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

Thirteenth Meeting
Montreal, 25-27 July 1994

COUNTRY PROGRAMME: ZIMBABWE

This document consists of:

- Comments and recommendations of the Fund Secretariat
- Country Programme Evaluation Sheet (prepared by the Fund Secretariat)
- Transmittal Letter from the Government of Zimbabwe
- Country Programme Cover Sheet
- Country Programme Executive Summary¹
- Institutional strengthening project proposal

¹ Complete Country Programme was sent only to members of the Executive Committee that requested full documentation.

COMMENTS AND RECOMMENDATIONS OF THE FUND SECRETARIAT

COMMENTS

1. The Country Programme conforms to the format and content of the approved guidelines. In addition to providing the status of ODS use in the country it provides insight into the impact of the global phase-out of ODS as well as the activities of transnational corporations on the ODS-using sector of the Zimbabwe industry and economy. It is expected that the future demand for ODS will be determined by external ODS supply dynamics.
2. While the global phase-out has manifested itself in higher prices and reduced availability of CFCs, local ODS suppliers and industries with links to transnational corporations are promoting substitute and recycling technologies. There has been a shift away from CFCs to HCFC-22, while refrigerator manufacturers and vehicle assemblers are preparing themselves for the use of HFC-134a.
3. Due to the economically strategic nature of methyl bromide in Zimbabwe (consumption: 600 tonnes) the issues relating to its phase-out is of concern to the government.
4. Six project proposals with a total cost of US \$1.201 million have been developed and annexed to the country programme for consideration by the Executive Committee.

Projects Proposals Submitted for Approval with the country programme

The project proposals submitted for consideration include:

• Institutional Strengthening for phase-out of ODS	US \$172,150
• CFC recovery, recycling and reclamation	393,000
• Retrofitting of refrigeration equipment for conversion from CFC-12 to HCFC and HFC-134a	395,000
• Recycling and reclamation of halons	150,000
• Methyl bromide studies for alternative technology investigation	15,000
• Strategic stocks of CFC-12	75,000

5. Upon the review of the project proposals, the Fund Secretariat could recommend approval by the 13th Meeting of only the institutional strengthening project in the amount of US \$172,150. The two projects "CFC recovery, recycling and reclamation" and "Recycling and reclamation of halons" need to be redesigned in cooperation with the designated implementing agency or agencies. Furthermore, in view of the level of funding (US \$393,000) it would have been appropriate for the designated implementing agency to be involved in the preparation or to have endorsed the project before its submission to avoid further review by the agency following its approval.

6. With regard to the project "Retrofitting of refrigeration equipment for conversion from CFC-12 to HCFC and HFC-134a" (US \$395,000) the proposal does not provide adequate information to enable assessment of its feasibility and cost effectiveness, e.g. it is not known what types of refrigeration units are to be retrofitted and how. The Executive Committee's decision on chillers (UNEP/OzL.Pro/ExCom/12/37, para 160) might apply to this situation. The new refrigeration units to be purchased would not be eligible for funding.

7. The recycling and reclamation of halons for fire fighting equipment is a request for a halon recycling machine for use by Air Zimbabwe to recycle and reclaim halons during annual testing of extinguisher cylinders as well as serve some of the fixed fire systems in existence. The use of halon 1301 in fire extinguisher in the civil aviation industry is an essential use. Although the recycling of the halon 1301 is eligible and essential activity the cost and apparent underutilization of the facility to be set up calls the cost effectiveness of this and similar requests into question. There is need for the Executive Committee to consider possible means of satisfying the requirements of such apparently small airline fleets in a manner that would be cost effective.

8. The Methyl bromide studies for alternative technology investigation is subject to decision V/23 of the Fifth Meeting of the Parties which restricted methyl bromide projects.

9. The issue of establishment of strategic stocks of CFC-12 poses a policy issue which is yet to be resolved.

Institutional Strengthening

10. Following adjustments in the prices of typewriters from US \$1,800 to US \$800, the amount of US \$171,050 including 10% contingency was recommended for approval.

RECOMMENDATIONS

The Fund Secretariat recommends as follows:

11. To approve the Zimbabwe Country Programme. Approval of Country Programme does not denote approval of the projects identified therein or their funding levels;

12. In accordance with the Executive Committee decision on implementation of country programmes (UNEP/OzL.Pro/ExCom/10/40, para 135), to request the Government of Zimbabwe to provide information on the progress of implementation of the country programme within one year of its approval, i.e. on 31 July 1995 and annually on 31st day of July of each subsequent year.

13. To approve the amount of US \$171,050 and US \$22,240 support costs for the institutional strengthening project to be included in UNEP's 1994 Work Programme.

14. To request the Government of Zimbabwe to cooperate with the designated implementing agencies to review and where possible redevelop the projects in accordance with the relevant Executive Committee decisions and in light of the above comments.

ZIMBABWE COUNTRY PROGRAMME EVALUATION SHEET

National Implementing Agency: Ozone Office, Ministry of Environment and Tourism

Status of ratification of the Vienna Convention and the Montreal Protocol

	Signature	Ratification	Entry Force
Vienna Convention (1985)		03/Nov/92	01/Feb/93
Montreal Protocol (1987)		03/Nov/92	01/Feb/93
London Amendment (1990)			
Copenhagen Amendment (1992)			

Production of controlled substances: 0 metric tonnes (mt)

Consumption of controlled substances (1993): 236.7 metric tonnes
(excluding methyl bromide) 320.4 weighted tonnes (ODP)

Substance	CFC						Halon			Solvents			M-Br
(ton)	11	12	113	114	115	Total	1211	1301	Total	CTC	MCF	Total	
ODS	88.0	135.0	0.5			223.5	5.0	8.2	13.2				600.0
ODP	88.0	135.0	0.4			223.4	15.0	82.0	97.0				420.0

Source: Country Programme (1994)

Distribution of ODP by substance:

CFC: 69.7% Halon: 30.3% CTC, MCF:

Distribution of ODP by sector:

Sector:	Aerosol	Foam	Halon	Refrig.	Solvent
Consumption (tonnes):	7.0	20.0	97.0	196.0	
Percent of total:	2.2%	6.2%	30.3%	61.2%	

Country Programme

Duration of country programme: 1994-2005 (Action Plan covers initial three years)

ODS phase-out target:

Complete phase out of halon by 2005 and complete phase out of CFC by 2010

Phase-out priority area:

Refrigeration sector

Cost of activities in country programme: \$1,201,000

Strategy:

Phase out within the framework of a National Ozone Policy elements of which include enhanced capacity building, registration/certification system, a Strategic Task Force to provide guidance and negotiate voluntary phase-out agreements with affected sectors, promotion of the use of substitute chemicals and technologies, introduce ODS import licensing system and bans for various applications. Import of CFC for recharge only until 2010.

All communications should
be addressed to
The Secretary for
Environment and
Tourism



ZIMBABWE

SECRETARY OF ENVIRONMENT
AND TOURISM
Karigamombe Centre
53, Samora Machel Avenue
Harare, Zimbabwe

Private Bag 7753
Causeway, Zimbabwe
Telephone: 794455

Your Ref.:

Our Ref.:

June 3, 1994.

The Chief Officer
Secretariat of the Multilateral Fund
for the Implementation of the Montreal Protocol
1800 McGill College
27th Floor
MONTREAL, Canada HJA 3J6

Sir

I have the honour to submit herewith the Country Programme of Zimbabwe for the consideration and approval of the Multilateral Fund for the Implementation of the Montreal Protocol.

Zimbabwe adhered to the Protocol on 1 November 1992 and became a Party thereto on 1 February 1993. It is classified as operating under paragraph 1 of Article 5 of the Protocol.

I would like to place on record our appreciation of the assistance extended to us by UNEP IE/PAC Ozone Action Programme and CIDA during the preparation of the Country Programme.

I am pleased to say that the Government is committed to the implementation of the actions contained in the Country Programme. The decision to that effect was made by The Minister of Environment and Tourism on 2 June 1994.

I further assert that it is the Government's intention to monitor compliance with the Protocol. If necessary, further and different actions from those specified in the country programme will be taken, and the Country Programme will be updated and submitted to the Executive Committee of the Multilateral Fund.

We hope that the Executive committee will approve the request for assistance made in respect of the following actions:

- a) Institutional Strengthening
- b) CFC recycling, recovery and reclamation

- c) Retrofitting for conversion of refrigeration equipment
- d) Recycling of Halon fire extinguishers contents
- e) Methyl Bromide Studies



E. T. Sundanger

SECRETARY FOR ENVIRONMENT AND TOURISM

COUNTRY PROGRAMME COVER SHEET

Country: Zimbabwe

Lead National Agency: Ministry of Environment and Tourism (Ozone Office)

Participating Implementing Agencies: UNEP

1. Phase Out Schedule

Substance	Current consumption (1993) (ODP Tonnes)	Planned total cumulative consumption until phase out (ODP Tonnes)		Planned year for complete phase out
		Article 5 schedule	Accelerated Schedule	
CFC-11	88	2471	727	2010
CFC-12	135	3780	1116	2010
CFC-115	<1	<1	<1	2010
Halon 1301	82	1736	353	2005
Halon 1211	15	280	57	2005
Total	320	8267	2253	

2. Governmental Action Plan

Type of Action	Description	Start Date	Sector
Institutional	enhanced capacity building	1994	All
Institutional	registration/certification system for all ODS users, especially targeting of the extensive informal and small scale operators	1994	All
Institutional	strategic task force in Ministry of Environment and Tourism to negotiate voluntary phase out agreements with industry	1994	Mainly refrigeration
Information	public and industry awareness	1994	All
Customs and Excise	refined import monitoring procedures	1995	All
Customs and Excise	implementation of a licensing allocation system for import	1995	All
Industry	bans or forced reductions	As appropriate	All
Industry	projects as set out in following table	1994 on	Various

3. Project summary Table

Project	Intended Effect	Sector	ODP tonnes affected per year	Cost (US\$)			Total Cost (US\$)
				1994	1995	1996	
1. Institutional strengthening	Co-ordination, control, technical support and monitoring	All	742	66,550	52,800	52,800	172,150
2. CFC recovery and recycle	Recovery and recycling	Refrigeration	196.5	263,000	130,000	nil	393,000
3. Retrofitting equipment	Investment Project	Refrigeration	10	275,000	120,000	nil	395,000
4. Halons recovery and recycling	Investment Project	Halons	48	150,000	nil	nil	150,000
5. Refrigerant stock	Investment Project	Refrigeration	nil	75,000	nil	nil	75,000
6. Methyl Bromide substitution	Useage reduction	Methyl bromide / agriculture	140	15,000	nil	nil	15,000
TOTAL			1136.5	844,550	302,800	52,800	1,200,150

(i)

EXECUTIVE SUMMARY

The Montreal Protocol is an international agreement to reduce the consumption of Chlorofluorocarbons (CFC's) and Halons. It was signed in Montreal, Canada in September, 1987 and has since been ratified by over 70 countries worldwide. In June 1990, the Protocol was amended to include other Ozone Depleting Substances (ODSs), namely methyl chloroform, (otherwise known as 1,1,1-trichloroethane) and carbon tetrachloride. The amended Protocol requires a complete phase-out of CFC's and Halons by 2000 but developing countries with a calculated per capita consumption below 0.3 kg (Article 5 countries) are allowed a further 10 years to phase out by 2010 as the 10 year delay provision only applies to Ozone Depleting Substances used to meet basic domestic needs. Zimbabwe qualifies under Article 5 as the total per capita consumption is currently at 0.031 kg.

The Montreal Protocol (as amended in June 1990) provides in Article 10 for a financial mechanism to assist Article 5 paragraph 1 countries to comply with the control measures of the Protocol. Currently this has been implemented as the Multilateral Fund (Multilateral Fund).

As a first step towards obtaining assistance from the Multilateral Fund, the Government of Zimbabwe has decided to submit a Country Programme to the fund's Executive Committee. The preparation of this Country Programme, reflects commitment on the part of the Government of Zimbabwe to fulfil its obligations as a Party to the Protocol.

Uses of ODS's in Zimbabwe

There is no production of controlled substances in the country. These are all imported through a variety of sources. However there are 3 to 4 main distributors of the chemicals. The total amount imported into the country is currently (1993) estimated at 860 metric tonnes. This is broken down into substances as follows:

CFC-12	135 tonnes
CFC-11	88 tonnes
CFC-115	0.5 tonnes
Halon 1211	5 tonnes
Halon 1301	8.2 tonnes
HCFC-22	28 tonnes
Methyl Bromide	600 tonnes

The Action Plan covers an initial period of 3 years in some detail. This plan is supported by a series of strategic projects for the country.

These are as follows:-

1. Institutional strengthening for phase out of Ozone Depleting Substances - UNEP (US\$173 000)
2. CFC recycling, recovery and reclamation. Establishment of a CFC - 12 bank management system for recharge demand - UNDP (Designate). (US\$393 000)
3. Retrofitting for conversion of refrigeration equipment from CFC-12 to HFC-134a. A range of technicians will be trained on conversion - UNDP or UNIDO (Designate). (US\$395 000)
4. Recycling of Halon fire extinguishers contents -(UNDP or UNIDDO (Designate)).(US\$150 000)
5. Methyl Bromide Studies for alternative technologies in general fumigation as well as food produce storage. UNEP (US\$ 15 000)
6. Strategic stockpiling of CFC 12 for recharge (UNEP and Gouvernement to decide on implementing agency) US\$75 000 for strategic stocks.

