3.6% of the open units and 3.7% of the hermetic units. It is difficult to judge whether this is an adequate number under normal circumstances due to the economic reasons involved (under certain circumstances no repairs are being made);

The project proposal in Annex 2 looks at retrofit costs (which are in fact to be paid by the consumer). It also makes a calculation of the amount involved in retrofitting (7% of the inventory to be recoverable in the first year, total duration six years which seems acceptable).

- However, PYT is involved in the maintenance of 5276 units. It is assumed that PYT can start with retrofitting the equipment it services while it identifies the other equipment dfor retrofitting in future years (how can there be 100% recovery efficiency and not 90%).
- By the way, the retrofit activity would imply that PYT would retrofit roughly**900 systems** per year (since 5276 systems are maintained and/or repaired by PYT of the total of 13,460). With 82 technicians involved in recovery it would imply about 1 retrofit per month per person (next to the normal service operation with recovery which is more complex than before). It seems fully realistic, even if it would be doubled in later years.
- It is assumed that also one third of the industrial systems is retrofitted; however, here is then a sort of double counting; 90% of the industrial charge is assumed to be recovered in normal servicing and 90% of the total charge is assumed to be recovered after retrofit. This would change the amounts in the spreadsheet in Table 8.
- The spreadsheet in Annex 8 gives a rough calculation of the amount phased out. If one would refine the model applied (retrofit efficiency, industrial equipment, what happens with the equipment serviced by other organisations where it concerns the need for refrigerant, averages per year could be adjusted) then the amount phased out in the first year would slightly change. However, other uncertainties still play a role which cannot be estimated. Therefore the figure given is OK in a first instance.

6. Recommendations

The project proposal for the recovery and recycling by the PYT servicing organisation workshops has been studied and extensively discussed with the consultant involved. It has resulted in three updates of the project proposal.

It is clearly stated that this is a demonstration project and in so far, the uncertainties still present in the proposal are acceptable.

One should note that the cost effectiveness mentioned is a cost effectiveness per kg phased out in the first year and this factor CANNOT be compared to the standard CE-amounts used in conversion projects which are in kg per year.

■ The project proposal can be **supported / endorsed.**

Eindhoven, 98 09 16
(Ozone Day)

Kuijpers, LJM

Country: **Russian Federation**
Firms: **Commercial Refrigeration Equipment Servicing at Kemerovo Oblast by Kemerovo Torgtechnika**
Type: **Recovery and Recycling**
Date: **September 1998**

RTU-UNWB-LK-98224-dl

Scope

The project under review covers the installation of recovery equipment plus additional material in 150 workshops (or at service engineers) at Kemerovo Oblast for the Kemerovo Torgtechnika organisation. It also proposes a limited number of recycling centres (12 centres) and one reclaim centre.

Training will be a separate item within the framework of the project; the latter training project also involves the installation of recovery machines and charging units in the workshops (for HFC-134a also) (since a steadily increasing number of appliances that needs servicing will apply HFC-134a).

An important issue in this proposal is that a large number of equipment will be retrofitted to HCFC based blends; it is actually proposed that about 10% of all equipment present will be retrofitted in the first year. The amount involved in the recovery and recycling from the retrofitted equipment substantially influences the total ODS amount saved and the related cost effectiveness.

1. Sector and Enterprise Background

From the proposal the project objective is clear. The sector background given summarises the structure of the major industries and the service company in the Kemerovo region (as well as in many Russian regions with former "oblast" organisation forms) in an adequate manner. The enterprise background is clear. KTT maintains 30,000 systems, and repairs on an ad-hoc basis 18,000 units. This implies that (from a total of 90,000) KTT is not involved in the preventative maintenance or repair of another 42,000 units; it should be assumed that the KTT organisation is aware where these units are installed and how they are maintained (possibly by new independent companies). This is an important issue where it concerns the retrofit of all the equipment in the oblast.

2. Project Description

The project description is clear. It seems logical to establish a number of recovery units (engineers or workshops) and about one recycling centre per 12 recovery units. This number may even be decreased, but this is very much dependent on the infrastructure and the distances involved.

The recovery and recycling units will not be obsolete in six years time since they can be used for HCFC based blends and HFCs as well.

Where it concerns the price-setting of the recycled refrigerant, the observations made are valid. It will nevertheless be difficult in practice to get all the material recovered (and recycled) which is calculated due to the stimulus to re-use the refrigerant when doing a repair, on site.

- The major element in the service consumption is the refrigerant replacement that is lost through leakage. A number of 76% is given. In Annex 5 preventative maintenance assumes 30% of the total charge to be used (it is assumed that this figure stems from experience, which seems reasonable) from which 10% is recoverable. The latter figure is not more than a reasonable assumption.
- If 76% of the service consumption is through normal leakage then this amount can be reduced via training, after which better practices are applied and modern service equipment is used. In the proposal it is assumed that the consumption can be reduced by 10% due to training. This is OK
- The figure given of 60% (conservative figure mentioned in the proposal) for recovery in Annex 5 is a reasonable average for hermetic and open systems.
- The scheme for retrofit as given in Annex 8 seems reasonable; however, where it concerns the fact that equipment using 40,000 kg is retrofitted, the amount recovered should be 90% of the total (equal to the assumption in Annex 5 for industrial equipment).

3. Environmental Impact

The proposal will significantly reduce the ODS emissions to the atmosphere which is important. It is furthermore so that the ODP and GWP emissions are substantially reduced if the systems are retrofitted with an HCFC based blend with a much lower ODP and GWP (5% of the ODP and 15-20% of the GWP of the CFC-12 applied). The remarks on efficiency and less emissions can be supported.

No comments to the environmental assessment presented in Annex 4.

4. Implementation timeframe

No comments.

