PROJECT BRIEF

1. IDENTIFIERS

PROJECT NUMBER	ARM/
PROJECT NAME	**Armenia: Programme for Phasing out Ozone Depleting Substances**
DURATION	1 April 2002 – 1 December 2006
IMPLEMENTING AGENCY	United Nations Development Programme and United Nations Environment Programme
EXECUTING AGENCY	Government of Armenia / Ministry of Nature Protection
REQUESTING COUNTRY	Armenia
ELIGIBILITY	Armenia acceded to the Vienna Convention and Montreal Protocol on 1 October 1999
GEF FOCAL AREA	Ozone Depletion

2. SUMMARY

The objective of this project is to assist Armenia in the rapid phase-out of ODS consistent with the international efforts in this direction. The project will assist Armenia in meeting its phase-out obligations under the Montreal Protocol within a realistic time frame and ensure availability of technical assistance to expedite the implementation of the country programme. The project targets priority ODS phase-out activities in the refrigeration and aerosol sectors and proposes technical assistance at the institutional and enterprise levels to facilitate implementation of the country programme. The project is formulated as a framework project, comprising of a Recovery and Recycling sub-project for Refrigerants, one project aimed at elimination of ODS in the refrigeration sector, one for the aerosol sector and four technical assistance and training components. The project is designed in full conformity with relevant GEF policies on cost-effectiveness, exports, ownership, financing, operational costs and financial viability as per the requirements of the GEF Operational Strategy.

3. COSTS AND FINANCING (MILLION US$)

(US$ 1 = 560 ARM DRAM)

GEF:	- Project	:	US$ 1.785
	- Executing Agency (OPS/DTIE)	:	US$ 0.143
	- PDF		US$ 0.159 [1]
	Subtotal GEF	**:**	**US$ 2.087**
Co-financing	No co-financing		
Total Project Costs		**:**	**US$ 2.087**

4. ASSOCIATED FINANCING (MILLION US$)

Government and enterprise contribution : US$ 0.077

[1] The PDF B indicated corresponds to ½ of the amount approved for Armenia and Kyrgyzstan for UNDP and UNEP

5. OPERATIONAL FOCAL POINT ENDORSEMENT

Name: Dr. Aram Gabrielian, Head **Title:** Attn: Mrs. Asya Muradian
Organization: Department of Atmosphere Protection **Date:** 11 March 2002
Ministry of Nature Protection

6. IMPLEMENTING AGENCY CONTACT

FOR UNDP

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LIST OF ACRONYMS / ABBREVIATIONS:

CE:	Cost Effectiveness
CEIT:	Countries with Economies in Transition
CIS:	Commonwealth of Independent States
CFC:	Chlorofluorocarbones
CTC:	Carbontetrachloride
GEF:	Global Environmental Facility
HCFC:	Hydro chlorofluorocarbons
HFC:	Hydro fluorocarbons
IA:	Implementing Agency
MCF:	Methyl chloroform
MLF:	Multilateral Fund for the Implementation of the Montreal Protocol
MP:	Montreal Protocol
MT:	Metric Tonnes
NA:	Not Applicable
NGO:	Non-Governmental Organization
ODP:	Ozone Depleting Potential
ODS:	Ozone Depleting Substances
PDF:	Project Development Facility
RAC:	Refrigeration and Air Conditioning
STAP:	Science and Technical Advisory Panel
UNDP:	United Nations Development Programme
UNEP:	United Nations Environmental Programme
UNOPS:	United Nations Office for Projects Services
WTO:	World Trade Organization

BACKGROUND AND CONTEXT

Background

1. The recognition of the phenomenon of depletion of the stratospheric ozone layer, has led to a substantial international effort to phase out Ozone Depleting Substances (ODS). The emission of ODS into the earth's atmosphere causes damage to the stratospheric ozone layer which acts as a barrier to ultra-violet radiation from the Sun. Increased radiation has been traced as contributing to a higher incidence of skin cancer, eye diseases and immunological disorders while adversely affecting ecological food chains and bio-diversity. In the mid-1980s it was found that ozone-depleting substances are responsible for the destruction of the ozone layer :

