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COMITÉ EXÉCUTIF
DU FONDS MULTILATÉRAL AUX FINS
D'APPLICATION DU PROTOCOLE DE MONTRÉAL
Quarante-deuxième réunion
Montréal, 29 mars – 2 avril 2004

PROPOSITIONS DE PROJETS : RÉPUBLIQUE POPULAIRE DÉMOCRATIQUE DE CORÉE

Ce document comprend les observations et les recommandations du Secrétariat du Fonds sur les propositions de projets suivantes :

Production

• Vérification et fermeture complète de toutes les installations de production de méthyle chloroforme et de CFC-113, CFC-11 et CFC-12 en République populaire démocratique de Corée	ONUDI

Réfrigération

• Élimination sectorielle dans le secteur de la réfrigération domestique par la reconversion de la fabrication d'équipement de réfrigération et de compresseurs à 5th October Electronic and Automation Company (deuxième tranche)	ONUDI

VÉRIFICATION ET FERMETURE COMPLÈTE DE TOUTES LES INSTALLATIONS DE PRODUCTION DE MÉTHYLE CHLOROFORME, CFC-113, CFC-11 ET CFC-12 EN RÉPUBLIQUE POPULAIRE DÉMOCRATIQUE DE CORÉE

DESCRIPTION DU PROJET

1. La 36e réunion du Comité exécutif a approuvé en 2002 l'accord amendé pour l'élimination de la production de SAO en République populaire démocratique de Corée à un niveau de financement convenu en principe de 2 566 800 $US. L'accord prévoit la cessation permanente de la production de CFC-11, CFC-12, CFC-113, de tétrachlorure de carbone et de méthyle chloroforme, et le démantèlement des installations de production visées. Le niveau de financement convenu sera décaissé en vertu du calendrier suivant sur remise du rapport de vérification indépendant sur la fermeture permanente et le démantèlement des installations de production des SAO visées, et l'approbation du rapport par le Comité exécutif.

Calendrier de fermeture et de décaissement

Installations de production	Date de fermeture	Date de vérification	Niveau de décaissement	Date du décaissement
CFC-113	Mai 2001	Août 2001*	687 700	Sur vérification satisfaisante de la cessation permanente de la production de CFC-113 et du démantèlement des installations de production.
Méthyle chloroforme	Mai 2001	Août 2001*	656,650	Sur vérification satisfaisante de la cessation permanente de la production de méthyle chloroforme et du démantèlement des installations de production.
CFC-11/12	2003	2003	733 700	Sur vérification satisfaisante de la cessation permanente de la production de CFC-11/12 et du démantèlement des installations de production.
Tétrachlorure de carbone	2005	2005	488 750	Sur vérification satisfaisante de la cessation permanente de la production de tétrachlorure de carbone et du démantèlement des installations de production
Total			**2 566 800**	

* Vérifié par Wakim Consulting pendant la vérification technique, à confirmer par l'ONUDI.

2. En conséquence, l'ONUDI, l'agence d'exécution du projet, a vérifié la cessation des activités de production du CFC-113 et du méthyle chloroforme de même que le démantèlement des installations de production correspondantes au mois de juillet 2002, et du

CFC-11 et CFC-12 au mois de décembre 2003, et a remis ses rapports sur les résultats des missions. Ces rapports sont résumés ci-dessous.

Vérification du démantèlement des installations de production de CFC-113 et de méthyle chloroforme

3. La vérification a été effectuée en juillet 2002 par un consultant du Royaume-Uni possédant de l'expérience dans l'industrie du chloro-fluor. Le rapport propose d'abord une courte description du processus de production du CFC-113 et du méthyle chloroforme, et une liste des principaux équipements. La visite des lieux a permis de voir de visu ce qui restait après le démolition des principales composantes de l'équipement utilisé pour fabriquer 500 tonnes par année de CFC-113 et 1 000 tonnes par année de méthyle chloroforme, c'est-à-dire les réservoirs, les réacteurs, la colonne de distillation et autres composantes. Il comprend également une liste des équipements qui ont été récupérés aux fins de réutilisation dans d'autres usines, comme par exemple les moteurs et les soupapes. Le consultant a aussi rendu visite aux utilisateurs de CFC-113 et de méthyle chloroforme, et s'est dit satisfait que ceux-ci ont déjà reconverti leurs activités à un solvant à base de tétrachlorure de carbone.

4. Le consultant a profité de sa visite à l'usine afin de photographier les principaux équipements utilisés pour la production de CFC-11, de CFC-12 et de tétrachlorure de carbone qui deviendront les équipements de référence pour la vérification de la cessation de la production de CFC-11, de CFC-12 et de tétrachlorure de carbone de 2003 et de 2005. Le rapport contient également le plan de travail de 2003, convenu avec l'usine de fabrication de SAO.

5. Le rapport conclut que la République populaire démocratique de Corée a respecté les exigences de l'accord en mettant fin de façon permanente à sa production de CFC-113 et de méthyle chloroforme, et en démantelant ses installations de production. La gamme de fabrication du CFC-113 et du méthyle chloroforme, des photos des sites démantelés et des restes des principaux équipements, de même que des principaux équipements utilisés pour la production de CFC-11, de CFC-12 et de tétrachlorure de carbone sont jointes au rapport. Le rapport sans les photos est joint aux présentes. Toutefois, les photos peuvent être remises sur demande.

6. Sur achèvement de la vérification, l'ONUDI a remis au gouvernement de la République populaire démocratique de Corée le paiement de 1 344 350 $US qu'elle avait reçu au moment de l'approbation de l'accord en 2002.

Vérification du démantèlement des installations de production de CFC-11 et de CFC-12

7. Le même consultant a procédé à la vérification du démantèlement des installations de production de CFC-11 et de CFC-12 en décembre 2003. Le rapport propose d'abord une courte description du secteur de la production de SAO au pays, comme toile de fond de la production de CFC-11 et de CFC-12 en 2003, avant la fermeture des installations. La production de CFC-11 et de CFC-12 en 2003 a été le double de la production de 2002 (2002 : 64 tonnes PAO de CFC-11, 235 tonnes PAO de CFC-12; 2003 : 109 tonnes PAO de CFC-11, 478 tonnes PAO de CFC-12). Le rapport propose ensuite une description du processus de

démantèlement de l'usine auquel le consultant a assisté. La production a cessé le 9 décembre 2003 et les travaux de démantèlement ont débuté le 11 décembre, pendant la visite du consultant. Au départ du consultant, le 13 décembre, les composantes principales des installations telles que les réacteurs, les colonnes du catalyseur de fabrication, les colonnes de rectification du CFC et les réservoirs avaient déjà été détruits ou étaient en voie d'être détruits, et le processus s'est poursuivi après le départ des membres de la mission. Certaines composantes telles que les soupapes, les tuyaux et les moteurs électriques ont été utilisés ailleurs. Des photos des lieux ont été prises avant et après le démantèlement, et sont jointes au rapport.