5. Project costs and calculation of recovered amounts

No comments to the project costs. The only question is whether one should use 12 recycling centres and whether the reclaim machine should cost $ 160,000. Where it concerns the cost for training, no comments.

Annex 5 and 8 give a calculation of the amounts that can be recovered. Following comments:

- an "overall" average of 60% for recovery efficiency seems reasonable;
- 10% for the amount recoverable from normal preventative maintenance may be OK, 10% due to training is acceptable;
- The amounts calculated for the refrigerant used for preventative maintenance do not seem to be compatible with the statements made. It is mentioned that KTT services 30,000 units and repairs (on ad-hoc basis) 18,000 units. In Annex 5 48,000 units are being mentioned as being serviced; it is not clear whether this would imply a large difference for the recovered amounts;

- There is no explicit mentioning of the repair frequency in Annex 5; it seems to be 3.3% of the open units and 3.4% of the hermetic units. It is difficult to judge whether this is the adequate figure due to economic reasons involved.

The project proposal in Annex 2 looks at retrofit costs (which are in fact to be paid by the consumer). It also makes a calculation of the amount involved in retrofitting (10% of inventory to be recoverable in the first year, total duration six years which seems acceptable).

- However, KTT is involved in the maintenance of 30,000 units and in ad-hoc repair of another 18,000 units. It should be assumed that KTT can start to retrofit the equipment it services, while it identifies the total refrigeration equipment base in the oblast (why the recovery has 100% and not 90% efficiency?).
- By the way, the retrofit activity would imply that KTT would retrofit roughly **9,000 systems** per year (since 48,000 systems are maintained and/or repaired). With 150 technicians involved in recovery it would imply 5 retrofits per month per person(next to the normal service operation with recovery which is more complex than before). This is realistic. Even if it would be doubled in later years it seems possible.
- It is assumed that also 10% of the industrial systems is retrofitted; however, here is then a sort of double counting; 90% of the industrial charge is assumed to be recovered in normal servicing and 90% (100%) of the total charge is assumed to be recovered after retrofit. This would slightly change the amounts.
- The spreadsheet in Annex 8 gives a rough calculation of the amount phased out. If one would refine the model applied (retrofit efficiency, industrial equipment, what happens with the equipment serviced by other organisations where it concerns the need for refrigerant, averages per year could be adjusted) then the amount phased out in the first year would slightly change. However, other uncertainties still play a role which cannot be estimated. Therefore the figure given is OK.

6. Recommendations

The project proposal for the recovery and recycling by the KTT servicing organisation workshops has been studied and extensively discussed with the consultant involved. It has resulted in three updates of the project proposal.

It is clearly stated that this is a demonstration project and in so far, the uncertainties still present in the proposal are acceptable.

One should note that the cost effectiveness mentioned is a cost effectiveness per kg phased out in the first year and this factor CANNOT be compared to the standard CE-amounts used in conversion projects which are in kg per year.

■ The project proposal can be **supported / endorsed.**

Eindhoven, 98 09 16
(Ozone Day)

Kuijpers, LJM

RUSSIA - JSC PLASTIK

TECHNOLOGY

The enterprise manufactures polyurethane integral skin and rigid foam products for the automotive industry. It proposes to replace the CFC 11 currently used as a blowing agent by pentane for the integral skin production and liquid CO2 (LCD) for the rigid foam. The enterprise is a major producer.

For integral skin pentane is one of the non-ODS technologies now being used. Several manufacturers are moving to CO2 (water) technology but this may require in mould coating as a supplementary technology to obtain the required skin quality. Pentane technology more readily provides a good quality skin but is more expensive to implement because of the cost of converting the plant to operate safely with flammable pentane.

The rigid foam used in body panels is used to provide strength and not thermal insulation. As a consequence it is a less critical application. The use of LCD in this application is quite novel and it cannot be considered as a well proven option. Despite there being a very experienced and reliable technology partner (Cannon) there is a possibility that the chosen technology option will not work in a satisfactory manner. Alternative technologies are HCFC 141b or CO2 (water). In addition Cannon can offer a glass fibre-filled polyurethane.

The project provides for equipment for conversion to pentane and LCD technologies including the replacement of all its current low pressure injection machines by high pressure units.

SAFETY AND ENVIRONMENTAL ISSUES

The main issue is to ensure safe operation with pentane. There is provision for equipment including ventilation and detectors and safety training is also requested. There is provision for a safety audit detailed in Annex 5.

PROJECT COSTS

The grant effectiveness of $12.41/kg is within the threshold of $13.76/kg for the composite project involving integral skin and rigid foam components.

Otherwise the items listed are appropriate (bearing in mind the comments on technologies). The existing dispensing equipment is of 1970s vintage and will be scrapped.

There are substantial savings in operating costs.

IMPLEMENTATION TIMEFRAME

Challenging.

RECOMMENDATION

The project is conditionally endorsed pending further information on trials with LCD technology for the rigid foam application. In the OORG reviewers opinion, the HCFC 141b option could be

included as a fall-back position, if the trials with Cannon are unsuccessful, within the moneys now allocated for LCD technology.

The OORG reviewer should be consulted when the outcome of the LCD trials are known if a another option has to be chosen.

M Jeffs

2/1/99 GEFrus99

RUSSIA - JSC STROIDETAL

TECHNOLOGY

The enterprise manufactures extruded polyethylene foam products for the construction market. It currently uses CFC 12 as the blowing agent and it intends to replace this by a butane/CO2 mixture and to progressively increase the CO2 content as the technology evolves.

Butane is a well established technology in this sub-sector. The introduction of CO2 technology gives the potential of a safer and more benign option. Other technologies were also considered, especially the HFCs but were rejected on cost and environmental grounds.