The total incremental cost to the country is estimated at US\$ 1 201 000.

This is made up as follows:-

Project incremental costs	US\$1 201 000
TOTAL INCREMENTAL COSTS	US\$1 201 000

By far the most dominant use is the 70% attributable to Methyl Bromide. It is used mainly in seed bed fumigation, grain-silo fumigation and in similar Horticultural applications.

The most important use is in refrigeration. In this sector, CFC-12 is used as a refrigerant in many applications. All domestic units are predominantly CFC-12 based.

It is strongly apparent, through the market study, that the bulk of the users have taken independent action at phasing out their dependence on these chemicals.

The use of CFC's in foam blowing and aerosols has declined very rapidly over the last two years. The bulk of the users have converted to non CFC chemicals.

Recommended Phase Out Strategy

The Country Programme proposes a 100% reduction of all CFC's by year 2010 and 100% reduction of all Halons by year 2005. This schedule was based on the most cost effective route to complying with the Montreal Protocol as well as the general resolutions passed by the user sectors during the National Workshop convened in March 1994. It is important to note that the Workshop participants resolved to treat with caution, the requirements for methyl bromide, as more scientific investigations were still under way. The Protocol itself has only recommended a reduction of up to 25% to 2010. No attempt was therefore made at pre-empting the phase out requirements at this stage. It was however noted that it is still a **controlled** substance under the Protocol and special consideration for project studies on alternatives is being proposed in this regard.

The total project incremental cost estimated for the phase-out was US\$ 1 201 000 (current value). This would achieve up to 80% reduction of ODS's by 2005.

Action plan

The primary objective of Action Plan is to effectively phase out the consumption of Ozone Depleting Substances in Zimbabwe much earlier than its obligations to the Montreal Protocol under Article 5.

The principal agents in this Action Plan will be the Government of Zimbabwe, the World Bank, which has been elected as the implementing agency for the investment projects, UNDP which will be responsible for technical support and UNEP which will provide institutional support and training assistance.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Institutional strengthening for the phase-out of ozone depleting substances and the establishment of an Ozone Office.

SECTOR COVERED: All sectors

ODS CONSUMPTION: 859 metric tonnes and 742 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year as per Country Programme

TOTAL INCREMENTAL COSTS (US\$): US\$ 172 250

COST PER KILOGRAMME PHASED OUT: US\$0.23/kg.

IMPLEMENTING AGENCY: UNEP

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. The Government of Zimbabwe acknowledges the importance of consistently adhering to the Country Programme commitment.
2. The country, however has currently very limited institutional capacity within the Ministry of Environment and Tourism to fully support and coordinate the implementation of the Country Programme Action Plan.
3. It is in this regard that the establishment of an Ozone Office fully dedicated to the successful implementation of the Montreal Protocol, as a primary short and long term objective, is proposed.
4. The functions of the Ozone Office will include the formulation of action programmes for the phase out of Ozone Depleting Substances as well promote the co-operation between Government and industry for the achievement of objectives of the Country Programme.

5. The Office will also serve as a focal point for all communication and coordination for the Fund Secretariat and Implementing Agencies as well as acting as a local secretariat for the proposed inter-ministerial task force.

6. Other functions and roles of the Ozone Office as exercised by the executive members of staff will be to:-

- * collect and process data and information to act as a national information exchange and a resource centre;
- * disseminate and exchange relevant information to users, other parties and organisations on the phase-out process;
- * launch public awareness campaigns on all Ozone issues;
- * monitor all activities related to ODS's and advise on the requirements of The Montreal protocol;
- * receive, appraise and write up additional projects for Multi- Lateral Fund consideration;
- * manage the licensing of all imports and coordinate the system on the ground.
- * manage the refrigerant stock.

7. The following project budget is proposed:-

CAPITAL EXPENDITURE

				PROJECT
Office Equipment	1994/5	1995/6	1996/7	TOTAL
		US\$		
Computer	2 700			
Printer	2 500			
Software	1 200			
Modem	500			
Photocopier	2 000			
Type writers	1 800			
Fax machine	1 800			
TOTAL	12 500			

RECURRENT EXPENDITURE

	1994/5	1995/6	1996/7	
Staff incentives				
Prof. Manager	14 000	14 000	14 000	
Assistant	8 000	8 000	8 000	
Materials				
and media brief	2 500	2 500	2 500	
Telecommunications	2 500	2 500	2 500	
Local Travel				
expenses	3 000	3 000	3 000	
Other Office exp.	2 000	2 000	2 000	
Local Consultancy fees				
Technical(20p/d)	8 000	8 000	8 000	
Other term (20 d)	8 000	8 000	8 000	
TOTAL	60 500	48 000	48 000	
Contingencies(10%)	6 050	4 800	4 800	
ANNUAL TOTAL	66 550	52 800	52 800	172 150

BUDGET SUMMARY

YEARS	TOTAL US\$
1994/5	66 550
1995/6	52 800
1996/7	52 800
TOTAL	172 150

8. The Ozone Office will be administered by a full time professional administrator with relevant qualification and a strong Management information systems background. He will have reporting into him, an assistant with an engineering background and strong computer skills. This small team will be supported by term consultants drawn locally on specific capacity building assignments. The administrator would develop the main Terms of Reference. The budget has allowed for about 20 person days per year. All the costs are nominal current prices. No attempt has been made to incorporate the impact of inflation.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: CFC recovery, recycling and reclamation.

SECTOR COVERED: Refrigeration and Air conditioning

ODS CONSUMPTION: 196.5 metric tonnes and 196.5 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS domestic demand reduction per year = 30 metric tonnes per year.

TOTAL INCREMENTAL COSTS (US\$):US\$ 393 000

COST PER KILOGRAMME PHASED OUT:US\$ 4.4/kg.

IMPLEMENTING AGENCY: UNDP (Designate)

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. Refrigeration and air conditioning sectors constitute the most important ODS consumption sectors in the country. The various types of applications make up 30% of the country's ODS consumption in ODP weighted terms.

2. There is a strong requirement for continued recharge demand for

2. There is a strong requirement for continued recharge demand for the old CFC-12 equipment. All local manufacturers continue to use CFC-12 based systems. The current population of domestic refrigerators is just over 500 000. According to the action plan, complete conversion to new HFC-134a systems is only going to be fully implemented by January 1996.

3. The proposal has the main short term objectives of reducing atmospheric emission of CFC-12, reduction of CFC imports, introducing the CFC bank concept and promote discipline among the fragmented users of refrigeration gases.

4. The project was conceived out of this urgent requirement to recover, recycle and reclaim of CFC's and Halons from the large and highly fragmented refrigeration sector. With over 200 refrigeration repair workshops, coordination for proper phase out has to be implemented at ground level. This project is being promoted by local entrepreneurs who have established technology agreement with foreign equipment manufacturers.

5. It has three complimentary phases, where suitable hardware installation is required:-

- * recovery

Basic gas capture equipment will be employed. These will be located in strategic locations (main urban centres to begin with) through out the country. These will capture client product, sort it and store it safely while awaiting further processing. Clients will be issued with deposit slips for quantities purchased.

- * reclamation and recycle

This equipment will be centrally located and will purify the component products through the normal fractional distillation under moderate pressure. The CFC's will then be resold to clients.

- * training

This is an important capacity building component for users. The on-the-job training will improve operational discipline and encourage recycling. It has been recognised that some workshops are manned by unqualified artisans with very little to no formal training. Normal, routine operations will identify the extent of the training needs. It will therefore form an input component of the Ozone Office.

6. This system will form a natural basis for a refrigerant management system or Bank. It will maintain accurate operational log books which will be examined.

7. The following budget is proposed:-

Capital equipment:

YEARS	1994/5 US\$	1996/7 US\$	1997/8 US\$
Office equipment			
Computer	2 000		
Printer	1 000		
Plant and machinery			
Recovery equipment			
50 Machines	100 000	100 000	
Freight	15 000	15 000	
Spares	5 000	5 000	
Reclamation centre			
Storage tanks 10 @ 1000	10 000	10 000	
Reclamation system	45 000		
Analytical Laboratory	35 000		
CFC management unit (Bank)			
Motor vehicles	25 000		
Training and Support Services			
Training unit	5 000		
and materials			
Consultancy fees	20 000		
TOTAL	US\$263 000	US\$130 000	

Total for the three years **US\$393 000**

Summary Implementation

YEAR	TOTAL COSTS	MAIN ACTIVITIES
1994/5	US\$263 000	Installation and commissioning
1995/6	US\$130 000	Full operational establishment
1996/7	--	"

8. This is a business proposition and recurrent expenditure does not constitute incremental costs as it can be matched against accrued operating revenue. It will be designed such that there is some net operating surplus to cover expenses. Investment in hardware is staggered over a two year period.

9. The organisation will be totally independent of Government as it is exclusively a private sector initiative. It will however maintain close liaison with the ozone office.

10. The main benefits will therefore be in the form of import reduction of 30 metric tonnes per annum, better servicing and the strategic establishment of a CFC bank.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Retrofitting of refrigeration equipment for conversion from CFC-12 to HCFC and HFC-134a.

SECTOR COVERED: Refrigeration

ODS CONSUMPTION: 10 metric tonnes and 10 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year = 10 tonnes x ODP

TOTAL INCREMENTAL COSTS (US\$): US\$ 395 000

COST PER KILOGRAMME PHASED OUT: US\$ 13.2/kg

IMPLEMENTING AGENCY: UNDP or UNIDO (Designate)

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. This is a large private sector company with specific interests in the leisure and hospitality (hotels) industries. The company is also the sole franchise holder for the Coca-Cola International. It also manufactures a whole range of other beverages, beers, spirits and wines. It also owns one of the largest supermarket chains in the country. It therefore owns a network of refrigeration units estimated at over 9 000.

2. The company has taken a strong policy decision to immediately convert all these units from CFC-12 to HFC-134a, within the next three years. All existing units will be converted to HFC-134a. All new units (2 000 in 1994) will be fitted with the substitute systems, beginning this year.

3 The main objective of this proposal is therefore to provide fast phase out of ODS's in support of the global coalition. This is also intended to serve as an example of private sector, social responsibility, as this is a high profile company.

4. The project is being implemented by a division of the company, Delta Operations. This change over will result in an immediate reduction of 10 tonnes per annum, in normal demand from Delta Operations.

5. Summary of Proposal

Capital equipment for charging new and retrofit units:-

YEARS	1994/5	1995/6	1996/7
Charging equipment	15 000		
Vacuum equipment	17 000		
Miscellaneous hose equip.	15 000		

Retrofit equipment

Incremental cost per unit(\$40)

Total for 9000	120 000	120 000	
Total new units (2000)	108 000		

TOTAL	275 000	120 000	
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Total for the period = US\$ 395 000

6. This will reduce consumption over the next three years by a total of 19 metric tonnes.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Recycling and reclamation of Halons for fire fighting equipment.

SECTOR COVERED: Fire - Fighting

ODS CONSUMPTION: 13 metric tonnes and 97 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year = 20 tonnes x ODP

TOTAL INCREMENTAL COSTS (US\$): US\$ 150 000

COST PER ODP KILOGRAMME PHASED OUT: US\$ 2.5/kg

IMPLEMENTING AGENCY: .

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. Air Zimbabwe is the National passenger airline. They already have a sophisticated workshop for the testing of high pressure fire extinguisher cylinders. Halons are used strategically for the recharge of these units. Halon production has stopped in all Montreal Protocol countries. There are currently no suitable alternatives or drop-in substitutes.

2. The main objective of the project is to recycle and reclaim all halons during annual testing as well serve some of the fixed fire systems in existence. This will result in partial self

sufficiency as well as reduce emissions and the associated costs. The coordination of strategic stocks and the management of an information system is of critical importance for continued operations. This information could then be linked to other regional activity.

3. The equipment proposed recycles Halon back to the MIL-M-12218c and ISO 7201 standards with a 99.5% recovery efficiency. This equipment is already extensively used by other airlines through out the world and is available from Aer Lingus.

4. Summary of Proposal

Capital equipment for recovery and recharging units:-

YEARS	1994/5	1995/6	1996/7
Charging equipment (HAL Mark 1)		105 000	
Miscellaneous spares	40 000		
Contingencies		5 000	
Total	150 000		

Total for the period = US\$ 150 000

The project will be implemented immediately after approval.

5. This will reduce consumption over the next three years by a total of 8 - 10 metric tonnes per annum.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Methyl Bromide studies for alternative technology investigation.

SECTOR COVERED: Agricultural chemicals

ODS CONSUMPTION: 600 metric tonnes and 420 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: Reduction of Methyl Bromide use as a fumigant in agricultural applications as much as 200 ODP tonnes.

TOTAL INCREMENTAL COSTS (US\$): US\$ 15 000

COST PER ODP KILOGRAMME PHASED OUT: US\$ 0.075/kg.

IMPLEMENTING AGENCY: UNEP

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. The Grain Marketing Board is the main grain marketing authority in the country. It is mandated as a residual buyer of all grains from farmers both commercial and communal. It has an extensive network of large storage silos and treatment depots throughout the country. It plays a very critical role in food security in the region. They have used methyl bromide for fumigation and storage applications since inception.

2. The main objectives of the proposal are to investigate and adopt non Methyl Bromide fumigation and storage techniques. The project will involve extensive trials with registered contact pesticides.