8. Le rapport a conclu que les principales composantes avaient été détruites et qu'il n'y avait pas de chance réaliste que l'usine puisse reprendre sa production.

9. Le reste du rapport contient de l'information sur les produits de remplacement proposés pour les CFC, le plan de gestion des frigorigènes et le secteur des mousses. Il comprend aussi un plan de travail pour la vérification de la fermeture des installations de production de tétrachlorure de carbone prévue pour 2005. Enfin, la proposition comprend une demande de décaissement de la prochaine tranche de 733 700 $US à payer au moment de la mise en œuvre réussie et de la vérification du démantèlement des installations de CFC-11 et de CFC-12, aux termes de l'accord.

10. Le rapport comprend 7 annexes : annexe I : Mandat de la vérification, annexe II : Accord visant l'élimination dans le secteur de la production de SAO en République populaire démocratique de Corée; annexe III : Inventaire de l'équipement de l'usine de CFC-11/12; annexe IV : Schéma de l'usine de CFC-11/12; annexe V : Plan du site de CFC-11/12 avant le démantèlement (photos); Annexe VI – Usine de CFC-11/12 pendant le début du démantèlement (photos); site de l'usine de CFC-11/12, poursuite du démantèlement et de la destruction (photos). L'annexe III du rapport de vérification, qui comprend une liste de l'équipement précisant la façon dont les pièces ont été éliminées, est également jointe au rapport. Les autres annexes ne sont pas comprises mais peuvent être remises sur demande.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

11. Le rapport de vérification présenté par l'ONUDI est conforme aux lignes directrices et au mode de présentation prévu pour l'élimination de la production de SAO approuvés par la 32^{e} réunion du Comité exécutif, et confirme que la République populaire démocratique de Corée a cessé de façon permanente sa production de CFC-113, méthyle chloroforme, CFC-11 et CFC-12, et démantelé les installations de production correspondantes au point d'éliminer toute possibilité réaliste de reprise de production.

12. Au cours de l'évaluation de la mise en oeuvre des accords d'élimination sectoriels visant la production de CFC au début de 2004, le représentant du Secrétariat s'est rendu à l'usine et a vu les installations de production de CFC-11 et de CFC-12 démantelées. Les

travaux de démantèlement étaient à toutes fins pratiques terminés, et ce qui restait sur le site confirmait les résultats du rapport de vérification.

RECOMMANDATION

13. Le Secrétariat recommande que le Comité exécutif :

a) Prenne note du rapport de vérification présenté par l'ONUDI;

b) Décaisse la 2e tranche de financement de 733 700 $US pour la mise en œuvre de l'accord visant la fermeture des installations de production de SAO en République populaire démocratique de Corée, de même que les coûts d'appui à l'ONUDI de 36 685 $US.

FICHE D'ÉVALUATION DE PROJET
RÉPUBLIQUE POPULAIRE DÉMOCRATIQUE DE CORÉE

SECTEUR : Réfrigération Consommation sectorielle de SAO (2002) : 299 tonnes PAO

Seuil de coût-efficacité du sous-secteur : Domestique 13,76 $US/kg

Titre du projet :

a) Élimination sectorielle dans le secteur de la réfrigération domestique par la reconversion de la fabrication d'équipement de réfrigération et de compresseurs à 5th October Electronic and Automation Company (deuxième tranche)

Données relatives au projet	**Domestique**
	5th October
Consommation de l'entreprise (tonnes PAO)	56,0
Incidences du projet (tonnes PAO)	56,0
Durée du projet (mois)	36
Coût initial du projet ($US)	981 011
Montant initial demandé ($US)	
Coût final du projet ($US) :	
Surcoûts d'investissement a)	
Coût d'imprévus b)	
Surcoûts d'exploitation c)	
Coût total du projet (a+b+c)	
Participation locale au capital (%)	100
Élément d'exportation (%)	0
Montant demandé ($US)	981 011
Rapport coût-efficacité ($US/kg.)	
Financement de contrepartie confirmé?	
Agence nationale de coordination	Comité national de coordination pour l'environnement
Agence d'exécution	ONUDI

Recommandations du Secrétariat	
Montant recommandé ($US)	981 011
Incidences du projet (tonnes PAO)	56,0
Rapport coût-efficacité ($US/kg)	
Coût de soutien à l'agence d'exécution ($US)	73 576
Coût total pour le Fonds multilatéral ($US)	1 054 587

DESCRIPTION DU PROJET

14. Conformément à la Décision 40/45, l'ONUDI a remis un rapport sur la mise en œuvre du projet d'élimination des CFC dans le secteur de la fabrication d'équipement de réfrigération domestique et commercial en République populaire démocratique de Corée et demande l'approbation de la deuxième et dernière tranche de 981 011 $US. Le rapport est joint au présent document. Le rapport révèle que l'équipement lié au volet frigorigène du projet a été acheté, qu'il sera installé et mis en service, et que des prototypes seront conçus d'ici mars 2004. Le processus de soumission pour l'équipement de gonflage de la mousse et les composantes pour la reconversion de l'usine de compresseurs est en cours.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

15. Le Secrétariat a examiné le rapport de l'ONUDI et émet les observations suivantes. La 40^{e} réunion du Comité exécutif a approuvé en principe la somme de 1 365 011 $US, plus les coûts d'appui à l'agence de 384 000 $US, pour la première tranche de la mise en œuvre de l'élimination par la reconversion du secteur de la fabrication d'équipement de réfrigération et de compresseurs à 5th October Electronic and Automation Company en République populaire démocratique de Corée. Le financement de la première tranche du projet a été approuvé, étant entendu que :

i) l'ONUDI ferait tous les efforts possibles pour mener le projet à terme le 1er janvier 2005; et

ii) l'ONUDI inclurait le solde du financement de 981 011 $ US dans son plan d'activités provisoire pour 2004 et demanderait l'approbation pour ce financement à la 42^{e} réunion du Comité exécutif (Décision 40/45).