The use of butane requires extensive modifications to provide a safe working environment. and these are provided for in the project. Equipment associated with the use of CO2 is also included.

SAFETY AND ENVIRONMENTAL ISSUES

The main issue is safe working with butane, a flammable gas. In addition to the engineering items there is provision for safety training. There is provision for a safety audits and the terms are detailed in Annex 5.

There will be an environmental benefit as butane is replaced by CO2 as it is a smog producer.

PROJECT COSTS

The grant effectiveness is just below the threshold for this sub-sector.

The capital and one off items are appropriate to the technology chosen but the costs are increased as the blend rather than butane alone is used. There is a saving in operating costs and this is taken into account.

IMPLEMENTATION TIMEFRAME

The implementation schedule is challenging..

RECOMMENDATION

Approval.

M Jeffs

2/1/99 GEFrus99

RUSSIA - JSC NELIDOVO PLASTIC PLANT

TECHNOLOGY

The enterprise manufactures foamed polyethylene products and proposes to replace the CFC 12 currently used as the blowing agent by a blend of butane and CO2 . It intends to increase the proportion of CO2 as the technology evolves.

Butane is a well established technology for this sub-sector. The introduction of CO2 gives the expec tation of a safer and more benign option. Other options were considered, notably the various HFC options, but these were rejected on cost and environmental grounds.

The technology choice requires extensive modifications to the production unit to give safe operating environment. These are included in the project, as is equipment to operate CO2.

SAFETY AND ENVIRONMENTAL ISSUES

The main concern is the safe operation of the plant with flammable butane. In addition to the safety engineering provisions there is training provided within the project. There is provision for a safety audit and the terms for this are detailed in Annex 5.

The introduction of CO2 would give a more environmentally benign technology.

PROJECT COSTS

The grant effectiveness is pegged at the limit for this sub-sector and substantial funding will have to be provided by the enterprise.

The capital and one of items are relevant to the choice of technology. The introduction of the technology based on the blend of butane and CO2 results in higher capital requirements than if one or other of the blowing agents were used alone. However, the technology choice is supported.

The implementation of the project will result in operating cost savings.

IMPLEMENTATION TIMEFRAME

This is challenging.

RECOMMENDATION

Approval.

M Jeffs

2/1/99 GEFrus99

OORG TECHNICAL REVIEW REQUEST
RUSSIA

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau

2nd Review

(OORG Reviewer: Joe Felty)

O O R G / The World Bank - O z o n e O p e r a t i o n s R e s o u r c e G r o u p
GEF Project Proposal Review

OORG TECHNICAL REVIEW REQUEST
Russia

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau

2nd Review

(OORG Reviewer: Joe Felty)

The following review of the M.V. Khrunichev State Space Scientific-Industrial Center (Construction Bureau "Salut") project on "Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau" was conducted at the request of Mr. Thomas Waltz, World Bank. This is a second (2nd) review of the project requested after modifications were made to the project report by the project report prepared as a result of the first OORG review (dated 01 March 1999). Only additional comments not in the previous review are included.

1. **Country of Origin**: Russia

2. **Project Title**: "Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau"

3. **Sector Covered:** Solvent Cleaning

4. **Relationship to Country Programme** Project documentation provided does not indicate whether or not the project is included in or consistent with the country's action plan.

5. **Technology:**

a) (See original OORG review, 01 February 1999).

One of the suggested cleaning solvent systems (based on HFE-7100) has a global warming potential of 240 compared to 5000 for CFC-113. Even though the US EPA has listed all components of 3M's HFE-71DE solvent formulation as "acceptable", without restrictions (under the EPA's Significant New Alternatives Policy (SNAP) program), this GWP value could pose potential future regulatory issues if this family of cleaning agents were to be regulated by international agreement.

In addition the time weighted average (TWA) for HFE-7100 solvent in the cleaning system is 600ppm. However, the TWA for trans-1,2-trichloroethylene solvent in the HFE-71DE system is much lower at 200 ppm. Calculation of the TWA for mixtures usually skews the value toward the lower number to protect the workers.

b) (See original OORG review, 01 February 1999).

c) Feasibility of transfer to the country of concern:

i) (See original OORG review, 01 February 1999).

ii) (See original OORG review, 01 February 1999).

iii) (See original OORG review, 01 February 1999).

iv) (See original OORG review, 01 February 1999).

6. Environmental Impact:

a) The ODP is zero for one of the potential cleaning solvents (HFE-71DE) and processes under consideration. However, the chosen cleaning solvent HFE-71DE have reported global warming potentials (GWP) of 240 compared to the prior cleaning solvent CFC-113 which had a GWP of 5000. The indirect GWP will be relatively small. However more energy will be required for drying and generation/regeneration of cleaning solvent when compared to CFC-113.

b) The proposed utilization of a low emission, "zero discharge", cleaning system employing solvent regeneration and reuse provides adequate safety from an environmental, safety and health perspective. The use of such equipment is also essential in retaining and obtaining maximum use of the relatively expensive HFE-71DE cleaning solvent.