- Chlorofluorocarbons (CFCs): Used extensively in refrigeration and air-conditioning (as refrigerants), in foams (as blowing agents), in aerosols (as propellants), and as solvents and cleaning agents.
- Halons: Used in fire-extinguishers and in fire fighting systems
- Methyl Bromide: Used as a fumigants

2. The basis of phasing out of the ozone depleting substances including CFCs, Halons, several halogenated solvents, agricultural fumigants such as Methyl Bromide and a class of transitional chemicals known as Hydro Chlorofluorocarbons (HCFCs), is the Montreal Protocol (1987) ratified by all developed countries and most developing countries. Further recognition that ozone depletion is in fact occurring more rapidly than anticipated, has led to two amendments to the Montreal Protocol that added controlled substances and accelerated phase-out schedules. The first amendment in June 1990 (London Amendment) added methyl chloroform (MCF) and carbon tetrachloride (CTC) and tightened the phase-out schedule. The second amendment in November 1992 (Copenhagen Amendment), added HCFCs and methyl bromide as controlled substances and further accelerated phase-out schedules. For developed countries, the phase-out dates are:

- Halons : January 1994
- CFCs, MCF and CTC : January 1996
- Methyl Bromide : Year 2010 (except critical agricultural uses)
- HCFCs : Year 2030

3. Armenia declared independence from the former Soviet Union in 1991. Armenia became a Party to the Vienna Convention and the Montreal Protocol 1 October 1999. Preparation of the basic documentation, submission to the various Ministries for consultation and agreement and issuing of the Government' official notification for agreement of the London and Copenhagen Amendments is underway. The London Amendment should be ratified by 1 September 2002.

4. The Ministry of Nature Protection (MNP) is the national co-coordinating body supported by the other Ministries. They are in the process of creating the necessary administrative and legal framework to control the trade and usage of ODS, to enable Armenia to fulfill its obligations under the Montreal Protocol.

5. The Ministry of Nature Protection will assume the management of the ODS phase out process, supervising the execution of the Action Plan by all enterprises, organizations and entities, as well as by individuals. Granting licenses for ODS and ODS containing products that are imported and exported. It is planned to set up an ODS Phase-Out Management Office in the MNP that will assume responsibility for the collection and analysis of data on ODS consumption, use, phasing out and monitoring, for project management, preparation of materials for the Interdepartmental Commission and reports for the UNEP Ozone Secretariat, UNDP, UNEP DTIE and the GEF.

6. The Government of Armenia clearly understands the country's responsibility as a member of the global community, to protect the ozone layer and that the Republic of Armenia must share the economic and social burden caused by the international efforts to phase out ODS. As a party to the Montreal Protocol classified under Article-2 of the Protocol, Armenia is required to contribute to the Multilateral Fund. However, being an economy in transition, Armenia expects to be technically and financially supported in its efforts to meet its obligations, by the Global Environmental Facility and other international environmental funds.

7. The stated priorities and the strategic goals of the Government, for implementing the compliance with the Montreal Protocol and the benchmarks chosen by the Government that happen to coincide with the phase-out of Article 5 Parties are as below:

- Phase out of the consumption of ODS by the January 2009, except for minor amounts of CFCs used as refrigerants for maintenance purposes)
- Comply with the phase-out schedules for HCFCs and Methyl Bromide as applicable to countries operating under Article-5 of the Montreal Protocol.
- Support the industry in Armenia to convert to ODS-free technologies with support from GEF and other international funds and multilateral agencies (UNDP, UNEP, World Bank, WTO, etc.)
- Develop and establish appropriate legal and regulatory framework to ensure effective and efficient phase-out process and mitigate the risk of illegal trade
- Develop and establish the necessary monitoring and licensing systems to control the imports and exports of ODS
- Support further scientific research on ozone layer depletion and thus contribute to its protection

8. Armenia does not produce or export any substances controlled under the Montreal Protocol. The bulk of ODS is imported from the Russian Federation and Turkey. The ODS producers in the Russian Federation were scheduled to discontinue production by the year 2000. Presently what Armenia receives is from the stocks available in the Russian Federation. The proposed GEF assistance to ODS consuming sectors in Armenia would enable them to make the transition to non-ODS materials in a planned and gradual manner, thereby avoiding a crisis, when the supplies from the Russian Federation are discontinued. Early reduction in ODS consumption will also reduce demand for ODS from unauthorized sources.