16. L'ONUDI a inclus les montants nécessaires, y compris les coûts d'appui, dans son plan d'activités pour l'année 2004 et a indiqué dans son rapport que tous les efforts possibles avaient été déployés pour mener le projet à terme le 1er janvier 2005. Il semble que les activités de 2004 proposées dans le rapport pourraient permettre à l'ONUDI d'achever ses projets pour 2005. Le plan d'activités de l'ONUDI pour 2004 comprend l'élimination de 56 tonnes PAO associées à l'achèvement prévu du projet d'ici 2005. Il n'y a aucune autre condition à remplir avant l'approbation de la deuxième tranche de financement.

RECOMMANDATIONS

17. Le Secrétariat recommande l'approbation générale du financement demandé pour la deuxième tranche du projet et des coûts d'appui connexes au niveau de financement indiqué dans le tableau ci-dessous.

	Titre du projet	Financement du projet ($US)	Coûts d'appui ($US)	Agence d'exécution
a)	Élimination sectorielle dans le secteur de la réfrigération domestique par la reconversion de la fabrication d'équipement de réfrigération et de compresseurs à 5th October Electronic and Automation Company (deuxième tranche)	981 011	73 576	ONUDI

PROJECT COVER SHEET

COUNTRY:
DPR of KOREA

VERIFYING AGENCY:
UNIDO

PROJECT TITLE:

Verification of complete closure of all Methyl Chloroform (MCF) and CFC-113 production facilities in the DPRK.

MP/DRK/02/045

Report prepared by UNIDO consultant Mr. John Place

UNIDO
2002

CONTENTS **Page**

1. BACKGROUND

The Multilateral Fund for the Implementation of the Montreal Protocol (MLF) engaged Wakim Consulting (Wakim) in 2001 to conduct a Technoeconomic Audit of Production of Ozone Depleting Substances (ODS) in the Democratic People's Republic of Korea (DPRK). The Final Report was submitted in September 2001 and issued on 8 November 2001.

DPRK and ExCom agreed at the 36th Meeting of ExCom on the terms of timing and compensation for the complete closure of all ODS production facilities.

Wakim (p. 2) reported that the DPRK shut down both the Methyl Chloroform (MCF) and CFC-113 production facilities in May 2001 and dismantled them. The CFC-11/CF-12 facilities will be closed in 2003 and the CTC facility will be closed in 2005. Wakim reported that these are the only ODS production plants in the DPRK and that they are located in the February 8th Vinalon Complex.

2. DPRK PRODUCTION SECTOR COMPLETE CLOSURE PROJECT FOR CFC-113 AND MCF

A. Plant identification

Name of Enterprise	:	8th February Vinalon Complex
Plant Ref. Number	:	n.a.
Address of the Plant	:	Huinsil-dong, Hungnam City, South Hamgyong Province, DPRK
Contact persons and Functional Title	:	Jang Myong Hak, General Director, February 8th Vinalon Complex, Hong Song Bok, Chief Engineer for Technological Development
Telephone Number	:	(+)850 2 3815908
Fax Number	:	(+)850 2 3815809
e-mail address	:	not available

B. Verification

Team Composition	:	1
Leader	:	1
Name	:	J. Place
Functional Title	:	Consultant, UNIDO
Member(s)	:	0
Date of Plant Visit	:	July 1, 2002
Duration of Visit	:	1 day

C. Plant History

Date of construction:	1983				
ODS Products	No. of Lines	Capacity in Baseline Year*, 2000	Production***		
			Baseline Year*, 2000	Year 1**, 2001	Year 2
MCF	1	1,000	51	22	
CFC-113	1	500	15	6	
Raw Materials Production***					
HF	1	2,000	85	110	
CTC	-	-	-	-	-

* The year from which data are used for approving the ODS production phase out project
** Till the year of verification
*** This applies to plants where production of either HF or CTC or both is integrated

D. Plant Activity in the Year Verified

Plants for Complete Closure (MCF and CFC-113)

No. of CFC-113/MCF lines closed : 1/1

Date CFC-113/MCF production ceased : May 5, 2001

Date of dismantling completed : Started May 18, completed May 30 2002 (date of demolition)

Verification of destruction of key components by : National Coordinating Committee for the Environment

Reactor tanks dismantled and destroyed : Yes

Control and monitoring equipment dismantled and destroyed : Yes

Pipes dismantled and destroyed : Dismantled; some were destroyed, some were used in other plants

Utilities dismantled and destroyed : Yes

Evidence of destruction : Photographs

Chance of resuming production : No

Assessment by the Verification Team Included in the Verification Report : Yes

3. MANUFACTURING PROCESSES FOR CFC-113 AND MCF

A. The CFC-113 Process

Hexachloroethane, CCl_3-CCl_3, was reacted with HF in the presence of antimony pentachloride to give CFC-113, which was then purified. The by-product was hydrochloric acid.

The process flow sheet is presented in Annex I. Major items of equipment in the process flow sheet are:

Reactors (2)
Mixing tanks (2)
Cooling and separating tower
Washing tower
Storage tanks (7)
Condensers/heat exchangers (2)

B. The MCF Process

Vinyl chloride, CH_2-CHCl, was reacted with chlorine to give trichloroethane, CH_2Cl-$CHCl_2$, followed by dehydrochlorination to vinylidene chloride, CH_2=CCl_2. Vinylidene chloride was reacted with hydrogen chloride to give 1,1,1-trichloroethane (methyl chloroform, MCF).

The process flow sheet is presented in Annex II. Major items of equipment in the process flow sheet are:

Reactors (3)
Separation tower
Storage tanks (4)
Condensers/heat exchangers (3)

4. SITE VISIT

UNIDO accepted the responsibility for administering the dismantling of the ODS processing units. The first Verification Team (J. Place, consultant, UNIDO) visited the 8th February Vinalon Factory on 1st July 2002 in order to verify the situation regarding the former Methyl Chloroform (MCF) and CFC-113 production facilities. Officials of the Factory and of the Ministry of Chemical Industry showed the Team the site of the former production facilities, provided a completed questionnaire and answered all questions. Photographs were taken of the (former) sites and are to be seen in Annexes III and IV.

The MCF and CFC-113 plants were in adjoining buildings (Workshops) separated by a pathway. Both the 500 t/y CFC-113 unit and the 1,000 t/y methyl chloroform unit were built in 1983 (Wakim). Some equipment was salvaged from the plants for re-use at other locations, but the Factory management decided to demolish the site together with the major part of the equipment. The Team was advised that 3,000 kg of TNT plus oxide were used for the demolition. This method of demolition is not unusual for the DPRK Chemical Industry. On a courtesy visit to the nearby Hungnam Fertiliser Factory the next day, the Team observed by chance the results of a similar demolition of an old Workshop.