3. A range of pesticides will be purchased in bulk and techniques employed by Indonesia will be investigated.

4. Summary of proposal

Part I - Chemicals

	Purchase of pesticides	US\$ 3 200
Travelling and subsistence		US\$ 3 000

Part II - Atmospheric Inert Gases

Inert gases investigation (Indonesia)	
	US\$ 8 800

Total for project	US\$ 15 000
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5. The project will completely replace GMB contribution of ODS's equivalent to 200 ODP tonnes. This will contribute to a short term reduction of over 30%.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Strategic stocks of CFC 12.

SECTOR COVERED: Refrigeration recharge

ODS CONSUMPTION: 7.5 metric tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: Reduction in premature scrapping of obsolete machinery thus reducing incremental cost of phase out to Zimbabwe economy.

TOTAL INCREMENTAL COSTS (US\$): US\$ Nil

COST PER ODP KILOGRAM PHASED OUT: US\$ Nil

IMPLEMENTING AGENCY: UNEP and Government of Zimbabwe to decide

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. It is proposed that a refrigerant stock of CFC-12 equivalent to three times the estimated recharge annual demand (1993) would be purchased. This strategic stock will be over the three year period of the Programme and would be initially administered by the Ozone Office.

The amount required is calculated as follows:

Recharge demand for domestic appliances:

Total population 500 000 of domestic units

Repairs and recharge @ 2% = 10 000

Average charge volume = 0.250kg

Number of periods = 3

Estimated price = US\$ 10/kg

Total cost = \$75 000

This stock will be sold to the industry at cost. Thus there will a net cost of zero, but the costs of the stocks will have to be funded. Operating costs will be met through the sale of CFC's

All communications should
be addressed to
The Secretary for
Environment and
Tourism



SECRETARY OF ENVIRONMENT
AND TOURISM
Karigamombe Centre
53, Samora Machel Avenue
Harare, Zimbabwe

Private Bag 7753
Causeway, Zimbabwe
Telephone: 794455

Your Ref.:

Our Ref.:

June 3, 1994.

The Chief Officer
Secretariat of the Multilateral Fund
for the Implementation of the Montreal Protocol
1800 McGill College
27th Floor
MONTREAL, Canada H3A 3J6

Sir

I have the honour to submit herewith the Country Programme of Zimbabwe for the consideration and approval of the Multilateral Fund for the Implementation of the Montreal Protocol.

Zimbabwe adhered to the Protocol on 1 November 1992 and became a Party thereto on 1 February 1993. It is classified as operating under paragraph 1 of Article 5 of the Protocol.

I would like to place on record our appreciation of the assistance extended to us by UNEP IE/PAC Ozone Action Programme and CIDA during the preparation of the Country Programme.

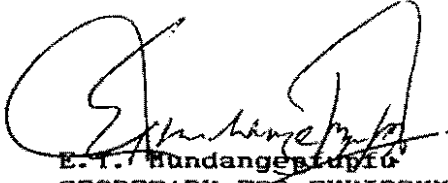
I am pleased to say that the Government is committed to the implementation of the actions contained in the Country Programme. The decision to that effect was made by The Minister of Environment and Tourism on 2 June 1994.

I further assert that it is the Government's intention to monitor compliance with the Protocol. If necessary, further and different actions from those specified in the country programme will be taken, and the Country Programme will be updated and submitted to the Executive Committee of the Multilateral Fund.

We hope that the Executive committee will approve the request for assistance made in respect of the following actions:

- a) Institutional Strengthening
- b) CFC recycling, recovery and reclamation

- c) Retrofitting for conversion of refrigeration equipment
- d) Recycling of Halon fire extinguishers contents
- e) Methyl Bromide Studies



E. T. Sundanger

SECRETARY FOR ENVIRONMENT AND TOURISM

COUNTRY PROGRAMME COVER SHEET

Country: Zimbabwe

Lead National Agency: Ministry of Environment and Tourism (Ozone Office)

Participating Implementing Agencies: UNEP

1. Phase Out Schedule

Substance	Current consumption (1993) (ODP Tonnes)	Planned total cumulative consumption until phase out (ODP Tonnes)		Planned year for complete phase out
		Article 5 schedule	Accelerated Schedule	
CFC-11	88	2471	727	2010
CFC-12	135	3780	1116	2010
CFC-113	<1	<1	<1	2010
Halon 1301	82	1736	353	2005
Halon 1211	15	280	57	2005
Total	320	8267	2253	

2. Governmental Action Plan

Type of Action	Description	Start Date	Sector
Institutional	enhanced capacity building	1994	All
Institutional	registration/certification system for all ODS users, especially targeting of the extensive informal and small scale operators	1994	All
Institutional	strategic task force in Ministry of Environment and Tourism to negotiate voluntary phase out agreements with industry	1994	Mainly refrigeration
Information	public and industry awareness	1994	All
Customs and Excise	refined import monitoring procedures	1995	All
Customs and Excise	implementation of a licensing allocation system for import	1995	All
Industry	bans or forced reductions	As appropriate	All
Industry	projects as set out in following table	1994 on	Various

3. Project summary Table

Project	Intended Effect	Sector	ODP tonnes affected per year	Cost (US\$)			Total Cost (US\$)
				1994	1995	1996	
1. Institutional strengthening	Co-ordination, control, technical support and monitoring	All	742	66,550	52,800	52,800	172,150
2. CFC recovery and recycle	Recovery and recycling	Refrigeration	196.5	263,000	130,000	nil	393,000
3. Retrofitting equipment	Investment Project	Refrigeration	10	275,000	120,000	nil	395,000
4. Halons recovery and recycling	Investment Project	Halons	48	150,000	nil	nil	150,000
5. Refrigerant stock	Investment Project	Refrigeration	nil	75,000	nil	nil	75,000
6. Methyl Bromide substitution	Useage reduction	Methyl bromide / agriculture	140	15,000	nil	nil	15,000
TOTAL			1136.5	844,550	302,800	52,800	1,200,150

Zimbabwe

Country Programme

For The Phase - Out of

Ozone Depleting Substances

May 1994

For

Submission to the thirteenth Executive Committee of the
Multilateral Fund under the Montreal Protocol

ACKNOWLEDGEMENT

The Country Programme for the phase out of Ozone Depleting Substances was prepared by the Government of Zimbabwe with kind assistance from UNEP - IE/PAC and the Canadian International Development Agency (CIDA). The Government of Zimbabwe, through the Ministry of Environment and Tourism, the Ministry of Industry and Commerce and UNEP IE/PAC organised a National Workshop for all economic sectors and other interested parties involved in the distribution and use of Ozone Depleting Substances. The workshop's primary objective was to develop guidelines for a Country Programme for phasing out Ozone Depleting Substances. The Government of Zimbabwe would like to record its appreciation to all the Ozone Depleting Substance distributors, users network and other groups who attended the National Workshop in March 1994.

The Government would further like to express its gratitude to UNEP, CIDA, other organisations and individuals who have kindly assisted in the preparation of the Country Programme. The Government of Zimbabwe would finally like to thank the Overseas Development Association (ODA) who provided funding for the baseline country study in 1991.

The Government of Zimbabwe is confident that this co-operation will continue during implementation of the plan of action developed and agreed to in this Country Programme.

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ANNEX A - Project Proposals

(i)

EXECUTIVE SUMMARY

The Montreal Protocol is an international agreement to reduce the consumption of Chlorofluorocarbons (CFC's) and Halons. It was signed in Montreal, Canada in September, 1987 and has since been ratified by over 70 countries worldwide. In June 1990, the Protocol was amended to include other Ozone Depleting Substances (ODSs), namely methyl chloroform, (otherwise known as 1,1,1-trichloroethane) and carbon tetrachloride. The amended Protocol requires a complete phase-out of CFC's and Halons by 2000 but developing countries with a calculated per capita consumption below 0.3 kg (Article 5 countries) are allowed a further 10 years to phase out by 2010 as the 10 year delay provision only applies to Ozone Depleting Substances used to meet basic domestic needs. Zimbabwe qualifies under Article 5 as the total per capita consumption is currently at 0.031 kg.

The Montreal Protocol (as amended in June 1990) provides in Article 10 for a financial mechanism to assist Article 5 paragraph 1 countries to comply with the control measures of the Protocol. Currently this has been implemented as the Multilateral Fund (Multilateral Fund).

As a first step towards obtaining assistance from the Multilateral Fund, the Government of Zimbabwe has decided to submit a Country Programme to the fund's Executive Committee. The preparation of this Country Programme, reflects commitment on the part of the Government of Zimbabwe to fulfil its obligations as a Party to the Protocol.

Uses of ODS's in Zimbabwe

There is no production of controlled substances in the country. These are all imported through a variety of sources. However there are 3 to 4 main distributors of the chemicals. The total amount imported into the country is currently (1993) estimated at 860 metric tonnes. This is broken down into substances as follows:

CFC-12	135 tonnes
CFC-11	88 tonnes
CFC-115	0.5 tonnes
Halon 1211	5 tonnes
Halon 1301	8.2 tonnes
HCFC-22	28 tonnes
Methyl Bromide	600 tonnes

By far the most dominant use is the 70% attributable to Methyl Bromide. It is used mainly in seed bed fumigation, grain-silo fumigation and in similar Horticultural applications.

The most important use is in refrigeration. In this sector, CFC-12 is used as a refrigerant in many applications. All domestic units are predominantly CFC-12 based.

It is strongly apparent, through the market study, that the bulk of the users have taken independent action at phasing out their dependence on these chemicals.

The use of CFC's in foam blowing and aerosols has declined very rapidly over the last two years. The bulk of the users have converted to non CFC chemicals.

Recommended Phase Out Strategy

The Country Programme proposes a 100% reduction of all CFC's by year 2010 and 100% reduction of all Halons by year 2005. This schedule was based on the most cost effective route to complying with the Montreal Protocol as well as the general resolutions passed by the user sectors during the National Workshop convened in March 1994. It is important to note that the Workshop participants resolved to treat with caution, the requirements for methyl bromide, as more scientific investigations were still under way. The Protocol itself has only recommended a reduction of up to 25% to 2010. No attempt was therefore made at pre-empting the phase out requirements at this stage. It was however noted that it is still a **controlled** substance under the Protocol and special consideration for project studies on alternatives is being proposed in this regard.

The total project incremental cost estimated for the phase-out was **US\$ 1 201 000** (current value). This would achieve up to 80% reduction of ODS's by 2005.

Action plan

The primary objective of Action Plan is to effectively phase out the consumption of Ozone Depleting Substances in Zimbabwe much earlier than its obligations to the Montreal Protocol under Article 5.

The principal agents in this Action Plan will be the Government of Zimbabwe, the World Bank, which has been elected as the implementing agency for the investment projects, UNDP which will be responsible for technical support and UNEP which will provide institutional support and training assistance.

The Action Plan covers an initial period of 3 years in some detail. This plan is supported by a series of strategic projects for the country.

These are as follows:-

1. Institutional strengthening for phase out of Ozone Depleting Substances - UNEP (US\$173 000)
2. CFC recycling, recovery and reclamation. Establishment of a CFC - 12 bank management system for recharge demand - UNDP (Designate). (US\$393 000)
3. Retrofitting for conversion of refrigeration equipment from CFC-12 to HFC-134a. A range of technicians will be trained on conversion - UNDP or UNIDO (Designate). (US\$395 000)
4. Recycling of Halon fire extinguishers contents - (UNDP or UNIDDO (Designate)). (US\$150 000)
5. Methyl Bromide Studies for alternative technologies in general fumigation as well as food produce storage. UNEP (US\$ 15 000)
6. Strategic stockpiling of CFC 12 for recharge (UNEP and Governement to decide on implementing agency) US\$75 000 for strategic stocks.

The total incremental cost to the country is estimated at US\$ 1 201 000.

This is made up as follows:-

Project incremental costs US\$1 201 000

TOTAL INCREMENTAL COSTS US\$1 201 000

1.0 INTRODUCTION

1. The Montreal Protocol is an international agreement to reduce the consumption of chlorofluorocarbons (CFC's) and halons. It was signed in Montreal, Canada in September, 1987 and has since been ratified by over 70 countries worldwide. In June 1990, the Protocol was amended to include other Ozone Depleting Substances (ODSs), namely methyl chloroform, (otherwise known as 1,1,1-trichloroethane) and carbon tetrachloride. The amended Protocol requires a complete phase-out of CFC's and halons by 2000 but developing countries with a calculated per capita consumption below 0.3 kg (Article 5 countries) are allowed a further 10 years to phase out by 2010 as the 10 year delay provision only applies to Ozone Depleting Substances used to meet basic domestic needs. Zimbabwe qualifies under Article 5 as the total per capita consumption is currently at 0.031 kg.

2. The Montreal Protocol (as amended in June 1990) provides in Article 10 for a financial mechanism to assist Article 5 paragraph 1 countries to comply with the control measures of the Protocol. Currently this has been implemented as the Multilateral Fund.

1.1 Purpose

3. As a first step towards obtaining assistance from the Multilateral Fund, the Government of Zimbabwe has decided to submit a Country Programme to the fund's Executive Committee. The preparation of this Country Programme, reflects commitment on the part of the Government of Zimbabwe to meet its obligations as a Party to the Protocol.