7. Project Cost:

a) (See original OORG review, 01 February 1999).

b) Existing cleaning equipment similar to the proposed new equipment would be expected to be present in the existing facility. Both the existing and the new cleaning processes are essentially vapor degreasing processes. However, due to the cost of the new cleaning solvent, the differences in cleaning chemistries/technology between CFC-113 and HFE-71DE, and the need for low emissions cleaning equipment to minimize solvent losses, the existing equipment would require replacement.

c) Cost of equipment

i) (See original OORG review, 01 February 1999).

ii) (See original OORG review, 01 February 1999).

iii) It appears that the equipment currently requested should meet the conversion requirements for replacing CFC-113 solvent cleaning with HFE-71DE 71DE or other potential cleaning solvents.

iv) (See original OORG review, 01 February 1999)..

v) (See original OORG review, 01 February 1999).

vi) (See original OORG review, 01 February 1999).

vii) Again, in the revised project report there was no indication whether or not the proposed project equipment and quantity listed would result in an increase in existing capacity. Salut must confirm that they will bear any increased costs

for the project that results in an increased capacity above the current, baseline CFC-113 cleaning process. **Such an enterprise contribution will prevent violation of the capacity rule.**

d) Appropriateness of training and related costs, if any:

(See original OORG review, 01 February 1999).

e) Operating Costs

i) The operating costs projected after the conversion are significantly higher than the existing costs. Increased costs associated with one of the proposed new cleaning solvents (HFE-71DE) are consistent with what has been experienced in other industrial sectors utilizing these cleaning solvents. Also, increased electric energy consumption is to be expected with the utilization of low emission cleaning equipment incorporating solvent capture, recycle and reuse technologies.

ii) (See original OORG review, 01 February 1999).

iii) (See original OORG review, 01 February 1999).

8. Implementation Time Frame: (See original OORG review, 01 February 1999)..

9. Recommendation:

a) **Approval after Modifications are addressed as described below:**

i) The issue of which cleaning solvent will finally be recommended does not appear to have been completely resolved at the time of this review. However, the HFE-71DE solvent cleaning system has been identified as the primary HFE based solvent under consideration.

ii) Especially troubling is the lack of a firm choice of solvent technology, which will have a significant impact on incremental costs, and hence overall project cost effectiveness. HFE-71DE has been identified, but the option of using other conventional non-ODS or very low ODS cleaning solvents (trichloroethylene, perchloroethylene or HCFCs) are apparently still under consideration and will be so up to and during project appraisal. These points need to be addressed to ensure smooth approval and implementation.

iii) The proposed vendor/supplier for the "zero solvent discharge" cleaning equipment is not identified in the modified report. This type of identification has typically addressed in prior reports.

OORG Technical Reviewer: Joe R. Felty

Date Review Completed: 21 March 1999 .

OORG TECHNICAL REVIEW REQUEST
Russia

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau

(OORG Reviewer: Joe Felty)

The following review of the M.V. Khrunichev State Space Scientific-Industrial Center (Construction Bureau "Salut") project on "Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau" was conducted at the request of Mr. Thomas Waltz, World Bank.

1. **Country of Origin**: Russia

2. **Project Title**: "Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at "Salut" Design Bureau"

3. **Sector Covered:** Solvent Cleaning

4. **Relationship to Country Programme** Project documentation provided does not indicate whether or not the project is included in or consistent with the country's action plan.

5. **Technology:**

   a) The choice of a hydrofluoroether azeotrope (HFE) solvent system for precision cleaning of metal (aluminum, stainless steel, etc.) parts (machined parts, fuel tanks and piping) effectively eliminates the ozone depleting potential (formerly associated with CFC-113 solvent) for the cleaning process.

   The suggested cleaning solvent system based on HFE-7100 has a global warming potential of 250 compared to 5000 for CFC-113. Even though the US EPA has listed all components of 3M's HFE-71DA and HFE-71DE solvent formulations as "acceptable", without restrictions, under the EPA's Significant New Alternatives Policy (SNAP) program, this GWP value could pose potential future regulatory issues if this family of cleaning agents were to be regulated by international agreement.

   In addition the time weighted average (TWA) for HFE-7100 solvent in the cleaning system is 600ppm. However, the TWA for trans-1,2-trichloroethylene solvent in the system is much lower at 200 ppm. Calculation of the TWA for mixtures usually skews the value toward the lower number to protect the workers.

   b) The technology chosen is not currently transitional since it does not depend upon solvents or chemicals which, at this time, face future bans.

If a "zero discharge" cleaning system is to be built/purchased; the potential for using a stabilized trichloroethylene (TCE) solvent might need to be investigated. TCE is an aggressive, much cheaper, easier to obtain solvent than the HFE-71DA or HFE-71DE azeotropes. The HFE 71-DA and HFE-71DE will probably also have an acid stabilizer system present to prevent the trans-1,2-dichloroethylene from going "acidic" and possibly attacking the aluminum parts to be cleaned. If there are no compatibility issues with stabilized TCE, the reduced solvent costs would positively impact the incremental operating costs. The lower TWA value of 50 ppm for TCE compared to 200 ppm for trans-1,2-dichloroethylene should not be an issue provided low emission, "zero discharge" cleaning equipment is to be utilized as stated in the project report which would minimize emissions/operator exposure.

c) Feasibility of transfer to the country of concern:

i) Technology transfer and training have not been included as line items in the investment costs. However, if the cleaning system is purchased, such transfer issues should not be a problem.

ii) There appears to be no licensing agreement required since the technology is well understood and commercially available.

iii) Other technology systems utilizing ozone safe cleaning chemistries were investigated but discarded due to the lack of compatibility with parts to be cleaned (aqueous and semi-aqueous cleaning), safety issues (flammability/combustibility of hydrocarbon solvents) and need to remove contaminants from machining/forming operations ("no-clean). The decision not to consider other less expensive chlorinated cleaning solvents (even though the chosen HFE solvent system contains a chlorinated cleaning solvent), such as TCE, methylene chloride and tetrachloroethylene (perchloroethylene), were not discussed. In light of the decision to pursue low emission, "zero discharge", cleaning equipment, these solvents might provide low cost, readily available alternatives provided there are no material/use incompatibilities.

iv) See paragraphs 5 b and 5 c iii) above.