As can be seen in the photographs, there is a convincing degree of destruction of the two production facilities. Remains of metal structures can be seen. These were variously identified as storage tanks, reactors, a distillation tower and smaller parts. Considerable parts of the equipment were said to still lie beneath the rubble. As metal pieces are uncovered, they are cut (see photo in Annex III-2) and sent for recycle to scrap metal facilities.

Clearance of the debris has been going on for some time. At the time of the visit, a considerable portion of the MCF plant had been cleared as well as some of the CFC-113 plant.

The salvaged equipment has been re-used in other Factories:

- 50 valves, sent to the Agricultural Chemicals Plant
- 480 m of various types of pipe, sent to the PVC plant
- 20 electric motors, sent to various plants, including the Songchonggang Chemical Plant.

Since the salvaged equipment has been integrated into other plant facilities, it can be considered to be "otherwise rendered unusable" as far as ODS production is concerned.

All the key components have been destroyed.

Ten tons of scrap iron have so far been recovered from the site and sent to a recycling facility.

Photographs of the remains of the MCF Plant Site, as described to the Team, are seen in Annex III:

Annex III-1	"Site clearance in progress"
	"Raw materials storage tank"
Annex III-2	"Raw materials storage tank" (closer view)
	"Cutting a steel support"

Photographs of the remains of the CFC-113 Plant Site, as described to the Team, are seen in Annex IV:

Annex IV-1	"Intermediate storage"
	"Reactor screw"
Annex IV-2	"Pressure reactor"
Annex IV-3	"Distillation tower"
	"Fan and ventilator"

5. REPLACEMENTS FOR MCF AND CFC-113

Within the context of a previous UNIDO Mission on the Solvent Sector (May 2002), the Team had already examined the history of the use of MCF and CFC-113 during visits to the user factories in the course of preparing the Project Documents.

The users of MCF had been the Plating Workshops of the Refrigeration Factory and of the Taedong-gang Television Factory. Both are now obliged to use CTC instead of MCF for their cleaning operations, pending approval and implementation of their ODS Elimination Projects.

CFC-113 has been replaced in the PCB Workshop of the Taedong-gang Television Factory by acetone.

Conversion of the users of MCF and CFC-113 to other solvents lends considerable credibility to the claim that production of MCF and CFC-113 indeed ceased in May 2001.

6. PHOTOGRAPHIC RECORD OF THE CFC11/12 PLANT

The Team made a photographic record of the CFC-11/12 plant in order to complete the baseline for the 2003 phase-out programme. This record, as described to the Team, is to be found in Annex V:

Annex V-1	"Storage tanks and products"
	"Reactors (below), distillation tower (above)"
Annex V-2	"Control room"

7. PHOTOGRAPHIC RECORD OF THE CTC PLANT

The Team made a photographic record of the CTC plant in order to complete the baseline for the 2005 phase-out programme. This record, as described to the Team, is to be found in Annex VI:

Annex VI-1	"Reactors"
	"More reactors"
Annex VI-2	"Control panel"
	"Still more reactors"
Annex VI-3	"Storage tanks"
Annex VI-4	"Raw materials storage"
	"Distillation"

8. WORKPLAN FOR 2003

The baseline for the 2003 phase-out programme of the CFC-11/12 plant has been established (Wakim) and recorded (Annex V).

The Team has set up the Workplan for 2003 with the 8th February Vinalon Factory as follows:

- The 8th February Vinalon Factory will notify UNIDO of the dates for the cessation of production, the commencement of dismantling and the start of destruction. These are anticipated to be in mid-2003.
- UNIDO will need to apply for Verification Team visas at least one month before planned arrival in DPRK. The 8th February Vinalon Factory must therefore give UNIDO adequate notice of the timetable.
- The Verification Team will confirm the dismantling of the plant and will verify the destruction process. A full photographic record will be made.
- The 8th February Vinalon Factory will maintain a photographic record of the steps taken before the arrival of the Team.

9. CONCLUSIONS AND ASSESSMENT BY THE VERIFICATION TEAM

The MCF and CFC-113 facilities have been dismantled and substantially destroyed in accordance with the terms of the Agreement between the Executive Committee and DPRK at its 36th Meeting. The key components have been destroyed and there is no realistic possibility that the facilities can be returned to operational status.

UNIDO will pay the First Tranche of US$ 1,344,350 upon acceptance of the Verification Report.

10. REQUEST FOR THE RELEASE OF 2003 FUNDING

In accordance with the terms of the Agreement reached between the Executive Committee and the DPRK at the 36th Meeting, UNIDO and DPRK request the Executive Committee to release the Second Tranche in the amount of US$ 733,700 together with the 5% fee. This will enable DPRK and UNIDO to complete the 2003 phase-out of the CFC-11/12 facility.

COUNTRY:
DPR of KOREA

VERIFYING AGENCY:
UNIDO

VERIFICATION REPORT

Verification of complete closure of all CFC-11 and CFC-12 production facilities in the DPRK

DRK/PRO/36/INV/17

Report prepared by John Place and V. Shatrauka

UNIDO
2004

CONTENTS

ANNEXES

1. BACKGROUND

Government and Industry Structure

NCCE is the leading body coordinating ozone issues at the national level. All environment issues and draft policies including those on ozone issues are discussed and reviewed in the NCCE first. Thereafter, the NCCE makes recommendation to the Cabinet regarding environment issues.

The Ministry of Chemical Industry is responsible for the management of production and consumption of ODS and for monitoring the production of ODS.

The State Planning Committee formulates the plan of ODS production.

The Ministry of Electronics Industry owns October 5th Automation Complex, which is a major producer of refrigerating equipment.

The General Bureau of External Service is in charge of repairing refrigeration equipment.

ODS Production, Import and Consumption

The 2003 Country Programme Update (CPU) will be presented to the 41st Meeting of the Executive Committee of the Multilateral Fund for approval. The 2003 CPU draft represents the most up-to-date survey of the situation regarding ODS in DPRK and has been a major source of background information for this document.