4. In accordance with Executive Committee's guidelines for Country Programme preparation UNEP/OzL.Pro/ExCom/S/16 the report contains an examination of the pattern of Ozone Depleting Substances consumption in Zimbabwe, a description of the institutional and policy framework within which the Country Programme will be implemented. It provides analysis of alternative Ozone Depleting Substances phase-out scenarios, description of the recommended phase-out strategy including an estimate of the incremental costs of a complete phase-out, and an Action Plan for Government activities and proposed projects for which the Zimbabwean Government seeks assistance from the Multilateral Fund.

5. The Country Programme serves as a key Government document for monitoring the progress being made in reducing Ozone Depleting Substances consumption in line with the recommended phase-out strategy, and periodically reviewing the effectiveness of the measures being taken.

6. The recommended phase-out schedule reflects the Government's objectives of reducing consumption of Ozone Depleting Substances, and minimizing the cost of this compliance to Zimbabwean industries and consumers while subscribing to the Montreal Protocol.

1.2 Status

7. The Ministry of Environment and Tourism took the lead in the preparation of the Country Programme. A local consultant carried out the data collection and analysis and prepared a Country Study.

This Study built on an original study carried with external assistance financed by the Overseas Development Administration and consisted of a significant number of interviews, and postal and telephone questionnaires.

The study was presented to the Government of Zimbabwe and was incorporated into the Country Programme. The Government of Zimbabwe, assisted by UNEP-IE/PAC consultants and the local consultant, co-ordinated the preparation of the Country Programme and the preceding National Workshop.

8. The Country Programme has been approved by a Cabinet committee of the Government of Zimbabwe for submission to the Executive Committee.

9. The total cost of preparing the Country Programme is estimated at US\$ 12 000 .

1.3 Assistance

10. The bulk of the funding assistance was received from UNEP-IE/PAC. The Canadian International Development Agency (CIDA) provided funding for secretarial assistance for the National Workshop and the Government of Zimbabwe provided staff for co-ordinating all the activities over an 18 month period.

11. A wide spectrum of regulated substances' users and distributors in both the public and private sectors, provided valuable input. A number of government departments also provided valuable assistance namely, the Department of Customs and Excise and the Central Statistics Office (C.S.O).

2.0 CURRENT SITUATION

2.1 Current and Forecast Consumption of ODSs

2.1.1 Current Consumption

ODS's by controlled substance

12. These estimates were derived from data and information collected during market research carried out during December 1993 and January 1994. The survey scanned all distributors and users of ODS's in Zimbabwe. The bulk of the estimates were derived from personal interviews with suppliers and main users, customs records and comparison with previous estimates (refer Table 2.1).

ODS's by end use and application

13. As in the previous section, the data was derived from the country study referred to earlier and updated to include specific data on Methyl Bromide. The estimates for Methyl Bromide have been broken down into individual applications (refer Table 2.2).

Notes

14. The limited use of the azeotropic mixture CFC-502 (CFC-22/115) was reported during 1991 and 1992. No evidence of use was discovered in the 1993 survey and the product may have been used as a refrigerant in some special frozen food display cabinets.

15. The use of Carbon Tetrachloride as a degreasing agent has now reportedly ceased.

2.1.2 Forecast Consumption

Unconstrained Demand

16. In order to determine the demand for controlled substances and hence incremental cost to the country, up to year 2010, the following assumptions were made:

- no attempt is made by industry and consumers to comply with the Protocol; and
- unconstrained quantities of controlled substances continue to be available from existing sources, at current prices.

Table 2.1 Estimated consumption of ODS in Zimbabwe broken down by substances, 1993.

Substances controlled by the Montreal Protocol	Consumption (metric tonnes)	ODP factor	Consumption (ODP tonnes)
Annex A Group 1			
CFC-11	88	1.0	88
CFC-12	135	1.0	135
CFC-113			
CFC-114			
CFC-115	0.5	0.6	0.3
Subtotal	223.5		223.8
Annex A Group 2			
Halon 1211	5	3	15
Halon 1301	8.2	10	82
Halon 2402			
Subtotal	13.2		97
Annex B Group 2	-	-	-
Carbon tetrachloride			
Annex B Group 3	-	-	-
Methyl chloroform			
Annex C Group 1			
HCFC 22	28	0.055	1.54
Annex E			
Methyl Bromide	600	0.7	420
Total controlled substances	864.7		742.3

Table 2.2 Consumption in 1993 broken down by use/application and substance

Area/ Sector	Substance	Application	Consumption in metric tonnes	ODP	ODP tonne
1.0 Agriculture -tobacco -horticultur e -grain storage	CH ₃ Br CH ₃ Br CH ₃ Br	seed bed fumigation soil sterilisation grain stack fumigation	540 44 16	0.7	378 31 11
2.0 Refrigerati on -domestic	CFC-12	used in charging new and servicing old units	113	1.0	113
-commercial	CFC-12 CFC-115	used in car and room a/conditioners used in a range of commercial display units	15 0.5	1.0 0.6	15 0.3
	CFC-11	used in room a/conditioners cleaning and system purging	68	1.0	68
	HCFC-22	used in large display units	28	0.055	1.54
Foams	CFC-11	used as blowing agent	20	1.0	20
3.0 Fire- fighting	Halon 1301 Halon 1211	used for charging fixed and portable units	8.2 5	10 3	82 15
4.0 Aerosols	CFC-12	used as a propellant	7	1	7
TOTAL			864.7		742.3

Table 2.3 Baseline macro-economic growth data

Population Growth rate	10.4 million 3% per annum
Households Growth rate	2.5 million
GDP Growth rate	2%

Area/Sector	Substance	Application	Unconstrained use in 1993	Sector Growth	Period
1.0 Agriculture	CH3Br	seed bed fumigation	540	5%	92/93
-tobacco	CH3Br	soil sterilisation	44		
-horticulture	CH3Br	grain stack fumigation	16		
-grain storage					
2.0 Refrigeration	CFC-12	used in charging new and servicing old units	113	2%	92/93
-domestic					
-commercial	CFC-12	used in car and room a/conditioners	15	2%	92/93
	CFC-115	used in a range of commercial display units	0.5		
	CFC-11	used in room a/conditioners	68	2%	92/93
	HCFC-22	used in large display units	28		92/93
Foams	CFC-11	used as blowing agent	20		92/93
3.0 Fire-fighting	Halon 1301	used for charging fixed and portable units	13	2%	92/93
	Halon 1211				
4.0 Aerosols	CFC-12	used as a propellant	7	2%	92/93

Data source: Central Statistics Office - Various publications

17. The overall demand forecast for controlled substances is largely determined by a range of macro economic indicators.

18. The following set of indicators were used:

- GDP (mp) growth
- population and growth rates
- new investment in ODS user sectors (sector growth)
- average Aggregate Demand for Consumer goods

19. The baseline macro-economic data is summarised in Table 2.3. This was obtained from material published by the Central Statistics Office as well as other economic bulletins.

20. Manufacturing sector growth data has shown moderate improvement from the recession induced by the severe drought of 91/92. Recovery has amounted to 6% from a low of -8% in the previous year. This recovery is set to continue for subsequent years with an average initial growth (GDP) of 2%. The manufacturing sector is also experiencing moderate recovery from the effects of the macro-economic structural adjustment programme and the drought. The deregulation of economic activity has brought with it short term problems of high interest rates and high inflation.

21. The picture is rather different in the agricultural sector as its fortunes are more closely allied to weather patterns. The entire sector was completely devastated by one of the worst droughts experienced in Zimbabwe during 1991/92. Its recovery was only partial during 1993 as commodity prices declined. However stronger performance is generally forecast as rainfall patterns improve. Average growth of up to 5% is anticipated.

22. The overall impact in consumption per controlled substance is as illustrated in Figs. 1 to 3.

23. As Zimbabwe is totally import dependant for all ODS's, future demand of ODS's is also be determined by what happens to the supply dynamics external to the country.

24. The main sources are Germany, South Africa, United Kingdom and the Unites States. These are all parties to the Montreal Protocol and they are already restricting production output. The effects of global phase out are already being felt in Zimbabwe through higher prices and reduced available volume of commonly used CFC's.