In order to mitigate the risk of illegal import and trade of ODS in Armenia through the IS project, the following activities are planned:
Develop and establish an appropriate legislation and regulatory framework to mitigate the risk of illegal import and illegal trade of ODS in the country. In particular to:

- Ban import of ODS-containing equipment
- Ban transit and/or export of ODS from the country
- Introduce a licensing system and quotas for import of ODS
- Introduce a certification system for trading in ODS and ODS-containing equipment
- Introduce appropriate tax incentives to facilitate use of alternative substances
- Develop capacity of the Custom Offices to identify, monitor and report imports of ODS;

These measures complemented by a training to the customs entry points will ensure control on the substances - both the quantities and the sources, and will permit to take corrective actions to prevent illegal entrance of ODS to the country.

9. In the year 2000, the total consumption of all ODS in Armenia was 205 MT or 176 MT ODP of controlled substances. The Refrigeration Sector consumption consumed 155.5 ODP MT or 90.9 % of the total consumption, 14.34 ODP MT or 8.14 % for aerosols and 1.6 ODP MT .9 % for agriculture. The ODS used in the refrigeration sector is related to servicing and repair of domestic (123.12ODP Tonnes or 79.2 %) and commercial refrigeration appliances including the production of commercial refrigerators (15.3 ODP Tonnes or 9.8 %), Industrial refrigeration (7.32 ODP Tonnes or 4.7%) and transport refrigeration including MAC (9.81 ODP Tonnes or 6.3 %).

10. There is one eligible indigenous manufactures of new commercial refrigeration appliances. Many industrial refrigeration applications use ammonia as the refrigerant. There is no use of Halons. ODS-based Aerosols is in one company only that uses 14,333 ODP Tonnes of CFC11/12. The above data is based on the survey conducted by the National Country Programme Team and UNDP and UNEP in 2001/2002. In the previous ten years (1986-97) the ODS consumption in Armenia has had mostly downs after independence in 1991. With the present growth of GDP it is expected that the consumption of ODS will rise. Since independence from the Soviet Union the maximum ODS consumption was 262 ODP MT.

11. It is foreseen that the ODS consumption would first rise in Armenia due to improved GDP then probably fall, due to the worldwide transition to ODS-free technologies and resulting market pressures. It is also expected that with the assistance of GEF that by January 2009, the consumption of ODS would be negligible to nil.

RATIONALE AND OBJECTIVES

12. The main objective of this project is to assist Armenia in the rapid phase-out of ODS consistent with international efforts in this direction. Other CEIT countries were asked by the Implementation Committee to phase out CFCs by the year 2000, and it is

unlikely that this will apply for Armenia as this project document is only presented in March 2002. Armenia has chosen to follow the phase-out schedules applicable to Article-5 countries.

13. Assistance to sectors representing the bulk of the consumption of ODS, would enable them to make the transition to non-ODS materials before legal supplies of ODS are discontinued. The project will also enable Armenia to meet its phase-out obligations under the Montreal Protocol within a rapid but realistic time frame, and ensure availability of technical assistance to expedite the Country Programme implementation.

14. The project targets priority ODS phase-out activities in the Refrigeration and the Aerosol sectors. It also provides technical assistance at the institutional levels to facilitate the implementation of the Country Programme.

15. The formulation of this project through the PDF grant has been a result of several missions of one UNDP/UNEP DTIE consultant and assistance from national consultants who carried out the data survey. The full-fledged Country Programme, the Refrigerant Management Plan and the sub-projects have been prepared in accordance with the GEF guidelines and of the Multilateral Fund for the Implementation of the Montreal Protocol. The project components listed in the ensuing paragraphs are a direct consequence of the strategies formulated in the Country Programme and the Refrigerant Management Plan.