DPR Korea's production of ODS in 2002 was 2,326 ODP tons, and consumption in the same year is 2,326 ODP tons. ODS consumption was largely concentrated in the CTC (solvents, fumigation and process agent) and refrigeration sectors. The ODS production and consumption profiles, based on the MP classification for Annex A, Group I and Annex B, Group II, for 1995-2002 is given in Tables 1and 2:

Table 1: ODS Production (MT)

ODS	Production Capacity (MT)	Actual Production (MT)							
		1995	1996	1997	1998	1999	2000	2001	2002
CFC-11	250	185	60	50	45	40	23	54	64
CFC-12	1000	500	150	125	40	50	42	208	235
CFC-113	500	100	40	35	35	20	15	36	
Halon 1211	-	0	0	0	0	0	0	0	0
Halon 1301	-	0	0	0	0	0	0	0	0
CTC	2300	1060	1822	1893	2022	1985	1594	1889	1843
TCA	1000	100	100	100	100	90	51	70	
MBr	200	200	0	0	0	0	0	0	0
Total ODS		**2145**	**2172**	**2203**	**2242**	**2185**	**1725**	**2247**	**2142**
Total ODP		**2061**	**2256**	**2267**	**2347**	**2299**	**1836**	**2376**	**2326**
CTC as Feedstock		956	330	270	125	130	93	361	402

Table 2: ODS Import (MT)

	Import in year							
	1995	1996	1997	1998	1999	2000	2001	2002
CFC-11	40	10	20	0	0	0	0	0
CFC-12	20	15	10	0	0	0	30	0
CFC-113	0	0	0	0	0	0	0	0
Halon-1211	0	0	0	0	0	0	0	0
Halon-1301	1	0	0	0	0	0	0	0
CTC	0	0	0	0	0	0	0	0
TCA	0	0	0	0	0	0	0	0
MBr	0	0	0	0	0	0	0	0
Total (ODP)	**70**	**25**	**30**	**0**	**0**	**0**	**30**	**0**

Production Phase-Out

The Multilateral Fund for the Implementation of the Montreal Protocol (MLF) engaged Wakim Consulting (Wakim) in 2001 to conduct a Technoeconomic Audit of Production of Ozone Depleting Substances (ODS) in the Democratic People's Republic of Korea (DPRK). The Final Report was submitted in September 2001 and issued on 8 November 2001.

DPRK and ExCom agreed at the 36th Meeting of ExCom on the terms of timing and compensation for the complete closure of all ODS production facilities.

The Government of DPR Korea dismantled the production facility of methyl bromide in 1995 at its own cost to honor its commitment of the ozone layer protection. The government also dismantled the production facilities of CFC-113 and methyl chloroform in May 2001.

Wakim (p. 2) reported that the DPRK shut down both the Methyl Chloroform (TCA) and CFC-113 production facilities in May 2001 and dismantled them. The CFC-11/CF-12 facilities were closed in December 2003 and the CTC facility will be closed in 2005. Wakim reported that these are the only ODS production plants in the DPRK and that they are located in the February 8th Vinalon Complex.

ODS Production Sector

DPR Korea is one of four Article 5 countries producing ODSs in the South Asia region. There is only one plant producing ODSs in DPR Korea in 2002, Feb.8th Vinalon Complex (former name was Sinhung Chemical Complex) in Hamhung. This plant produces CFC-11, CFC-12 and CTC. The country is self sufficient in the availability of the critical raw materials. Anhydrous hydrofluoric acid (AHF) is produced by Myonggan Chemical Plant, Myonggan County. The annual production capacity of the plant is 7,250 t/y, including 250 tons of CFC-11, 1,000 t/y of CFC-12 and 2,300 t/y of CTC. The CFC-11/-12 units were built in 1980 and the CTC production facility was built in 1975. There was also a 500t/yr CFC-113 unit and a 1,000 t/y methyl chloroform unit built in 1983. Table 3 summarizes the plant profile.

MLF approved in 2002 a production closure project of DPR Korea with the grant of US$ 1,350,000. Under this project implementation plan, the CFC-113 and TCA production facilities had been already destroyed in May 2001 in compliance with the DPR Korea's obligations under the MP. In accordance with the phase out schedule specified in the Agreement between ExCom and DPR Korea, the other ODS production facilities shall be dismantled by 2005.

Feb. 8th Vinalon Complex also operated a 2,300t/yr methyl bromide unit. The unit was shut down and dismantled at its own cost in 1995. DPR Korea suspended production of Halon 1211 and Halon-1301 before 1993. DPR Korea also phased out consumption of Halon 1211 in January 1995 and Halon 1301 in January 1996. No Halon-1211 has been imported since 1996, and only small quantities, 1 or 2 tons of Halon-1301 were imported from 1993 to 1995 annually.

DPR Korea does not export ODSs, and all the ODSs produced are consumed in the domestic market.

Table 3: Profile of ODS production facilities

Plant	ODS	Capacity (t/year)	Commissioning year	Remarks
2.8 Vinalon complex	CFC-11	250	1980	
	CFC-12	1,000	1980	
	CFC-113	500	1983	Dismantled in 2001
	TCA	1,000	1983	Dismantled in 2001
	CTC	2,300	1975	
	MBr	2,300		Dismantled in 1995

2. DPRK PRODUCTION SECTOR COMPLETE CLOSURE PROJECT FOR CFC-11 AND CFC-12

A. Plant identification

Name of Enterprise : 8th February Vinalon Complex

Plant Ref. Number : n.a.

Address of the Plant : Huinsil-dong, Hungnam City, South Hamgyong Province, DPRK

Contact persons and Functional Title : Jang Myong Hak, General Director, February 8th Vinalon Complex,

Hong Song Bok, Chief Engineer for Technological Development

Telephone Number : (+)850 2 381 5908

Fax Number : (+)850 2 381 5809

e-mail address : not available

B. Verification

Team Composition : 2

Leader : 1

Name : J. Place and V. Shatrauka

Functional Title : Consultant, UNIDO and Project manager, UNIDO

Member(s) : 1

Date of Plant Visits: December 10-13, 2003 by J. Place
January 14-15, 2004 by V. Shatrauka

Duration of Visits : 5 days and 2 days

C. Plant History

Table 4 summarises the plant history.

Table 4

Date of construction: 1980					
ODS Products	No. of Lines	Capacity in Baseline Year*, 2000	Production***		
			Baseline Year*, 2000	Year 1**, 2001	Year 2**, 2002
CFC-11	1	250	23	54	64
CFC-12	1	1,000	42	208	235
Raw Materials Production***					
HF	1	2,000	20.6	89	101
CTC (as feedstock)	2	2,300	93	361	402

* The year from which data are used for approving the ODS production phase out project
** Till the year of verification
*** This applies to plants where production of either HF or CTC or both is integrated
(Note – some mistakes in the Wakim Report have been corrected)

The figures for production in MT for 2003 are shown in Table 5.