25. The level of awareness and social responsibility among the users is already very high. The main local ODS suppliers

7A

CFC's in ANNEX A Group I **Unconstrained demand by substance**

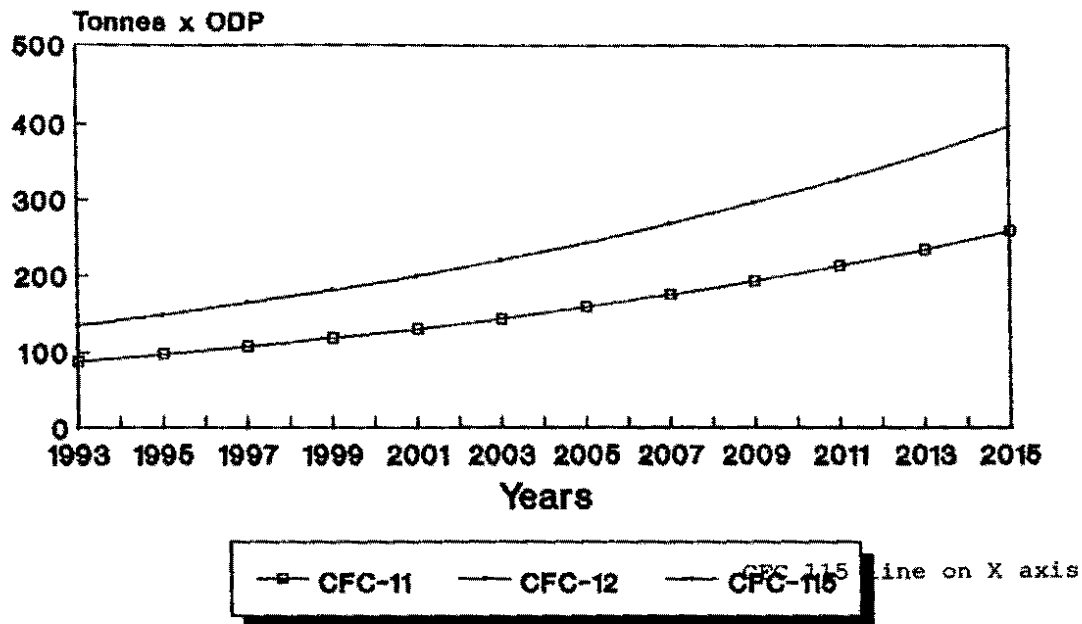


Fig.1

HALONS in ANNEX A Group II **Unconstrained demand by substance**

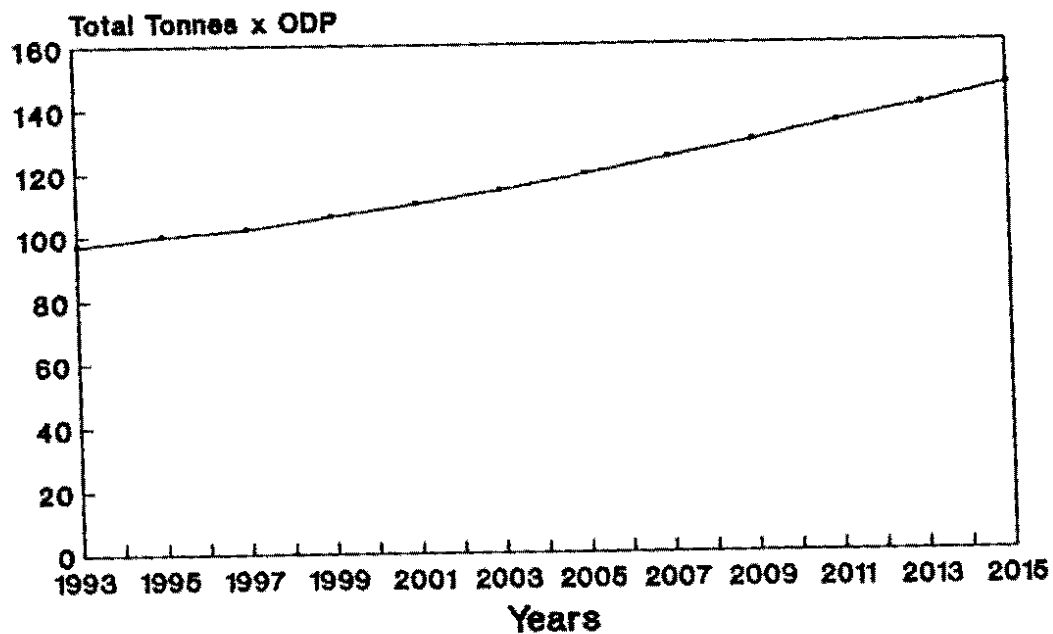


Fig.2

7B
Phase Out Schedule
CFC'S in ANNEX A Group I

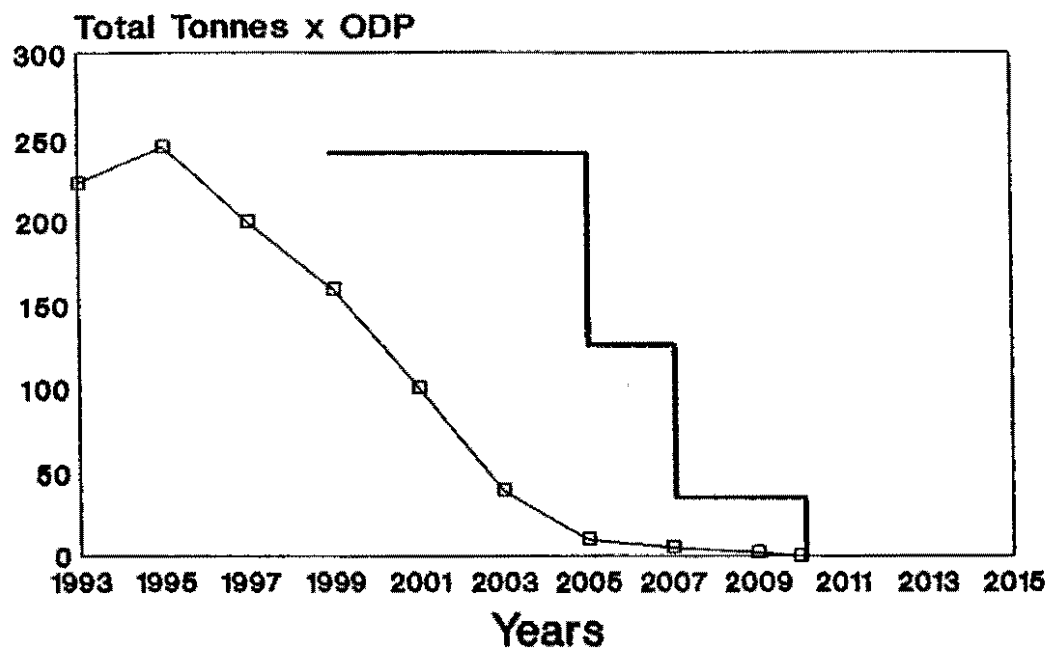


Fig.3.1

Phase Out Profile
HALONS in ANNEX A Group II

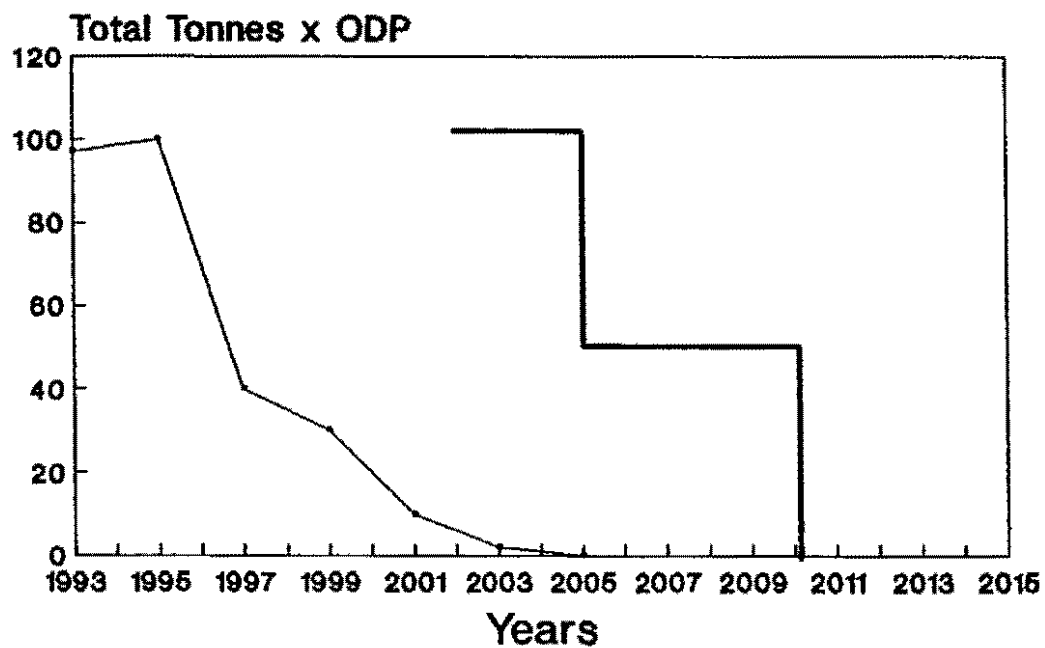


Fig.3.2

METHYL BROMIDE in ANNEX E Group I Unconstrained Demand + Profile

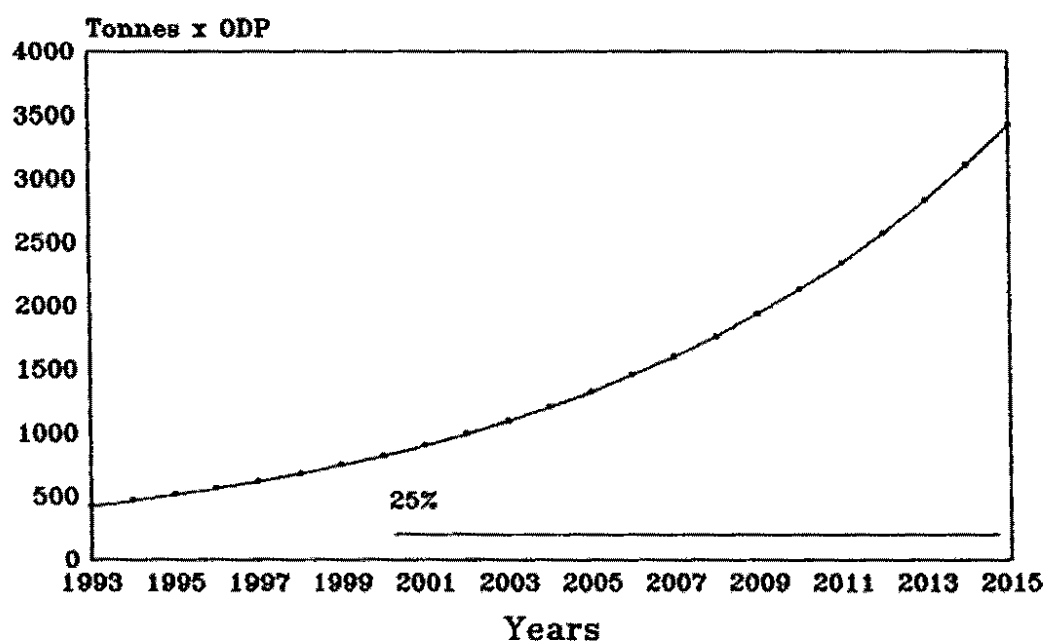


Fig.3.3

METHYL BROMIDE IN ANNEX E GROUP

Unconstrained demand by substance

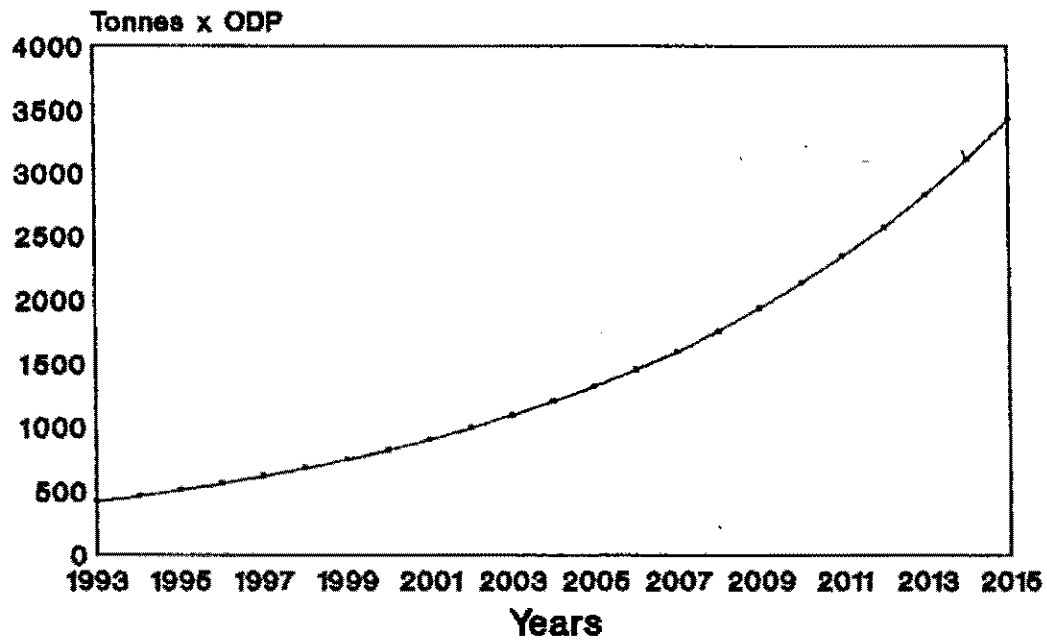


Fig.3

have been promoting alternatives and in some cases recycling technologies. The largest industrial users of controlled substances have already started using some transitional substances (HCFC-22) in their commercial units.

26. The main manufacturers of new domestic units have already made provisions for the transition to HFC-134a. Currently, trials are being conducted.

27. The main constraints appear to be the costs associated with conversion into new products and new technology. These include costs associated with building skill capacity and promoting greater awareness.

2.2 Industry Structure

28. All controlled substances used in the country are imported from a variety of sources the main ones being Germany, United Kingdom, South Africa, and the United States. There are altogether 5 principal importers/ distributors of Ozone Depleting Substances. They all tend to have strong core businesses in agro-chemicals as Zimbabwe has a largely agriculturally based economy.

29. CFCs are mainly imported by Chemplex Corporation and Hoechst (Zimbabwe) while Methyl Bromide is imported and distributed by Agricura, SprayQuip and Zimbabwe Fertilizer Company (ZFC).

30. Chemplex is a wholly owned private company under the Industrial Development Corporation (IDC). Chemplex import a whole range of CFC's, up to 90 metric tonnes per annum, mainly from South Africa.

31. Hoechst (Zimbabwe) is a locally registered, wholly owned subsidiary of the German multinational. All supplies of CFC's are therefore of German origin (80 metric tonnes).

32. The balance (61 metric tonnes) is imported by various companies in the refrigeration industry such as Ajax Refrigeration, New Hope Trading and Archer Refrigeration. These companies are also involved in distribution to the service and repair sector.

33. Agricura is a traditional agro-chemicals business which is locally owned and controlled. Its main supplies of Methyl Bromide are imported from the Great Lakes Chemical Corporation in the United States. The other two private companies SprayQuip and ZFC are also involved in the retail of agro chemicals and they import their Methyl Bromide from the United States (Great Lakes) and Israel, via South Africa.

34. Table 2.2 provides an overview of the consumption of all controlled substances in Zimbabwe by sector and application. A summary view of each user sector is as follows:-

Uses of controlled substances

Refrigeration

35. The industry uses a range of controlled substances as follows:-

(Refer to Table 2.2)

CFC-12	(128 MT)
CFC-11	(68 MT)
CFC-115	(0.5 MT)
HCFC-22	(28 MT)

Domestic Appliances

36. There are two major manufacturers of domestic refrigeration appliances; Capri Corporation, a publicly quoted company on the Zimbabwe Stock Exchange and Imperial Refrigeration, which is a subsidiary of T.A. Holdings group of companies. Their combined output for new units for 1993 was estimated at 18 000. The current estimates for installed domestic units out of 2.5 million households nationwide, is 500 000 (Central Statistics Office).

37. The manufacturers use CFC-12 as the main refrigerant and production of new units accounts for 3.1% (4.5 metric tonnes) of CFC-12 that is imported into the country.

38. There are other smaller retailers who have integrated operations and are also engaged in limited assembly of new units.

39. The repair and servicing of old units is as expected, a very important activity in Zimbabwe. There are over 200 formal sector workshops throughout the country. There are probably just as many informal sector operators.

40. Operational practices in maintenance and repair in this sector are not standardised. This is to be expected as the sector is highly fragmented and the skill and experience level of operators is varied. CFC-11 is widely used for cleaning, degreasing and system purging. Up to 18 metric tonnes of CFC-11 are used for this purpose. The total recharge demand is estimated at 2% of current population or 10 000 units recharged per year. This is equivalent to 2.5 tonnes per annum.

Commercial Refrigeration

41. There are five main companies involved with assembling in this sector. These are Imperial Refrigeration, Ajax Refrigeration, Quick Freeze, Ref Air and Archer Refrigeration. These are all locally owned and controlled.

42. There are a wide range of commercial refrigeration units ranging from commercial blast freezers to drinking fountains. The majority of these units still use CFC-12 as a refrigerant but others have reportedly converted to HCFC-22. New units are still being assembled with CFC-12 based systems, at an average of 10 000 per annum.

43. Operational practises tend to be more refined and higher calibre technicians, with formal qualifications are employed for servicing. The nature of work is generally in the form of contracts and therefore highly competitive.

Air Conditioning

- Buildings

44. There are a significant number of systems which operate with CFC-11 refrigerant. These are major installations in office and hotel buildings as well as hospitals. Servicing of these, accounts for up to an estimated 50 metric tonnes per annum. The installation, repair and servicing of the units is undertaken professionally by qualified technicians.

45. There are 5 notable locally owned companies in this sector namely WRS, Air Cool, Climatec, Ref Air and Bestobell.

- Motor Vehicles

46. There are only two assembly plants in the country. The main plant located in Harare, is owned and operated as Willowvale Motor Industries. This company is wholly owned by the Industrial Development Corporation. It has franchise agreements with Japanese car giants, Mazda, Mitsubishi and Toyota to assemble from "knock down" kits. They only recently started assembling air conditioned cars as a planned production process and a total of 2000 units were completed in all (1.3 metric tonnes of CFC-12). They have since discontinued the use of CFC's and have moved to HFC-134a for the 1994 assembly programme.