6. Environmental Impact:

a) The ODP is zero for the cleaning solvent and process chosen. However, the chosen cleaning solvents HFE-71DA or HFE-71DE have reported global warming potentials (GWP) of 250 and 240 respectively when compared to the prior cleaning solvent CFC-113 which had a GWP of 5000. The indirect GWP will be relatively small. However more energy will be required for drying and generation/regeneration of cleaning solvent when compared to CFC-113.

b) The proposed utilization of a low emission, "zero discharge", cleaning system employing solvent regeneration and reuse provides adequate safety from an environmental, safety and health perspective. The use of such equipment is also essential in retaining and obtaining maximum use of the relatively expensive HFE-71DA or HFE-71DE cleaning solvents.

7. **Project Cost**:

a) All the cost components identified in the project are essential to the conversion. The proposed equipment should provide up to date, efficient, low solvent loss cleaning equipment with capacity levels similar to current throughput levels.

b) Existing cleaning equipment similar to the proposed new equipment would have been expected to be found in the existing facility. Both the existing and the new cleaning processes are essentially vapor degreasing processes. However, due to the cost of the new cleaning solvent, the differences in cleaning chemistries/technology between CFC-113 and HFE-71DA or HFE-71DE, and the need for low emissions cleaning equipment to minimize solvent losses, the existing equipment would require replacement.

c) Cost of equipment

i) The base line costs are properly addressed. The suggested equipment costs appear consistent with current industry pricing practices.

ii) The equipment and technology listed should be readily available and all requested equipment is consistent with the project plan.

iii) It appears that the equipment currently requested should meet the conversion requirements for replacing CFC-113 solvent cleaning with HFE-71DA or HFE-71DE solvent cleaning.

iv) The cleaning of machined parts and tanks will require new, more sophisticated low emission cleaning equipment to minimize losses of the expensive HFE-71DA or HFE-71DE cleaning solvent. The project includes plans to modify/rebuild the existing system for cleaning pipes and tubing to allow the use of the new solvent.

v) A plan for the disposition of the current equipment to be scrapped was not provided.

vi) Projected salvage value of scrapped equipment was not provided; however, value of equipment scrapped from such lines is typically low and may not cover removal/disposal costs.

vii) The proposed project equipment and quantity listed gave no indication there would be an increase in existing capacity. Salut must confirm that they will bear any increased costs for the project that results in an increased capacity above the current, baseline CFC-113 cleaning process. **Such an enterprise contribution will prevent violation of the capacity rule.**

d) Appropriateness of training and related costs, if any:

The proposal states that "technical assistance with installation and training for the proper operating an maintenance of equipment have been requested and are included in the equipment procurement packages." The proposed packages were not provided, so there was no indication as to the supplier or amount/type of training planned or associated cost breakouts.

e) Operating Costs

i) The operating costs projected after the conversion are significantly higher than the existing costs. Increased costs associated with the proposed new cleaning solvent, HFE-71DA or HFE-71DE, are consistent with what has been experienced in other industrial sectors utilizing these cleaning solvents. Also, increased electric energy consumption is to be expected with the utilization of low emission cleaning equipment incorporating solvent capture, recycle and reuse technologies.

ii) The new process and equipment, while minimizing environmental, health and safety impacts associated with the new chemistry are projected to result in increased operating costs due to solvent purchase costs and electrical energy consumption. Possibly if the use of other less costly cleaning solvents could be pursued in the future (process improvements) for use with the new equipment, operational costs might be reduced.

iii) The operating cost given and their relation to the technology chosen are consistent with experience of other metal fabrication cleaning operations.

8. Implementation Time Frame: The implementation time frame proposed appears feasible.

9. Recommendation:

a) **Approval after Modifications are addressed as described below:**

i) There appears to be some confusion as to the actual HFE solvent azeotrope to be sued. Two different HFE 7100 based solvent azeotrope systems (HFE-71DA and HFE-71DE) are referenced in the report. As a result, both systems are referenced throughout the review until further clarification is made on which solvent system is to be chosen. Both systems utilize HFE 7100 as the base solvent but contain different secondary solvents in azeotropic blends which provide different chemical and cleaning chemistries and capabilities. The actual cleaning system planned for use must be clarified.

1. Page 6, under **Project Description**, reference is made to HFE-7100/trans 1,2 dichloroethylene azeotrope (e.g., **HFE-71DA**,) as the proposed cleaning solvent.
2. Page 12, under **Design Bureau "Salut": Investment Costs Summary,** under **Category D, Initial Solvent Charge**, reference is made to the solvent **being HFE-71DE.**

3. Page 14, in **Annex 2, CALCULATION OF INCREMENTAL OPERATING COSTS, 1. Solvent,** reference is again made to "Projected consumption of 2 MT/yr. of virgin **HFE-71DE**..."

HFE-71DA solvent azeotrope system contains 2.7% ethanol solvent, 44.6% trans-1,2-dichloroethylene solvent with the remainder HFE 7100 solvent (52.7%).

HFE-71DE solvent azeotrope system contains 50% trans-1,2-dichloroethylene solvent with the remainder HFE 7100 solvent (50 %).

ii) There is no mention if compatibility studies have been conducted with the proposed solvent and the metal parts to be cleaned. Freshly machined aluminum surfaces have been known to react rapidly with unsaturated chlorinated solvents like trans-1,2-dichloroethylene and trichloroethylene if the acid stabilizer chemical constituents are not maintained within strict limits. The use of non-alcohol containing solvents, such as HFE-71DE or TCE, is favored over alcohol containing formulations such as HFE-71-DA for maximum stability in the presence of freshly machined metal. Further, it is not stated if these metals are divalent, which accelerates the decomposition of halogenated solvents with depleted acid stabilization packages

iii) The proposed vendor/supplier for the "zero solvent discharge" cleaning equipment is not identified in the report. There is no indication of whether or not cleaning evaluation studies have been conducted with similar equipment and the proposed solvent cleaning system to determine if acceptable results will be achieved with the hardware to be cleaned and the contaminants to be removed.