16. The project is formulated as a framework project comprising of one Recovery and Recycling of Refrigerants, Elimination of CFC11 and CFC-12 from a Commercial Manufacturing Facility and the Elimination of CFC-11/12 from an Aerosol Manufacturing Facility sub-projects. Four technical assistance and training components are also included. The project has been designed in full conformity with relevant GEF policies, particularly those on cost-effectiveness, exports, ownership, retroactive financing, operational costs and financial viability as included in Chapter 5 of the GEF Operational Strategy. The summary of the overall project and the sub-projects cost data is provided in Annex-1. Resources provided through a PDF-B grant have been utilized in preparation of the project to a level acceptable for GEF review. The preparation includes detailed technology conversion and related cost analyses. A STAP reviewer, whose comments were taken into account, examined each sub-project; the STAP reviews recommended approval of all sub-projects. Both the sub-project documents and the STAP reviews are attached to the project documents.

All projects meet the cost effectiveness thresholds established by the Multilateral Fund. All subprojects included in the programme are utilizing the most-cost-effective solutions, methods and technologies (apart from the following exception). The Awareness and Incentive Programme is the only project that will allow the replacement of their ODS by HCFC's or HFC's. This means that zero-ODP solutions are applied to most projects, and that the programme does not negatively affect the global warming problem in any way. As such, synergism with other GEF priorities is already obtained to the maximum extent. However, in order to achieve this, the insulation in the Commercial Refrigerators

Production subproject is utilizing the "water-blown foam technology" which is less cost-effective than if HCFC-141b would have been selected.

As for the institutional strengthening project, UNEP-DTIE will ensure that the National Ozone Unit will establish regular links with other Government Units that deal with Global Warming in order to obtain maximum synergy and cooperation between the ozone and the climate activities taking place in the country.

A comparative study has been undertaken comparing the cost-effectiveness of the non-investment subproject components. This document is attached as Annex H.

PROJECT ACTIVITIES/COMPONENTS AND EXPECTED RESULTS

17. In order to achieve the above-mentioned objective, the project contains seven components:

- A refrigerant recovery/recycling component
- A component to eliminate the use of CFC-11 and CFC-12 from the manufacture of Commercial Refrigerators
- A component to eliminate the use of CFC-11 and CFC-12 from the manufacture of Aerosols
- Four technical assistance and training components are also included.

18. The technology conversion components comprises of two sub-projects in the Refrigeration and aerosols sectors to be implemented by the UNDP. A brief description of these sub-projects is given below:

- Refrigeration (US$ 1,302,495): Under this project a comprehensive national programme for Recovery and Recycling of refrigerants in the Refrigeration and Air-conditioning (US$595,410) sectors would be implemented, the Conversion of a Commercial Refrigeration Facility (US$170,716), an Awareness and Incentive Programme (US$482,369), and a Monitoring sub-project of the activities in the RMP (US$54,000) are part of a national Refrigerant Management Plan. This would be achieved through retrofitting the Commercial Refrigeration Facility, provision of recovery and recycling equipment to be used in some centers in the country, leading to an elimination of about 38.9 ODP Tonnes of CFCs annually.
- Aerosols (US$ 228,096): The conversion of an aerosol filling facility that presently uses 14.33 ODP Tonnes of CFC11 and CFC-12 to non-ODS.

19. The technical assistance & training components comprise of four sub-components: Assistance for training of trainers of refrigeration service technicians, Assistance for training of trainers of MAC refrigeration service technicians, Training for monitoring and control of ODS for Customs Officers, Monitoring of the Refrigerant Management Plan and Maintenance and Development of an Institutional Framework within Armenia for implementing the country programme by the UNEP. The brief descriptions for the technical assistance and training components are as follows :

- Training the Trainers in Refrigeration (US$ 144,612): This sub-component will provide training to training personnel for service, maintenance and repair in the

refrigeration sector, to ensure reduction in ODS emissions during service. This training project is crucial for the successful implementation of the Refrigerant Management Plan (which was prepared simultaneously with the Country Programme) due to the significant contribution of the Refrigeration sector to the overall ODS consumption in the country.