47. The other assembly plant, Leyland in Mutare, does not currently produce any air conditioned vehicles.

48. WRS Limited have the Mercedes Benz contract to service and repair CFC-12 air conditioning units. It also quite apparent that with current trends towards greater market liberalisation, there has already been an influx of imported new cars from South Africa, South Korea, Japan, Europe and elsewhere. All these cars invariably have older CFC-12 based air conditioning systems. The numerous small workshops traditionally set up for the repair of domestic units have since diversified into car air conditioning. Current estimates for this sector amount to 20 metric tonnes (new and repair). Their servicing and repair will increase recharge demand.

Fire fighting

49. There are three main locally owned, private sector manufacturers of fire extinguishers, fire fighting, detection and protection equipment in Zimbabwe. These are AFA Angus, Sargom and Chubb. They use Halon 1301 and 1211 in their portable range of fire extinguishers. They also report having used CFC-11 and CFC-12 as mixtures in the past.

50. Halon 1301 is also used in a number of fixed fire, deluge systems. Halon 1301 is very popular for portable car and other transport extinguishers.

51. The national passenger airline, Air Zimbabwe recharge their own high pressure Halon cylinders during annual testing. They have a fully equipped laboratory and workshop. The testing facility allows Halon 1301 release into the atmosphere without due regard to recycling or reclaim. The total consumption of Halons during 1993 was estimated at just over 13 MT.

Aerosols

52. There are a wide range of aerosols manufactured in Zimbabwe. The majority are produced under licence from overseas principals. The bulk of these companies have since converted their propellant mixes to iso-butane or other suitable hydrocarbon compounds. These are Reckitt and Colman, Bayer, Johnson and Johnson. All these are wholly owned subsidiaries of overseas principals. Some locally owned, pharmaceutical companies such as Graniteside Chemicals and Varichem Laboratories have also converted. While Datlabs, Caps and Wallace Laboratories have not fully converted. They still employ CFC-12 as a propellant in a number of deodorants, hair sprays and special pharmaceutical preparations. This usage accounts for a total of 7 tonnes per annum.

Agricultural chemicals

Tobacco seed bed fumigation

53. Zimbabwe produces an average of 200 000 tonnes of flue-cured tobacco per annum. There are over 2 600 registered farmers.

54. Unmanufactured tobacco is the single, largest, foreign exchange earner for Zimbabwe. Total earnings for the 1992 season were over US\$ 135 million.

55. Methyl Bromide fumigation therefore is practised extensively as an essential pre-planting stage in the growing of tobacco. It is an effective nematocide, fungicide, herbicide and insecticide. Tobacco seed bed fumigation accounts for over 90% (540 metric tonnes) of the Methyl Bromide imported into Zimbabwe.

56. It is used by all commercial and communal tobacco growing farmers. There are a number of techniques employed in fumigating the soil, the most popular form of dispensing being the use of 620g canisters, which are filled locally. Methyl Bromide is applied to seed beds covered with plastic sheeting to contain the gas and improve penetration and contact residence time.

Horticulture

57. Methyl Bromide is also widely used as a fumigant for perennial and green house crops. It is used in this context for total soil sterilisation with the same desirable effects as in tobacco. It is currently used by a wide spectrum of Horticultural farmers who export. The application techniques are the same as in tobacco fumigation.

58. There is also limited use in the fumigation of produce prior to exports. This sector used about 4% of all ODS's imported into Zimbabwe.

Bulk grain storage

59. Methyl Bromide is used mainly to control a range of specific pests found in maize, wheat, rapoko, rice and grain bags. It used for fumigation in storage, export and quarantine.

Other uses

60. The use of CFC-11 attributable to blowing foam, rigid and flexible, has declined considerably over the last two years from an estimated 35 metric tonnes in 1991 to about 20 metric tonnes in 1993 and has now been eliminated altogether.

This trend is set to continue as the major suppliers of polyurethane foams have now since converted to HCFC 141b. The sole manufacturer of flexible foam in Zimbabwe, Vitafoam, a subsidiary company of the UK based principal, have also fully converted their operations to methylene chloride.

2.3 Institutional Framework

61. This section summarises the specific responsibilities and individual capacities of all public and private sector institutions that will make critical contributions to successful implementation of ODS phase out in Zimbabwe.

2.3.1 Government Ministries, Departments and Agencies

62. The principal institutions for managing and coordinating compliance with the Montreal Protocol are currently under the Ministry of Environment and Tourism. This Ministry has largely been responsible for:

- representing Zimbabwe on environmental issues internationally.
- advising Cabinet and Government on all environmental impact assessment (EIA) issues for new industrial projects before implementation.
- monitoring and managing effluent treatment and disposal.
- promoting and coordinating natural resource conservation.

63. The Ministry of Environment and Tourism has a very strong capacity and information base for sustained conformance monitoring of compliance activities.

64. The Ministry of Industry and Commerce has also been providing an Industry sector specific coordination and investment appraisal. The Ministry forms the primary liaison conduit with the Industrial and Commercial sectors.

Science Research Council

65. This institute is responsible for industrial process technology research. It therefore has particular interest in coordinating research findings and appropriate environmentally friendly applications.

Ministry of Health (MOH)

66. The bulk of all environmental protection legislation is housed within this Ministry (Air Pollution Control Act, Hazardous Substances Control Act). The Ministry will work very closely with the Environment Ministry in order to fully develop the Environmental Impact Assessment (EIA) concept and the necessary regulatory mechanisms. It will also assist

in monitoring human health and other biological effects deriving from modifications of the ozone layer, particularly those resulting from changes in ultra-violet solar radiation.

Ministry of Lands, Agriculture and Water Development (MLAWD)

Research and Specialist Services (Plant Protection Research Institute)

67. This is the primary public research institute already involved in research on Methyl Bromide. It has already coordinated a number of sector specific workshops on Methyl Bromide and the search for appropriate substitutes.

Grain Marketing Board

68. This is the centralised grain marketing and storage authority within the Ministry. It is a semi autonomous body with strategic national significance. It has a variety of grain silos throughout the country. It has already implemented internal reduction in ODS use despite the unavailability of immediate drop-in substitutes. GMB will provide strategic assistance in coordinating and monitoring fumigation storage activities nationally. They also have suitable research facilities.

Ministry of Transport

Department of Meteorological Services

69. These are strategic climatic monitoring services and will assist in monitoring overall climatic changes. They are already involved in monitoring upper atmosphere changes and their impacts on weather patterns. Their research will provide data on the immediate upper atmosphere.

Ministry of Finance

70. The Ministry houses a number of very important departments with very critical contributions to the implementation of the Montreal Protocol.

Customs and Excise

71. The department constitutes the main entry point for all ODS's into Zimbabwe. Accurate and appropriate record keeping will form the new work ethic for all controlled substances. All duty and import taxes are levied at this point. Licences issued for clearance will be checked in this Department.

Central Statistics Office

72. The department makes historical records of all imports including ODS's as well as other critical implementation performance records.

Other Government Industries

73. The Ministry of Education (Primary/Higher Education) will play a critical role in environmental awareness among the younger members of society.

74. The tertiary institutions under the Higher Education portfolio will also play a special training role for technicians and other artisans. This will facilitate technology transfer for substitutes and retrofits.

Industry and Consumer Associations

(CZI, ZNCC, IBDC).

75. The bulk of industrial activity is organised into three main business associations, CZI (Confederation of Zimbabwe Industries) ZNCC (Zimbabwe National Chamber of Commerce) and IBDC (Indigenous Business Development Centre). They are generally complimentary and will play an important role in disseminating essential information, encouraging compliance and general awareness.

(CFU, ZNFU, and HPC)

76. The agricultural farmers are organised into the Commercial Farmers Union and the Horticultural Promotional Council, a sister institute to the CFU. These are membership organisations of national significance, whose role in information dissemination will be critical.

Tobacco Research Board (Kutsaga)

77. This is the largest research institute serving the tobacco farming community. There are already conducting extensive research on cost effective substitutes in seed bed fumigation.

Consumer Council of Zimbabwe

78. This is a Government funded consumer watchdog organisation affiliated to the International Organisation of Consumer Unions (IOCU). Its role is critical in promoting public and more specifically consumer awareness of ozone "friendly" products and processes.

Non Governmental Organisations

79. There are numerous NGO's with some interest in environmental issues. Their numbers appear to have grown dramatically since the Rio Earth Summit, covering a whole spectrum of issues.

They will be asked to play a role in public awareness campaigns.

2.4 Government Policy Framework

Economic Environment

80. Zimbabwe has experienced very slow economic growth since independence in 1980. GDP growths during 1980-1989 averaged 2.7% per annum compared to a population growth rate of 3% per annum. Current figures indicate an equivalent growth per capita of US \$300. This has been a consequence of the recent severe droughts.

81. The economy was previously highly regulated with central government playing a principal role in all aspects of economic activity. In 1991 it adopted one of the World Bank/IMF approved Economic Structural reform programmes. Tremendous progress has since been made in the liberalisation of key aspects of economic activity ranging from trade to foreign exchange. There are strong signs of positive recovery despite the obvious short term hardships being experienced by ordinary citizens. Some aspects of reform, as expected, had deleterious effects on the macro-economy. During the last 18 months the inflation rate has fluctuated from an all time high of 50% during 1993 to a managed 20%, presently.

82. The package of measures introduced so far have also had some desirable effects of stimulating investment and export led growth.

83. There is now a deliberate policy of attracting foreign investment which would constitute faster capital formation, providing more employment opportunities in the short term.

Regulatory policy

84. General policy shifts towards more market orientation and away from regulatory control would be the desired approach. Government would further reinforce commitment by entering into agreements on phase out procedures with trade associations. However there are a range of statutes that can be used to enforce specific legislative powers where moral persuasion fails.

85. Quantitative restrictions are no longer being employed although there are goods which are on a negative list, where import is discouraged in an attempt to protect local industries.

86. Generally, Central Government has full executive powers and parliamentary majority to enforce desired policies.

Fiscal measures

87. There is general taxation levied on all imported goods and the levels range from 0 - 100% (ad valorem). This is collected at the point of entry. (Customs and Excise).

2.5 Government and Industry Response to the Protocol

88. Zimbabwe acceded to the Montreal Protocol on 3 November 1992 and it became a party on 1 February 1993.

89. Government representatives have attended all significant meeting of the Montreal Protocol since. The last meeting in Bangkok, Thailand being attended by a Deputy Minister of Environment and Tourism. Zimbabwe was party to the Declarations on Hydrofluorocarbons (HCFC) and Methyl Bromide.

90. Zimbabwe is eligible for assistance from the ~~Interim~~ Multilateral Fund as it qualifies for developing country status under Article 5 with an ODS consumption per capita of 0.07 kg.

Government Response to the Protocol

91. Government initiated the development of the Country Programme and assigned the management of all activities related to the Montreal Protocol to the Ministry of Environment and Tourism.

92. The Ministry of Environment and Tourism has coordinated the development of this Country Programme and with concurrence from the main user sectors at the National Workshop of 28-29 March 1994, has developed and instituted an action plan for phasing out of all ODS's.

93. The establishment of an Ozone office, as an institutional strengthening unit, is an integral part of the Country Programme. It will serve as a primary focal point for all activities during implementation and monitoring.

94. All government ministries and departments have been appropriately sensitised on the issues regarding the Montreal Protocol. The Ministry is currently putting

together a refined public awareness strategy campaign and media briefs for launching.

Industry Response to the Protocol

95. The industrial and commercial sectors are particularly well developed owing to strategic linkages with overseas principals. These principals and other major controlled substance manufacturers have successfully provided local users with substantive information about practices elsewhere. The user sector, without exception, are aware of both the consequences of ODS use as well as the broad conformance requirements of phasing out as per Montreal Protocol. This information has been effectively transmitted through the main suppliers and distributors. It has largely come in the form of strategic planning intelligence information for corporations. There has been no observable panic reaction and most large users are already carrying out trials on substitutes and retrofitting for alternatives.

96. There are a number of foreign based firms and consultants who are already promoting recycling and reclamation hardware for small applications. These retail for approximately US \$3 200 each. Sluggish sales were initially reported.

97. The refrigeration manufacturing sector has been very responsible, under moderate pressure from suppliers as well as being part of an adaptive strategic approach. All the companies are locally owned and have already instituted trials on HFC-134a and are moving away from CFC-11 as a rigid insulation foam blowing agent.

98. The refrigeration sector has, over the last 2 years, conducted various in-house seminars during which the status of phase out and alternatives have been discussed at length. They have indicated a strong willingness to conform and would much rather prefer positive inducements for good performance as opposed to punitive deterrents for poor performance. Their time table for phase out, as developed during the recent National workshop, has been incorporated in the Country Programme.

99. The foam sector has also been gradually phasing out its use of controlled substances (CFC-11) .

100. The only manufacturer of flexible foam has already converted all their processes to methylene chloride.

101. The aerosol manufacturers are also aware of the movement away from CFC-12 and the large majority have since converted to hydrocarbons. Some aerosol cans now carry ozone

"friendly" stickers. This is fast becoming a competitive point of sale feature. This has also heightened desirable public awareness and general interest.

102. The agricultural sector has also responded positively, by initiating a range of discussion workshops on the Protocol. Information dissemination has been very effective among users. The numerous scientific research establishments are already very busy developing alternatives and further investigations on uses. A special UNEP technical panel on which Zimbabwe is represented, has already visited the country on a fact finding mission.