Table 5

	January	February	March	April	May	June	July	August	September	October	November	December	Total
CFC-11	8.5	9.3	9.8	10.6	9.7	10.8	10.5	8.7	10.4	8.8	8.5	3.5	109.1
CFC-12	37.3	40.8	43	46.5	40.5	49.4	44.2	35.2	47.3	40.8	37.7	15.6	478.3

D. Plant Activity in the Year Verified

Plants for Complete Closure (CFC-11 and CFC-12)

No. of CFC-11/CFC-12 lines closed : 1/1

Date CFC-11/CFC-12 production ceased : December 9, 2003

Date of dismantling completed : Started December 11, 2003, completed December 12, 2003
Destruction completed :

Verification of destruction of key components by : National Coordinating Committee for the Environment (NCCE)

Reactor tanks dismantled and destroyed : Yes

Control and monitoring equipment dismantled and destroyed : Yes

Pipes dismantled and destroyed : Dismantled; some were destroyed, some were used in other plants

Utilities dismantled and destroyed: Yes

Evidence of destruction : Photographs

Chance of resuming production : No

Assessment by the Verification Team Included in the Verification Report : Yes

3. MANUFACTURING PROCESSES FOR CFC-11 AND CFC-12

The process for manufacture of CFC-11 and CFC-12

The inventory of the equipment in the CFC-11/12 plant is given in Annex I.

Hydrogen fluoride, carbon tetrachloride and catalyst are fed from their storage tanks to the reactor, where a gaseous mix of CFC-11 ($CFCl_3$) and CFC-12 (CF_2Cl_2) is produced with hydrogen chloride as by-product.

$$CCl_4 + HF = CFCl_3 + CF_2Cl_2 + HCl$$

The mix of CFC-11, CFC-12 and HCl is fed to an absorption tower where water dissolves and removes the hydrogen chloride. The aqueous hydrochloric acid goes to the neutralisation tower where it is reacted with NaOH to form a salt solution for disposal.

The gaseous crude mix of CFC-11 and CFC-12 is fed to a dehydration tower to be dried. The dry gas is stored and then compressed to feed for the low boiling separation tower.

The two separated components, CFC-11 and CFC-12, are further distilled in rectification columns to give the purified products, ready for storage and shipment.

A schematic of the process is presented in Annex IV. A detailed drawing is to be found in the Wakim Report (Appendix D-1).

4. SITE VISIT

UNIDO accepted the responsibility for administering the dismantling of the ODS processing units. The Verification Team (J. Place, consultant, UNIDO and V. Shatrauka, project manager, UNIDOI) visited the 8th February Vinalon

Factory from 10-13 December 2003 by J. Place and 14-15 January 2004 by V. Shatrauka in order to verify the dismantling and commencement of the destruction of the CFC-11 and CFC-12 production facilities.

The Terms of Reference for UNIDO mission and the Questionnaire Template are located in Attachment I.

Officials of the Factory, of the Ministry of Chemical Industry and of the National Ozone Unit accompanied the Verification Team to the site of the former production facilities.

Production had ceased on December 9, 2003. The closed facilities were inspected on December 10, 2003; the photographic record at this stage is presented in Annex III.

Dismantling started on December 11, 2003 and was completed on the next day, when destruction of key items of equipment started. The photographic record at this stage is presented in Annex IV.

Destruction continued after departure of the Verification Team. The Factory has maintained a photographic log of the completion of the destruction process, for later inspection.

As noted in Annex I, some salvaged equipment has been re-used in other Factories.

- *50 valves, sent to the Agricultural Chemicals Plant*
- *480 m of various types of pipe, sent to the PVC plant*
- *20 electric motors, sent to various plants, including the Songchonggang Chemical Plant.*

Since the salvaged equipment has been integrated into other plant facilities, it can be considered to be "otherwise rendered unusable" as far as ODS production is concerned.

All the key components have been destroyed.

5. REPLACEMENTS FOR CFC-11 AND CFC-12

According to the Agreement on ODS production phase out between the ExCom and DPR Korea, ExCom does not provide any financial support to DPR Korea in the development and/or production of ODS alternatives.

In order to meet domestic demand for ODS alternatives, DPR Korea plans to produce methylene chloride as a substitute for CFC-11 in the foam sector.

HFC-134a is the preferred substitute for CFC-11 and CFC-12 in the Refrigeration and Air Conditioning (RAC) sector.

According to NCCE, national scientists of the Research Centre for Environment Protection have developed a new refrigerant, "Moran", manufactured from propylene. However until "Moran" has been commercially proven, DPR Korea has identified HFC-134a as the replacement alternative.

6. NATIONAL ACTION PLAN TO PHASE OUT ODS

Phase-out of production and consumption of CFC-11 and CFC-12 is a significant part of the National Action Plan.

The national action plan includes the following components:

1) Phase-out of remaining CFC in household refrigeration sector by implementing Sector Plan of Refrigeration Production Conversion;
2) Phase-out of remaining CFC in refrigeration service sector by implementing Refrigerant Management Plan (RMP);
3) Technical assistance and capacity building.

The action plan will be supported by continued strengthening of ODS import controls. NCCE will be actively involved through technical support programs to ensure full compliance with the regulations and policies.

7. REFRIGERANT MANAGEMENT PLAN (RMP)

UNEP is assisting DPR Korea in developing a RMP (refrigerant management plan) in cooperation with UNIDO.

The RMP addresses servicing requirements for CFCs in the refrigeration service sectors. This supplemental component will phase out the remaining CFC use in the refrigeration service sector.

In 2002 the total CFC-11 and -12 consumption by the servicing workshops estimated to be 27 and 216 ODP tons respectively. This consumption figure includes CFC-12 used for the servicing of mobile air conditioners (MAC).

The RMP includes funding for establishing a recycling and recovery network comprising of 166 recovery stations and 25 recovery and recycling centres throughout the country. The recovery/recycling equipment will be procured and deployed to the selected beneficiary workshops according to criteria set by NCCE upon approval of RMP. Funding request for the associated training, collection and storage of contaminated CFC and monitoring and managing the servicing sector is US$1,177,394. The project will also include provisions for receipt and use of recycled CFC-12 from conversions of refrigeration projects and outside sources as available.

8. PHOTOGRAPHIC RECORD OF THE CFC-11/-12 PLANT

The Verification Team of 2002 made a brief photographic record of the CFC-11/-12 plant in order to prepare the baseline for the 2003 phase-out programme. This record, as described to the 2002 Verification Team, is to be found in Annex II of the 2002 Verification Report for the closure of the CFC-113 and TCA plants.