iv) There is no mention of training for operators to teach the chemistry analysis techniques and make-up requirements to keep the acid stabilizer concentration within acceptable limits to avoid potential corrosion problems with freshly machined aluminum parts in the presence of inadequately stabilized unsaturated chlorinated solvents such as trans-1,2-trichloryethylene. Such analyses were not as critical for CFC-113 cleaning systems due to the inert characteristics of the solvent.

v) Page 3, D. Financial Analysis
Typographical error in the first sentence or in the table: Total sales were USD 142,000,000 in ~~1997~~ 1996, which was....

vi) Annex 3, A. ODS Savings:
Possible typographical error the ODP value calculated for the CFC-113 usage is listed as 22.4 MT ODP. However, the next entry indicates that the ODP weighted savings is 24.0 MT ODP. The Cost Effectiveness calculations at the bottom of the page appeared to use the 22.4 MT ODP value.

vii) The inconsistencies noted above need to be resolved by an elaboration from the project preparation and enterprise representatives. Especially troubling is the lack of a firm choice of solvent technology, which will have a significant

impact on incremental costs, and hence overall project cost effectiveness. These points need to be addressed to ensure smooth approval and implementation.

OORG Technical Reviewer: _____
Joe R. Felty

Date Review Completed: 01 March 1999 .

OORG TECHNICAL REVIEW REQUEST
RUSSIA

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

2nd Review

(OORG Reviewer: Joe Felty)

O O R G / The World Bank - O z o n e O p e r a t i o n s R e s o u r c e G r o u p
GEF Project Proposal Review

OORG TECHNICAL REVIEW REQUEST
Russia

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

2nd Review

(OORG Reviewer: Joe Felty)

The following review of the Miassky Mashinostroitelny (MMZ), Miass, project on " Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)" was conducted at the request of Mr. Thomas Waltz, World Bank. This is a second (2nd) review of the project requested after modifications were made to the project report by the project report preparer as a result of the first OORG review (dated 01 March 1999). Only additional comments not in the previous review are included.

1. **Country of Origin**: Russia

2. **Project Title**: Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

3. **Sector Covered:** Solvent Cleaning

4. **Relationship to Country Programme** Project documentation provided does not indicate whether or not the project is included in or consistent with the country's action plan.

5. **Technology:**

a) (See original OORG review, 01 February 1999).

One of the suggested cleaning solvent systems (based on HFE-7100) has a global warming potential of 240 compared to 5000 for CFC-113. Even though the US EPA has listed all components of 3M's HFE-71DE solvent formulation as "acceptable", without restrictions (under the EPA's Significant New Alternatives Policy (SNAP) program), this GWP value could pose potential future regulatory issues if this family of cleaning agents were to be regulated by international agreement.

The time weighted average (TWA) for HFE-7100 solvent in the cleaning system is 600ppm. However, the TWA for trans-1,2-trichloroethylene solvent in the HFE-71DE system is much lower at 200 ppm. Calculation of the TWA for mixtures usually skews the value toward the lower number to protect the workers.

b) (See original OORG review, 01 February 1999).

c) Feasibility of transfer to the country of concern:

i) (See original OORG review, 01 February 1999).

ii) (See original OORG review, 01 February 1999).

iii) (See original OORG review, 01 February 1999).

iv) (See original OORG review, 01 February 1999).

6. Environmental Impact:

a) The ODP is zero for one of the proposed cleaning solvents (HFE-71DE). However, the HFE-71DE has a reported global warming potentials (GWP) of 240 when compared to the prior cleaning solvent CFC-113 which has a GWP of 5000. The indirect GWP will be relatively small. However more energy will be required for drying and generation/regeneration of cleaning solvent when compared to CFC-113.

b) The proposed utilization of a low emission, "zero discharge", cleaning system employing solvent regeneration and reuse provides adequate safety from an environmental, safety and health perspective. The use of such equipment is also essential in retaining and obtaining maximum use of the relatively expensive HFE-71DA or HFE-71DE cleaning solvents.

7. Project Cost:

a) (See original OORG review, 01 February 1999)..

b) Existing cleaning equipment similar to the proposed new equipment would have been expected to be found in the existing facility. Both the existing and the new cleaning processes are essentially vapor degreasing processes. However, due to the cost of one of the potential new cleaning solvents, the differences in cleaning chemistries/technology between CFC-113 and HFE-71DE, and the need for low emissions cleaning equipment to minimize solvent losses, the existing equipment would require replacement.

c) Cost of equipment

i) (See original OORG review, 01 February 1999).

ii) (See original OORG review, 01 February 1999).

iii) It appears that the equipment currently requested should meet the conversion requirements for replacing CFC-113 solvent cleaning with HFE-71DE or other potential cleaning solvents.

iv) (See original OORG review, 01 February 1999).

v) (See original OORG review, 01 February 1999).

vi) (See original OORG review, 01 February 1999).

vii) (See original OORG review, 01 February 1999).

d) Appropriateness of training and related costs, if any.

(See original OORG review, 01 February 1999).

e) Operating Costs

i) The operating costs projected after the conversion are significantly higher than the existing costs. Increased costs associated with one of the proposed new cleaning solvents (HFE-71DE) are consistent with what has been experienced in other industrial sectors utilizing these cleaning solvents. Also, increased electric energy consumption is to be expected with the utilization of low emission cleaning equipment incorporating solvent capture, recycle and reuse technologies.

ii) (See original OORG review, 01 February 1999).

iii) (See original OORG review, 01 February 1999).