103. The Grain Marketing Board, on its own accord, has already reduced consumption of Methyl Bromide in grain fumigation by as much as 80% in certain sectors.

3.0 IMPLEMENTING PHASE OUT

3.1 Strategy Statement by Government

104. The Government of Zimbabwe is committed to a phase out strategy which will be consistent with the prevailing macro-economic reform programme and general industrial development. This strategy will form part of a National Ozone Policy. The phase-out strategy will take the minimum economic cost route and will be adopted uniformly throughout all affected sectors. The Government of Zimbabwe will encourage the adoption of alternative technologies for the effective reduction of controlled substances.

105 The policies proposed for adoption to manage the phase out will rely largely on the existing legal and institutional framework. Agreements will be negotiated with user industries who will be constituted into small, representative groups.

106. The Government of Zimbabwe will actively support and participate in programmes that will enhance public awareness of the proposed phase out. The Government of Zimbabwe will elicit public support for all strategy elements as well as ensure public awareness of the costs and inconveniences accompanying the phase-out.

107. The following policies will be incorporated as part of the National Ozone Policy:-

- * Enhanced capacity building within the Ministry of Environment and Tourism with increased technical and financial resources in line with the growing environmental demands in Zimbabwe;
- * Develop and establish a registration/certification system for all ODS's users via the current network list, in order to encourage and promote greater discipline in practises for users who qualify through an approved program. Targeting of the extensive informal and small scale operators will be a priority.
- * The environment section of the Ministry of Environment and Tourism will establish a strategic "Task force" whose primary role would be to provide guidance in policy issues within the National Ozone Policy. This special unit will also negotiate voluntary phase out agreements with affected sectors.

- * Facilitate the implementation of special projects with the largest reduction potential of ODS consumption and promoting the use of substitute chemicals and technologies.
- * The Ministry of Environment and Tourism will heighten public awareness of the "ozone problem" through all types of media advertising.
- * The Department of Customs and Central Statistics Office will establish a refined import monitoring procedures which account for all ODS's as required by the Protocol. This will form the basis of an ODS management system. It will further implement a licensing allocation system for importing Ozone Depleting Substances.
- * Ban or forced reductions will be introduced for various CFC applications as appropriate.
- * The proposed strategy will allow the continuing importation of CFC's for recharge demand purposes only until year 2010 and the establishment of a CFC bank.

Phase-out schedule recommended for all Ozone Depleting Substances in Zimbabwe.

108. The recommended phase-out schedule, as illustrated in Table 3.1 is based entirely on the accelerated phase-out scenario. It does not incorporate Methyl Bromide as more scientific research work on the substance is still being carried out. The phase out schedules for Methyl Bromide are indicative only and apply to non article 5 countries. Refer Fig. 3.1 and 3.2. The time table for this is as given in Table. 3.2

Table 3.1

Substance	Current consumption (1993) (Tonnes x ODP)	Article 5 schedule unconstrained (Tonnes x ODP)	Planned total consumption until phase out (Tonnes x ODP)	Planned year for complete phase out
CFC-11	88	2471	727	2010
CFC-12	135	3780	1116	2010
CFC-113	<1	<1	<1	2010
Halon 1301	82	1736	353	2005
Halon 1211	15	280	57	2005
Total	320	8267	2253	

Table 3.2 Time Table for Implementation of Phase-out

Year	CFC's Tonnes x ODP	Halons Tonnes x ODP
1995	246	100
1997	200	40
1999	160	30
2001	100	10
2003	40	2
2005	10	0
2007	5	0
2009	2	0
2010	0	0

3.2 Action Plan

3.2.1 Government Actions

109. The primary objective of the Action Plan is to effectively phase out the consumption of Ozone Depleting Substances in Zimbabwe much earlier than its obligations to the Montreal Protocol under Article 5.

110. The principal agents in this Action Plan will be the Government of Zimbabwe, the World Bank, which has been elected as the implementing agency for the investment projects, UNDP which will be responsible for sustained technical support and UNEP for the institutional strengthening, information needs and training support.

111. The action plan is consistent with all phase out schedules and in conformity with the principles for evaluating and financing net incremental costs for the ODS phase out as detailed in the "indicative list of Categories of Incremental Costs", adopted by the Second Meeting of the Parties to the Montreal Protocol, taking into account the following general principles:-

- * the options selected and identified are the most cost effective.
- * project proposals for funding have involved careful screening of cost items to eliminate double counting.
- * savings and benefits will be taken into account on a case by case basis.
- * funding of incremental costs is expected to enhance early adoption of alternatives or consumption reducing technologies.

Government Actions

112. The following section summaries the specific actions to be taken by the various government ministries and agencies who have active roles in phasing out controlled substances (refer Table 3.3).

Responsible Authority - Ministry of Environment and Tourism

- * Establish an inter-ministerial task force with representation from users, distributors and all business organisations (CZI, ZNCC and IBDC).
- * Development of publicity and awareness campaign for plans on Montreal Protocol through this task force.
- * Establish Ozone Office with executive authority for Protocol issues.
- * Develop a draft environmental policy statement as prescribed in the strategy statement.
- * Establish sector specific task forces and registration of all ODS users.
- * Establish an information system to qualify and licence all ODS users and importers. Accurate monthly records of all imports and users will be kept.
- * Ban on Annex A and Annex B substances.
- * Prepare all necessary supportive legislation (with support from Ministry of Justice)

Responsible Authority - Ministry of Finance Department of Customs and Excise

- * Establish an internal information system for ODS's and importers with type of ODS's volumes, country of origin and value. Prohibition of ODS goods imported without relevant licence.
- * Levy increased import duty on all Annex A and Annex B substances.

Responsible Authority - Ministry of Finance Central Statistics Office (CSO)

- * Collect data from customs and licensing (MOET) on all imports and exports of ODS's or products with controlled substances.

Responsible Authority - Ministry of Finance
Treasury (Multilateral Funds section)/Reserve Bank of Zimbabwe.

- * Establish mechanism for receipt and disbursement support of funds.

3.2.2 Projects

113. The following projects, as detailed in Annex A, have been identified and approved by the Government of Zimbabwe, the distributors and users of Ozone Depleting Substances:-

1. Institutional strengthening for phase out of Ozone Depleting Substances - Government of Zimbabwe (US\$173 000) plus an additional US\$75 000 for strategic stocks.
2. CFC recycling, recovery and reclamation. Establishment of a CFC - 12 bank management system for recharge demand - R & M Haulage. (US\$393 000)
3. Retrofitting for conversion of refrigeration equipment from CFC-12 to HFC-134a. A range of technicians will be trained on conversion - Delta Corporation. (US\$395 000)
4. Recycling of Halon fire extinguishers contents - Air Zimbabwe. (US\$150 000)
5. Methyl Bromide Studies for alternative appropriate technologies. (US\$ 15 000)

114. The identified projects are designed to build specific sector capacities as well as effectively coordinate and centralise consumption information. All the above private sector companies are wholly locally owned.

115. The total incremental costs of the proposed projects has been estimated at US\$ 1 201 000 in current prices, over the period 1994 - 1996. This includes the additional amount for strategic refrigerant stock.

116. The Zimbabwe Government will progressively forward more proposals for further projects. These will be generated from alternative technology implementation proposals. Although most of the projects are expected to be in refrigeration, initially. The outcome of current scientific research on Methyl Bromide will also determine the extent of financial and technical support. This requirement will require further special consideration.

3.3 Roles in Implementing the Strategy

117. The lead agency in this Programme will be the Ministry of Environment and Tourism and through it, the National Ozone Office, to be established.

118. The following organisations and government departments have been identified as playing an important role in the implementation.

*** Government departments**

- Ministry of Industry and Commerce
- Ministry of Finance
 - Customs and Excise
 - Treasury
 - Central Statistics Office

*** Industry Association**

- Confederation of Zimbabwe Industries (CZI)
- Indigenous Business Development Centre (IBDC)
- Zimbabwe National Chamber of Commerce (ZNCC)

119. There are smaller professional associations which would also be requested to provide support.

*** Implementing Agencies**

- World Bank (investment projects)
- UNDP (technical assistance and demonstrations)
- UNEP (institutional support, information and training)
- UNIDO (small scale investment)

120. There is already a facility within the Ministry of Environment and Tourism for the receipt and limited disbursement of programme and project funds.

3.4 Time Table and Consumption Implications

121. The forecast demand for the various categories of use is as illustrated in Table 3.2. However, it is clear that even without accelerated phase out, there would be a forced reduction in normal activity as global supply is already constrained. Halons are now almost impossible to source. CFC-12 has at least doubled in price. The impact of global changes in supply and technology has been very strong. The dependence on imports has forced all consumers to conform as it is not easy to find alternative sources of supply. The volumes would not warrant it.

122. As a consequence, a lot of refrigeration companies are retrofitting their plants for better compatibility with international practice. The transforming economy, with its general demand for new technology will make for faster adoption of substitutes and alternatives.

TABLE 3.3 ACTION PLAN

YEAR	DESCRIPTION OF ACTION	RESPONSIBLE ORGANISATION	SECTOR	INTENDED EFFECT	ESTIMATED COST (US\$)
1994	Establish an interministerial task force with representatives from users, distributors and business organisations (CZL, INACC, BDO)	MOET	ALL	Enhance cooperation during compliance	
1994	Develop draft environmental policy strategy	MOET	ALL	Formal approach to management	
1994	Initiate publicity and awareness campaigns on Montreal Protocol and phase out	MOET	ALL	Awareness in all communities	
1994	Formally register/licence all users and qualify operations with capacity building needs assessment	MOET	ALL	Ensure compliance	
1994	Establish an Ozone office with secretariat	MOET/Business Organisations	ALL	Institutional strengthening	173,000
1994	Implement Methyl Bromide studies	MOET	AGRI/CHEM	Reduce dependence on controlled substance	15,000
1995	Establish an ozone information system with main users and suppliers for monitoring all ODS movement and use	MOET/MOF (CSO and Customs)/Business organisations	ALL	Improve management and consistent data collecting	
1995	Establish Halon bank system	MOET, Fire extinguishers	F/FIGHTING	Enhance management of Halon applications	150,000
1995	Introduce retrofitting equipment	MOET/Refrigeration	REFRIGERATION	Incentives for conversion to HFC 134a	395,000
1995	Establish CFC-12 bank as refrigeration stock	MOET	REFRIGERATION	Enhanced management of CFC's	468,000
1995	Ban use of CFC-12 as propellant except for special pharmaceuticals	MOET	PROPELLANTS	Ensure compliance	
1996	Introduce levy on all Annex A and B substances	MOET/MOF	REFRIGERATION	Reduction in usage	
1996	Ban manufacture and importation of CFC-12 and CFC-11 based refrigeration systems	MOET/MOF (Customs)	ALL	Reduction in CFC-12 applications	

123. The total incremental cost to the country is estimated at US\$ 1 201 000.

This is made up as follows:-

Project incremental costs	US\$1 201 000
Total incremental costs	US\$1 201 000

Table 3.4 - Summary of Project Proposals
US\$

Project Description	1994/5	1995/6	1996/7	TOTAL COST (US\$)
1. Institutional strengthening	68 550	52 800	52 800	172 150
2. CFC recovery and recycle	263 000	130 000		393 000
3. Retrofitting equipment	275 000	120 000		395 000
4. Halons recovery and recycling	150 000			150 000
5. Refrigerant stock	75 000			75 000
6. Methyl Bromide Studies	15 000			15 000
TOTAL	844 550	302 800	52 800	1 201 000

3.5 Budget and Financing Programme

Activities 1994 -1997

124 The full breakdown of all project costs by the various elements is as given in Table 3.3 above. It is proposed that all the costs indicated are covered by the Multilateral Fund.

125. There is a special initial project proposal for studies on Methyl Bromide alternatives. The project is intended to initially review suitable alternative technologies employed elsewhere for grain fumigation and storage.
Total incremental costs are estimated as follows:-

Project incremental costs	US\$1 201 000
Total incremental costs	US\$1 201 000

3.6 Monitoring Arrangements

Consumption

126. Overall scheduled monitoring of ODS consumption will be achieved largely through the Ozone office as well as through the intimate cooperation of user and supplier industries. A system of import clearance certificates will be used and will be issued by this office only. Only import certificates will allow customs clearance. These numbered certificates will also be used for imports of finished goods such as refrigerators and other equipment which contain Ozone Depleting Substances.

127. Scheduled, formal monthly meetings of the inter-ministerial committee, to be established, will form the main forum for discussion on programme effectiveness.

128. The inter-ministerial committee, will review general effectiveness of all government actions and problems being encountered. Each responsible authority identified in the Action Plan will be required to report back to this committee. This committee will as delegate responsibility and task individuals with specific objectives to report on for the next meeting.

129. The recycling projects proposed provide for institutional monitoring at ground level.

Projects

130. The monitoring of all projects will be the primary responsibility for the Government of Zimbabwe, through the Ministry of Environment and Tourism and the Ozone Office, as soon as it is set up. The local United Nations Development Programme (UNDP) office, will be requested to have strong input in monitoring with ground support expertise during implementation. They will be requested to provide the Ministry of Environment and Tourism with scheduled formal feed back on implementation.

131. The main business associations are being requested to establish and maintain an ODS consumption information system for their members. This information will be consolidated initially at the Ministry of Environment and Tourism and thereafter by the Ozone Office.

132. The Government of Zimbabwe will continue to be fully accountable for reporting all manner of progress to the Fund Secretariat.