Annex VI "Storage tanks and products"
"Reactors (below), distillation towers (above)"
Annex VII "Control room"

The 2003 Verification Team recorded the baseline, the dismantling and the start of destruction of key items during the visit of 10-13 December 2003. The photographs are presented in

Annex V - Photographs of CFC-11/-12 plant site before dismantling
Annex VI - Photographs of CFC-11/-12 plant site during dismantling

9. FOAM SECTOR

There were 3 factories producing foam using ODS. One was Pyongyang Foam Factory, established in 1989. This factory caters to the demand of various kinds of polyurethane products in the country. The production of flexible foam is dominant, but there is also a small share of 8 % of the total output of rigid foam, semi-flexible foam and integral skin. There is no considerable import of polyurethane foams to DPR Korea. The main goal of the Factory is production of fine, high quality, low-density foam, which is mainly used for lamination for clothing and furniture.

The other two factories were Hamhung factory in South Hamgyong Province and Chongjin Factory in North Hamgyong Province, which were established in 1990 and 1992 respectively. The production technology of all three factories is very similar. These two factories have been integrated through an industrial rationalization process into one factory, the Pyongyang Foam Factory. This was facilitated through the foam project funded by MLF.

The industrial conversion of these factories from CFC-12 to non-ODS technology was approved by ExCom in 1997 and the conversion was completed in 2000.

10. CONCLUSIONS AND ASSESSMENT BY THE VERIFICATION TEAM

The CFC-11 and CFC-12 facilities have been dismantled and substantially destroyed in accordance with the terms of the Agreement between the Executive Committee and DPRK at its 36th Meeting. The key components

have been destroyed and there is no realistic possibility that the facilities can be returned to operational status.

UNIDO will pay the Second Tranche of US$ 733,700 upon acceptance of the Verification Report by 42d Session of the ExCom of the MLF.

11. WORKPLAN FOR 2005

The baseline for the 2005 phase-out programme of the CTC plant has been established (Wakim) and recorded (Annex III of 2002 Verification Report).

The Team has set up the Workplan for 2005 with the 8th February Vinalon Factory as follows:

- The 8th February Vinalon Factory will notify UNIDO of the dates for the cessation of production, the commencement of dismantling and the start of destruction. These are anticipated to be in late-2005.
- UNIDO will need to apply for Verification Team visas at least one month before planned arrival in DPRK. The 8th February Vinalon Factory must therefore give UNIDO adequate notice of the timetable.
- The Verification Team will confirm the dismantling of the plant and will verify the destruction process. A full photographic record will be made.
- The 8th February Vinalon Factory will maintain a photographic record of the steps taken before the arrival of the Team.

12. REQUEST FOR THE RELEASE OF 2003/4 FUNDING

In accordance with the terms of the Agreement reached between the Executive Committee and the DPRK at the 36th Meeting, UNIDO and DPRK request the Executive Committee to release the Second Tranche in the amount of US$ 733,700 together with the 5% fee.

ANNEX III

Inventory of CFC-11/12 Plant Equipment

On-site

No.	Item	Dimensions	Material of construction	Quantity	Fate
1	Column for manufacturing catalyst	ϕ 400 x 1,400	Titanium steel	2	Destroy
2	Catayst storage vessel	ϕ 1,600 x 2,000	Stainless steel	2	Destroy
3	Catayst transfer pump	Q = 20 m^3/h	Stainless steel	2	Reuse
4	CTC transfer pump	Q = 6 m^3/h	Steel	1	Reuse
5	CTC measuring vessel	ϕ 1,600 x 2,000	Steel	1	Destroy
6	HF measuring vessel	ϕ 1,600 x 2,000	Steel, PE	2	Destroy
7	HF transfer pump	Q = 2 m^3/h	Steel, PE	2	Reuse
8	HF metering pump	Q = 0.2 m^3/h	Steel, PE	2	Reuse
9	CTC metering pump	Q = 0.5 m^3/h	Steel, PE	2	Reuse
10	Reactor	ϕ 400 x 8,000	Steel, PE	1	Destroy
11	Reactor	ϕ 1,000 x 3,400	Steel, PE	1	Destroy
12	Water seal	ϕ 800 x 1,100	Steel, PE	2	Destroy
13	Pressure regulator	P = 10 at	Stainless steel	2	Reuse
14	Storage vessel for absorption liquid	ϕ 1,600 x 3,000	Steel, rubber	2	Destroy
15	Waste vessel	ϕ 219 x 300	Steel	2	Destroy
16	Absorption column	ϕ 380 x 6,000	Steel	2	Destroy
17	Neutralisation column	ϕ 380 x 6,000	Steel	1	Destroy
18	Gas-liquid separator	ϕ 800 x 1,100	Steel	1	Destroy
19	Dehydrating column	ϕ 700 x 1,500	Steel	1	Destroy
20	Oil separator	ϕ 300 x 900	Steel	1	Destroy
21	Brine cooler	ϕ 400 x 1,500, F = 2.5 m^2	Steel	2	Destroy
22	Crude CFC transfer pump	Q = 2 m^3/h	Steel	2	Reuse
23	Separating column for low-boiling liquid	ϕ 330 x 10,000	Steel	1	Destroy
24	Condenser for low-boiling liquid	ϕ 400 x 2,500, F = 20 m^2	Steel	1	Destroy
25	Gas-liquid separator for low-boiling liquid	ϕ 200 x 400	Steel	1	Destroy
26	Cooler for low-boiling liquid	F = 0.7 m^2	Steel	1	Destroy
27	CFC-12 rectifying column	ϕ 400 x 1,000	Steel	1	Destroy
28	CFC-12 rectifying column	ϕ 800 x 900	Steel	1	Destroy
29	CFC-12 condenser	ϕ 500 x 2,000, F = 8 m^2	Steel	1	Destroy
30	CFC-11 rectifying column	ϕ 400 x 1,000	Steel	1	Destroy
31	CFC-11 rectifying column	ϕ 600 x 800	Steel	1	Destroy
32	CFC-11 condenser	ϕ 350 x 2,000, F = 6 m^2	Steel	1	Destroy
33	CFC 12/11 separator	ϕ 300 x 800	Steel	2	Destroy
34	Compressed nitrogen tank	ϕ 800 x 2,950	Steel	1	Destroy
35	NaOH transfer pump	Q = 5 m^3/h	Steel	2	Reuse
36	Pressure transmitter	11 GM		3	Reuse
37	Liquid position transmitter	13 FA		18	Reuse
38	Level transmitter	17 JB6		1	Reuse
39	Differential pressure transmitter	13 A/IFD		8	Reuse
40	Indicator (air)	PO-4DL		19	Reuse
41	Indicator (air)	475I		3	Reuse
42	Regulator (air)	465I		8	Reuse
43	Temperature recorder	ERB-6		1	Reuse
44	Balance indicator	EI		1	Reuse
45	Regulating valve (air)			8	Reuse
46	Transfer switch			1	Destroy
47	Resistance wire			30	Reuse
48	Electric boiler	2 T/h		2	Reuse
49	Refrigerator motor	75/4		1	Reuse