8. Implementation Time Frame: (See original OORG review, 01 February 1999).

9. Recommendation:

a) **Approval after Modifications as described below are addressed:**

ii) The issue of which cleaning solvent will finally be recommended does not appear to have been completely resolved at the time of this review. However, the HFE-71DE cleaning solvent system has been identified as the primary HFE based solvent under consideration.

ii) Especially troubling is the lack of a firm choice of solvent technology, which will have a significant impact on incremental costs, and hence overall project cost effectiveness. HFE-71DE has been identified, but the option of using other conventional non-ODS or very low ODS cleaning solvents (trichloroethylene, perchloroethylene or HCFCs) is apparently still under consideration and will be so up to and during project appraisal. These points need to be addressed to ensure smooth approval and implementation.

OORG Technical Reviewer: Joe R. Felty

Date Review Completed: 21 March 1999

OORG TECHNICAL REVIEW REQUEST
RUSSIA

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

(OORG Reviewer: Joe Felty)

OORG TECHNICAL REVIEW REQUEST
Russia

Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

(OORG Reviewer: Joe Felty)

The following review of the Miassky Mashinostroitelny (MMZ), Miass, project on " Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)" was conducted at the request of Mr. Thomas Waltz, World Bank.

1. **Country of Origin**: Russia

2. **Project Title**: Conversion of Precision Cleaning Processes from CFC-113 to a Non-Ozone Depleting Solvent at Miass Machine Building Plant-Miassky Mashinostroitelny Zavod (MMZ)

3. **Sector Covered:** Solvent Cleaning

4. **Relationship to Country Programme** Project documentation provided does not indicate whether or not the project is included in or consistent with the country's action plan.

5. **Technology:**

   a) The choice of a hydrofluoroether azeotrope (HFE) solvent system for precision cleaning of metal (aluminum, stainless steel, etc.) parts (machined parts, fuel tanks and piping) effectively eliminates the ozone depleting potential (formerly associated with CFC-113 solvent) for the cleaning process.

   The suggested cleaning solvent system based on HFE-7100 has a global warming potential of 250 compared to 5000 for CFC-113. Even though the US EPA has listed all components of 3M's HFE-71DA and HFE-71DE solvent formulations as "acceptable", without restrictions, under the EPA's Significant New Alternatives Policy (SNAP) program, this GWP value could pose potential future regulatory issues if this family of cleaning agents were to be regulated by international agreement.

   The time weighted average (TWA) for HFE-7100 solvent in the cleaning system is 600ppm. However, the TWA for trans-1,2-trichloroethylene solvent in the system is much lower at 200 ppm. Calculation of the TWA for mixtures usually skews the value toward the lower number to protect the workers.

   b) The technology chosen is not currently transitional since it does not depend upon a solvent or chemicals which, at this time, face future bans.

If a "zero discharge" cleaning system is to be built/purchased; the potential for using a stabilized trichloroethylene (TCE) solvent might need to be investigated. TCE is an aggressive, much cheaper, easier to obtain solvent than the HFE-71DA or HFE-71DE azeotropes. The HFE-71DA and HFE-71DE will probably also have an acid stabilizer system present to prevent the trans-1,2-dichloroethylene from going "acidic" and possibly attacking the aluminum parts to be cleaned. If there are no compatibility issues with stabilized TCE, the reduced solvent costs would positively impact the incremental operating costs. The lower TWA value of 50 ppm for TCE compared to 200 ppm for trans-1,2-dichloroethylene should not be an issue provided low emission, "zero discharge" cleaning equipment is to be utilized as stated in the project report which would minimize emissions/operator exposure.

c) Feasibility of transfer to the country of concern:

i) Technology transfer and training have not been included as line items in the investment costs. However, if the cleaning system is purchased, such transfer issues should not be a problem.

ii) There appears to be no licensing agreement required since the technology is well understood and commercially available.

iii) Other technology systems utilizing ozone safe cleaning chemistries were investigated but discarded due to the lack of compatibility with parts to be cleaned (aqueous and semi-aqueous cleaning), safety issues (flammability/combustibility of hydrocarbon solvents) and need to remove contaminants from machining/forming operations ("no-clean). The decision not to consider other less expensive chlorinated cleaning solvents (even though the chosen HFE solvent system contains a chlorinated cleaning solvent), such as TCE, methylene chloride (MC) and tetrachloroethylene (perchloroethylene), were not discussed. In light of the decision to pursue low emission, "zero discharge", cleaning equipment, these solvents might provide low cost, readily available alternatives provided there are no material/use incompatibilities.

iv) See paragraphs 5 b and 5 c iii) above.

6. Environmental Impact:

a) The ODP is zero for the cleaning solvent and process chosen. However, the chosen cleaning solvents HFE-71DA or HFE-71DE have reported global warming potentials (GWP) of 250 and 240 respectively when compared to the prior cleaning solvent CFC-113 which has a GWP of 5000. The indirect GWP will be relatively small. However more energy will be required for drying and generation/regeneration of cleaning solvent when compared to CFC-113.

b) The proposed utilization of a low emission, "zero discharge", cleaning system employing solvent regeneration and reuse provides adequate safety from an environmental, safety and health perspective. The use of such equipment is also essential in retaining and obtaining maximum use of the relatively expensive HFE-71DA or HFE-71DE cleaning solvents.