**

ANNEX A

PROJECT PROPOSALS

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Institutional strengthening for the phase-out of ozone depleting substances and the establishment of an Ozone Office.

SECTOR COVERED: All sectors

ODS CONSUMPTION: 859 metric tonnes and 742 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year as per Country Programme

TOTAL INCREMENTAL COSTS (US\$): US\$ 172 250

COST PER KILOGRAMME PHASED OUT: US\$0.23/kg.

IMPLEMENTING AGENCY: UNEP

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. The Government of Zimbabwe acknowledges the importance of consistently adhering to the Country Programme commitment.
2. The country, however has currently very limited institutional capacity within the Ministry of Environment and Tourism to fully support and coordinate the implementation of the Country Programme Action Plan.
3. It is in this regard that the establishment of an Ozone Office fully dedicated to the successful implementation of the Montreal Protocol, as a primary short and long term objective, is proposed.
4. The functions of the Ozone Office will include the formulation of action programmes for the phase out of Ozone Depleting Substances as well promote the co-operation between Government and industry for the achievement of objectives of the Country Programme.

5. The Office will also serve as a focal point for all communication and coordination for the Fund Secretariat and Implementing Agencies as well as acting as a local secretariat for the proposed inter-ministerial task force.

6. Other functions and roles of the Ozone Office as exercised by the executive members of staff will be to:-

- * collect and process data and information to act as a national information exchange and a resource centre;
- * disseminate and exchange relevant information to users, other parties and organisations on the phase-out process;
- * launch public awareness campaigns on all Ozone issues;
- * monitor all activities related to ODS's and advise on the requirements of The Montreal protocol;
- * receive, appraise and write up additional projects for Multi- Lateral Fund consideration;
- * manage the licensing of all imports and coordinate the system on the ground.
- * manage the refrigerant stock.

7. The following project budget is proposed:-

CAPITAL EXPENDITURE

			PROJECT
Office Equipment	1994/5	1995/6	TOTAL
		US\$	
Computer	2 700		
Printer	2 500		
Software	1 200		
Modem	500		
Photocopier	2 000		
Type writers	1 800		
Fax machine	1 800		
TOTAL	12 500		

RECURRENT EXPENDITURE

	1994/5	1995/6	1996/7	
Staff incentives				
Prof. Manager	14 000	14 000	14 000	
Assistant	8 000	8 000	8 000	
Materials				
and media brief	2 500	2 500	2 500	
Telecommunications	2 500	2 500	2 500	
Local Travel				
expenses	3 000	3 000	3 000	
Other Office exp.	2 000	2 000	2 000	
Local Consultancy fees				
Technical(20p/d)	8 000	8 000	8 000	
Other term (20 d)	8 000	8 000	8 000	
TOTAL	60 500	48 000	48 000	
Contingencies(10%)	6 050	4 800	4 800	
ANNUAL TOTAL	66 550	52 800	52 800	172 150

BUDGET SUMMARY

YEARS	TOTAL US\$
1994/5	66 550
1995/6	52 800
1996/7	52 800
TOTAL	172 150

8. The Ozone Office will be administered by a full time professional administrator with relevant qualification and a strong Management information systems background. He will have reporting into him, an assistant with an engineering background and strong computer skills. This small team will be supported by term consultants drawn locally on specific capacity building assignments. The administrator would develop the main Terms of Reference. The budget has allowed for about 20 person days per year. All the costs are nominal current prices. No attempt has been made to incorporate the impact of inflation.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: CFC recovery, recycling and reclamation.

SECTOR COVERED: Refrigeration and Air conditioning

ODS CONSUMPTION: 196.5 metric tonnes and 196.5 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS domestic demand reduction per year = 30 metric tonnes per year.

TOTAL INCREMENTAL COSTS (US\$):US\$ 393 000

COST PER KILOGRAMME PHASED OUT:US\$ 4.4/kg.

IMPLEMENTING AGENCY: UNDP (Designate)

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. Refrigeration and air conditioning sectors constitute the most important ODS consumption sectors in the country. The various types of applications make up 30% of the country's ODS consumption in ODP weighted terms.

2. There is a strong requirement for continued recharge demand for

2. There is a strong requirement for continued recharge demand for the old CFC-12 equipment. All local manufacturers continue to use CFC-12 based systems. The current population of domestic refrigerators is just over 500 000. According to the action plan, complete conversion to new HFC-134a systems is only going to be fully implemented by January 1996.

3. The proposal has the main short term objectives of reducing atmospheric emission of CFC-12, reduction of CFC imports, introducing the CFC bank concept and promote discipline among the fragmented users of refrigeration gases.

4. The project was conceived out of this urgent requirement to recover, recycle and reclaim of CFC's and Halons from the large and highly fragmented refrigeration sector. With over 200 refrigeration repair workshops, coordination for proper phase out has to be implemented at ground level. This project is being promoted by local entrepreneurs who have established technology agreement with foreign equipment manufacturers.

5. It has three complimentary phases, where suitable hardware installation is required:-

* recovery

Basic gas capture equipment will be employed. These will be located in strategic locations (main urban centres to begin with) through out the country. These will capture client product, sort it and store it safely while awaiting further processing. Clients will be issued with deposit slips for quantities purchased.

* reclamation and recycle

This equipment will be centrally located and will purify the component products through the normal fractional distillation under moderate pressure. The CFC's will then be resold to clients.

* training

This is an important capacity building component for users. The on-the-job training will improve operational discipline and encourage recycling. It has been recognised that some workshops are manned by unqualified artisans with very little to no formal training. Normal, routine operations will identify the extent of the training needs. It will therefore form an input component of the Ozone Office.

6. This system will form a natural basis for a refrigerant management system or Bank. It will maintain accurate operational log books which will be examined.

7. The following budget is proposed:-

Capital equipment:

YEARS	1994/5 US\$	1996/7 US\$	1997/8 US\$
Office equipment			
Computer	2 000		
Printer	1 000		
Plant and machinery			
Recovery equipment			
50 Machines	100 000	100 000	
Freight	15 000	15 000	
Spares	5 000	5 000	
Reclamation centre			
Storage tanks 10 @ 1000	10 000	10 000	
Reclamation system	45 000		
Analytical Laboratory	35 000		
CFC management unit (Bank)			
Motor vehicles	25 000		
Training and Support Services			
Training unit	5 000		
and materials			
Consultancy fees	20 000		
TOTAL	US\$263 000	US\$130 000	

Total for the three years US\$393 000

Summary Implementation

YEAR	TOTAL COSTS	MAIN ACTIVITIES
1994/5	US\$263 000	Installation and commissioning
1995/6	US\$130 000	Full operational establishment
1996/7	--	"

8. This is a business proposition and recurrent expenditure does not constitute incremental costs as it can be matched against accrued operating revenue. It will be designed such that there is some net operating surplus to cover expenses. Investment in hardware is staggered over a two year period.

9. The organisation will be totally independent of Government as it is exclusively a private sector initiative. It will however maintain close liaison with the ozone office.

10. The main benefits will therefore be in the form of import reduction of 30 metric tonnes per annum, better servicing and the strategic establishment of a CFC bank.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Retrofitting of refrigeration equipment
for conversion from CFC-12 to HCFC and
HFC-134a.

SECTOR COVERED: Refrigeration

ODS CONSUMPTION: 10 metric tonnes and 10 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year = 10 tonnes x ODP

TOTAL INCREMENTAL COSTS (US\$): US\$ 395 000

COST PER KILOGRAMME PHASED OUT: US\$ 13.2/kg

IMPLEMENTING AGENCY: UNDP or UNIDO (Designate)

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. This is a large private sector company with specific interests in the leisure and hospitality (hotels) industries. The company is also the sole franchise holder for the Coca-Cola International. It also manufactures a whole range of other beverages, beers, spirits and wines. It also owns one of the largest supermarket chains in the country. It therefore owns a network of refrigeration units estimated at over 9 000.

2. The company has taken a strong policy decision to immediately convert all these units from CFC-12 to HFC-134a, within the next three years. All existing units will be converted to HFC-134a. All new units (2 000 in 1994) will be fitted with the substitute systems, beginning this year.

3 The main objective of this proposal is therefore to provide fast phase out of ODS's in support of the global coalition. This is also intended to serve as an example of private sector, social responsibility, as this is a high profile company.

4. The project is being implemented by a division of the company, Delta Operations. This change over will result in an immediate reduction of 10 tonnes per annum, in normal demand from Delta Operations.

5. Summary of Proposal

Capital equipment for charging new and retrofit units:-

YEARS	1994/5	1995/6	1996/7
Charging equipment	15 000		
Vacuum equipment	17 000		
Miscellaneous hose equip.	15 000		
Retrofit equipment			
Incremental cost per unit(\$40)			
Total for 9000	120 000	120 000	
Total new units (2000)	108 000		
TOTAL	275 000	120 000	

Total for the period = US\$ 395 000

6. This will reduce consumption over the next three years by a total of 19 metric tonnes.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Recycling and reclamation of Halons for fire fighting equipment.

SECTOR COVERED: Fire - Fighting

ODS CONSUMPTION: 13 metric tonnes and 97 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: ODS phase out per year = 20 tonnes x ODP

TOTAL INCREMENTAL COSTS (US\$): US\$ 150 000

COST PER ODP KILOGRAMME PHASED OUT: US\$ 2.5/kg

IMPLEMENTING AGENCY: AEC

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. Air Zimbabwe is the National passenger airline. They already have a sophisticated workshop for the testing of high pressure fire extinguisher cylinders. Halons are used strategically for the recharge of these units. Halon production has stopped in all Montreal Protocol countries. There are currently no suitable alternatives or drop-in substitutes.

2. The main objective of the project is to recycle and reclaim all halons during annual testing as well serve some of the fixed fire systems in existence. This will result in partial self

sufficiency as well as reduce emissions and the associated costs. The coordination of strategic stocks and the management of an information system is of critical importance for continued operations. This information could then be linked to other regional activity.

3. The equipment proposed recycles Halon back to the MIL-M-12218c and ISO 7201 standards with a 99.5% recovery efficiency. This equipment is already extensively used by other airlines through out the world and is available from Aer Lingus.

4. Summary of Proposal

Capital equipment for recovery and recharging units:-

YEARS	1994/5	1995/6	1996/7
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Charging equipment (HAL Mark 1)	105 000		
Miscellaneous spares	40 000		
Contingencies	5 000		

Total	150 000		
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Total for the period = US\$ 150 000

The project will be implemented immediately after approval.

5. This will reduce consumption over the next three years by a total of 8 - 10 metric tonnes per annum.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Methyl Bromide studies for alternative technology investigation.

SECTOR COVERED: Agricultural chemicals

ODS CONSUMPTION: 600 metric tonnes and 420 ODP weighted tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: Reduction of Methyl Bromide use as a fumigant in agricultural applications as much as 200 ODP tonnes.

TOTAL INCREMENTAL COSTS (US\$): US\$ 15 000

COST PER ODP KILOGRAMME PHASED OUT: US\$ 0.075/kg.

IMPLEMENTING AGENCY: UNEP

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. The Grain Marketing Board is the main grain marketing authority in the country. It is mandated as a residual buyer of all grains from farmers both commercial and communal. It has an extensive network of large storage silos and treatment depots throughout the country. It plays a very critical role in food security in the region. They have used methyl bromide for fumigation and storage applications since inception.

2. The main objectives of the proposal are to investigate and adopt non Methyl Bromide fumigation and storage techniques. The project will involve extensive trials with registered contact pesticides.

3. A range of pesticides will be purchased in bulk and techniques employed by Indonesia will be investigated.

4. Summary of proposal

Part I - Chemicals

	Purchase of pesticides	US\$ 3 200
Travelling and subsistence		US\$ 3 000

Part II - Atmospheric Inert Gases

Inert gases investigation (Indonesia)	
	US\$ 8 800

Total for project	US\$ 15 000
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5. The project will completely replace GMB contribution of ODS's equivalent to 200 ODP tonnes. This will contribute to a short term reduction of over 30%.

PROJECT COVER SHEET

COUNTRY: Zimbabwe

PROJECT TITLE: Strategic stocks of CFC 12.

SECTOR COVERED: Refrigeration recharge

ODS CONSUMPTION: 7.5 metric tonnes

PROJECT DURATION: 3 Years

PROJECT IMPACT: Reduction in premature scrapping of obsolete machinery thus reducing incremental cost of phase out to Zimbabwe economy.

TOTAL INCREMENTAL COSTS (US\$): US\$ Nil

COST PER ODP KILOGRAM PHASED OUT: US\$ Nil

IMPLEMENTING AGENCY: UNEP and Government of Zimbabwe to decide

NATIONAL IMPLEMENTING AGENCY: Ministry of Environment and Tourism

PROJECT DESCRIPTION:

1. It is proposed that a refrigerant stock of CFC-12 equivalent to three times the estimated recharge annual demand (1993) would be purchased. This strategic stock will be over the three year period of the Programme and would be initially administered by the Ozone Office.

The amount required is calculated as follows:

Recharge demand for domestic appliances:

Total population 500 000 of domestic units

Repairs and recharge @ 2%	= 10 000
Average charge volume	= 0.250kg
Number of periods	= 3
Estimated price	= US\$ 10/kg
Total cost	= \$75 000

This stock will be sold to the industry at cost. Thus there will a net cost of zero, but the costs of the stocks will have to be funded. Operating costs will be met through the sale of CFC's