No.	Item	Dimensions	Material of construction	Quantity	Fate
50	Air compressor motor	55/6		2	Reuse
51	Nitrogen compressor motor	55/6		1	Reuse
52	Water pump motor	5.5/2		2	Reuse
53	Transformer	3 x 4,000 KVA		1	Reuse
54	Transformer	3 x 150 KVA		1	Reuse
55	Lamp	300 w		18	Reuse
56	Circuit breaker	Cha 10-600		4	Reuse
57	Breaker	Dan 10-600		4	Reuse
58	Power cable	3 x 120		75 m	Reuse
59	Power cable	3 x 50		350 m	Reuse
60	Operating cable	4 x 1.5		550 m	Reuse
61	Distribution board	Bun-10		4	Reuse

Off-site

No.	Item	Dimensions	Material of construction	Quantity	Fate
62	HF storage vessel	ϕ 1,600 x 3,000	Steel, PE	1	Destroy
63	NaOH storage vessel	ϕ 1,500 x 3,000	Steel	1	Destroy
64	Crude CFC liquid storage vessel	ϕ 1,000 x 2,200	Steel	1	Destroy
65	CFC-11 storage vessel	ϕ 1,200 x 2,000	Steel	1	Destroy
66	CFC-12 storage vessel	ϕ 800 x 1,500	Steel	1	Destroy
67	Storage tank for CFC-11/12 gas	100 m^3	Steel	1	Destroy
68	CTC storage vessel	ϕ 2,300 x 3,400	Steel	1	Destroy
69	Compressor	Q = 40+F1 m^3/h	Steel	2	Destroy
70	Gas chromatograph	G-1800 T		1	Reuse
71	Piping				Reuse

Shared with other plants

No.	Item	Dimensions	Material of construction	Quantity	Fate
72	Hoist	5 T	Steel	1	Reuse
73	Crane	7 T	Steel	1	Reuse
74	Fire-fighting equipment			3	Reuse
75	Equipment storage			1	Reuse
76	Repair shop			1	Reuse

DPR Korea: Sectoral Phase Out in Domestic

Summary of activities completed in 2003

Sectoral Phase Out in Domestic Refrigeration Sector in DPR Korea by Conversion of Refrigeration and Compressor Manufacture at 5th October Electronic and Automation Company (DRK/REF/40/INV/26) implemented by UNIDO

Presented to the Executive Committee of the Montreal Protocol at its 42nd Meeting, March 2004

BACKGROUND

At its 40th Meeting, the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol agreed to approve, in principle, US $1,365,011 (excluding agencies support costs) as the total funds that would be available to the Government of the Democratic People's Republic of Korea to achieve its commitments for the complete phase-out of CFCs used in the manufacture of domestic refrigeration and compressors.

In accordance with the Agreed Conditions for Phase-out of CFCs in Korea the initial approval was made in July 2003 for US $384,000 of which was attributed to the purchase of the refrigerant equipment and bidding for the foaming equipment and the services required for the conversion of the compressor factory.

PROJECT OBJECTIVES

Reductions in accordance with the terms of the sectoral phase out plan in domestic refrigeration would ensure that Korea meets the Montreal Protocol's 2005 compliance target.

5th October Automation Co., refrigerator production line will be converted to use HFC-134a Technology as refrigerant and cyclopentane as blowing agent for the polyurethane foam used to insulate the refrigerator.

The alternatives have been selected on the advice of 5th October Electronic and Automation Co. management.

Through the implementation of the sectoral phase out plan, the government has committed itself to reducing total national consumption of controlled.

The overall objective of this project is to eliminate the use of 56 ODP MT of CFC-11 and CFC-12 in the domestic refrigeration and compressor manufacturing sub-sector through converting the production lines from using CFC-11 as foam blowing agent and CFC-12 as refrigerant to using cyclopentane and HFC-134a. This will achieve the final phase out in the domestic refrigeration sector and provide a balance for the supply and demand of compressors.

The phase out of CFC use in the household refrigerator sector will require integration of new technologies for non-ODS foams and refrigerants, and compressor designs to accommodate the different properties of refrigerants and foam blowing agent while sustaining energy efficiency and overall mechanical performance.

The plan involves the provision of capital equipment and technology transfer as well as the funding of incremental operating costs

YEAR 2003: PHASE-OUT TARGETS AND RESULTS

Year 2003 Target:

No CFC phase out was planned for 2003.

Year 2003 Results:

A. Domestic refrigeration manufacturing

- Refrigerant equipment was purchased and will be installed and commissioned in March 2004.
- International expert is recruited to assist October 5th Factory technicians in the development and manufacturing of prototypes in March 2004.
- Offers for the foaming equipment were obtained through the process of competitive bidding. The funds provided within the first tranche are insufficient therefore; award of the contract will be made in March upon release of second tranche from Executive Committee of the Multilateral Fund.

B. Compressor manufacturing

- The terms of reference for the supply of the services for the conversion of the compressor manufacturing were reviewed and agreed upon with the counterpart and NCCE. We are in the process of bidding for the component of redesign of the compressor and transfer of technology, the award of the contract is expected in February 2004.

YEAR 2004: TARGETS and PROPOSED ACTIVITIES

Year 2004 Target:

UNIDO will make every effort to complete the project by 1 January 2005.

Year 2004 Proposed activities:

- Ordering of foaming equipment, installation and commission and start of trial production
- Development and manufacturing of prototypes, starting with the mass trial production using HFC-134a as refrigerant.
- Redesign new compressor model, starting with the trial production.

Year 2004 Requested Fund:

The 384,000 US$ allocated for the sectoral phase out plan in 2003 are mostly obligated and partially disbursed.

The remaining sum of 981,011 US$ is requested for 2004.