7. **Project Cost:**

a) All the cost components identified in the project are essential to the conversion. The proposed equipment should provide up to date, efficient, low solvent loss cleaning equipment with capacity levels similar to current throughput levels.

b) Existing cleaning equipment similar to the proposed new equipment would have been expected to be found in the existing facility. Both the existing and the new cleaning processes are essentially vapor degreasing processes. However, due to the cost of the new cleaning solvent, the differences in cleaning chemistries/technology between CFC-113 and HFE-71DA or HFE-71DE, and the need for low emissions cleaning equipment to minimize solvent losses, the existing equipment would require replacement.

c) Cost of equipment

i) The base line costs are properly addressed. The suggested equipment costs appear consistent with current industry pricing practices.

ii) The equipment and technology listed should be readily available and all requested equipment is consistent with the project plan.

iii) It appears that the equipment currently requested should meet the conversion requirements for replacing CFC-113 solvent cleaning with HFE-71DA or HFE-71DE solvents.

iv) The cleaning of machined parts and tanks will require new, more sophisticated low emission cleaning equipment to minimize losses of the expensive HFE-71DA or HFE-71DE cleaning solvents. The project includes plans to modify/rebuild the existing system for cleaning pipes and tubing to allow the use of the new solvent.

v) A plan for the disposition of the current equipment to be scrapped was not provided.

vi) Projected salvage value of scrapped equipment was not provided; however, value of equipment scrapped from such lines is typically low and may not cover removal/disposal costs.

vii) The project, as defined, represents an increase in capacity in that the new system will handle parts that are approximately 3X larger than the current system handling capacity. The project report indicates Maiss will assume the investment cost of detailed design, fabrication and start-up associated with the increase in capacity. **This strategy will allow project implementation without violating the capacity rule.**

d) Appropriateness of training and related costs, if any.

The proposal states that "no technical assistance is requested beyond written installation, operation and maintenance instructions associated with purchased equipment." Training for the proper operation and maintenance of equipment has not been addressed nor requested in the project report. No indication was made as to the amount/type of training planned on equipment operation, control or chemical analysis for maintaining cleaning solution chemistry process control.

e) Operating Costs

i) The operating costs projected after the conversion are significantly higher than the existing costs. Increased costs associated with the proposed new cleaning solvent, HFE-71DA or HFE-71DE, are consistent with what has been experienced in other industrial sectors utilizing these cleaning solvents. Also, increased electric energy consumption is to be expected with the utilization of low emission cleaning equipment incorporating solvent capture, recycle and reuse technologies.

ii) The new process and equipment, while minimizing environmental, health and safety impacts associated with the new chemistry are projected to result in increased operating costs due to solvent purchase costs and electrical energy consumption. Possibly if the use of other less costly cleaning solvents could be pursued in the future (process improvements) for use with the new equipment, operational costs might be reduced.

iii) The operating cost given and their relation to the technology chosen are consistent with experience of other metal fabrication cleaning operations.

8. Implementation Time Frame: The implementation time frame proposed appears feasible.

9. Recommendation:

a) **Approval after Modifications as described below are addressed:**

i) There appears to be some confusion as to the actual HFE solvent azeotrope to be sued. Two different HFE 7100 based solvent azeotrope systems (HFE-71DA and HFE-71DE) are referenced in the report. As a result, both systems are referenced throughout the review until further clarification is made on which solvent system is to be chosen. Both systems utilize HFE 7100 as the base solvent but contain different secondary solvents in azeotropic blends which provide different chemical and cleaning chemistries and capabilities. The actual cleaning system planned for use must be clarified.

1. Page 5, under **Project Description**, reference is made to HFE–7100/trans 1,2 dichloroethylene azeotrope (e.g., **3M HFE-71DA**) as the proposed cleaning solvent.
2. Page 9, under **MMZ: Investment Costs Summary,** under **Category C, Initial Solvent Charge**, reference is made to the solvent being **HFE-71DE**.

3. Page 12, in Annex 2, **CALCULATION OF INCREMENTAL OPERATING COSTS, 1. Solvent,** reference is again made to "Projected consumption of 0.5 MT/yr. of virgin **HFE-71DE** ..."

HFE-71DA solvent azeotrope system contains 2.7% ethanol solvent, 44.6% trans-1,2-dichloroethylene solvent with the remainder HFE 7100 solvent (52.7%).

HFE-71DE solvent azeotrope system contains 50% trans-1,2-dichloroethylene solvent with the remainder HFE 7100 solvent (50 %).

ii) There is no mention if compatibility studies have been conducted with the proposed solvent and the metal parts to be cleaned. Freshly machined aluminum surfaces have been known to react rapidly with unsaturated chlorinated solvents like trans-1,2-dichloroethylene and trichloroethylene (TCE) if the acid stabilizer chemical constituents are not maintained within strict limits. . Therefore, the use of non-alcohol containing solvents, such as HFE-71DE, TCE, or MC, is favored over alcohol containing formulations such as HFE-71-DA for maximum stability in the presence of freshly machined metal. Further, it is not stated if these metals are divalent, which accelerates the decomposition of halogenated solvents with depleted acid stabilization packages

iii) The proposed vendor/supplier for the "zero solvent discharge" cleaning equipment is not identified in the report. There is no indication of whether or not cleaning evaluation studies have been conducted with similar equipment and the proposed solvent cleaning system to determine if acceptable results will be achieved with the hardware to be cleaned and the contaminants to be removed.

iv) There is no mention of training for operators to learn the chemistry analysis techniques and make-up requirements to keep the acid stabilizer concentration within acceptable limits to avoid potential corrosion problems with freshly machined aluminum parts in the presence of inadequately stabilized unsaturated chlorinated solvents such as trans-1,2-dichloroethylene. Such analyses were not as critical for CFC-113 cleaning systems due to the inert characteristics of the solvent.

v) The inconsistencies noted above need to be resolved by an elaboration from the project preparation and enterprise representatives. Especially troubling is the lack of a firm choice of technology, which will have a significant impact on incremental costs, and hence overall project cost effectiveness. These points need to be addressed to ensure smooth approval and implementation.

OORG Technical Reviewer: _____
Joe R. Felty

Date Review Completed: 02 March 1999 .

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