- Training to Customs Officers for Monitoring and Control of ODS: This sub-component is designed to upgrade and expand the systems for monitoring and control of import and export of CFCs in Armenia. The institutional structure within Armenia needs more organized and efficient systems to monitor and control quantities and sources of CFCs and CFC-containing equipment in the country. Currently, customs statistics are not reliable because customs officers have not been trained to recognize and identify CFCs and have not been informed about the legal and illegal sources of ODS.. In addition, training on policy and legal instruments will be provided, through a GEF funded regional project to assist the CEIT to comply with the Trade and Licensing Provisions of the Montreal Protocol. Under this project, three decision makers/heads from the Ministry of Trade & Industry and other Ministries and three heads of units from the Customs Department will be trained in regional workshops. In the intervening period between workshops, the country would implement and enforce the new licensing regulations and policies. This project will also provide the Customs Department with ODS detection equipment to enable identification of ODS imported in bulk quantities and in equipment and would provide hands-on training for selected customs officials from the various checkpoints (14 checkpoints) in the country. The project will result in improved monitoring and control of ODS, harmonized at the regional level. This sub-project is part of the Institutional Strengthening and Capacity Building sub-project.
- Monitoring of the National Refrigerant Management Plan (US$ 54,000): This sub-component will enable the UNDP to effectively assist the Ministry of Nature Protection to implement the national Refrigerant Management Plan. This sub-project is part of the Institutional Strengthening and Capacity Building sub-project.
- Assistance for Coordinating the Implementation of the Country Programme (US$ 252,569): This sub-component will provide resources to the Ministry of Nature Resources and Environmental Protection for strengthening the national institutional structure and monitoring the ODS phase-out activities for a period of three years. The Ozone Unit established within the Ministry, in the Ministry of Nature Protection, will assist in administering the project and coordinating the implementation of the Country Programme as per the National Action Plan. This support would include computing and communications equipment, operating costs including telecommunications and office supplies, staff support for a national project coordinator, funding for essential public awareness and project support services. This component will be implemented by UNEP.

21. Implementation of this project will contribute to the global ODS phase-out efforts by eliminating the use of 56.23 ODP MT of ODS annually. The GEF grant funding will allow Armenia to substantially meet its national obligations under the Montreal Protocol

within a three-year period. This will serve to enhance the credibility of the country in the international community. In the longer term, it allows the country to avoid the economic and social disruption that would occur when imported ODS would no longer be available for industrial, commercial and consumer applications. The technology conversion under the project will allow key industries to maintain domestic and export markets. The institutional capacity for monitoring and regulatory enforcement of ODS phase-out will also be strengthened under the project.

RISKS AND SUSTAINABILITY

22. The project will help the Government of Armenia in fulfilling its commitment for phasing out ODS through compensation to enterprises for the incremental costs incurred during the process of technology conversion. This will allow the beneficiary enterprises to be competitive both in the domestic and export markets. Sustainability of specific sub-projects has been assured through the evaluation of proposed technologies and their cost-effectiveness in relation to other alternatives ensuring the project preparation work and its review by STAP. Assistance under the project for the ozone office will enable the Government to provide a sound institutional and policy framework for the ODS phase-out programme. The Government will aim at meeting its ODS phase-out commitments by ensuring that elimination of ODS consumption takes place through smooth project implementation.

23. UNDP will ensure that the accompanying measures stipulated in the Refrigerant Management Plan such as the training activities to be carried out by the UNEP DTIE will have taken place prior to the Refrigerant Recovery and Recycling Project. There are no significant issues that need to be addressed or actions to be taken, prior to the implementation of the project. However, if any issues or actions need to be addressed to conform to the GEF Operational Strategy, these will be appropriately addressed

The risk of illegal ODS imports is expected to be mitigated through the legislative measures and the capacity building activities described in detail in the sections 8 and 19 (second bullet)

STAKEHOLDER PARTICIPATION & IMPLEMENTATION ARRANGEMENTS

24. As a part of the Country Programme development, the Ministry of Nature Resources undertook consultations with a broad spectrum of enterprises and interested parties such as other ministries, NGOs, industry associations, etc. The industry was provided adequate opportunities to participate in the project and to provide data necessary for the project staff to evaluate the financial viability, technological capability and eligibility. The project will be implemented by UNDP/UNOPS and/or UNEP in co-ordination with the Ministry of Nature Protection.

25. The subprojects designated for UNEP will be implemented from the UNEP-IE sub-office in Paris, which has extensive experience for this kind of activities under the Multilateral Fund. UNDP's subprojects will be executed by UNDP's Montreal Protocol

Unit and in close coordination with UNDP's GEF unit, and in conjunction with the United Nations Office for Project Services (UNOPS), as is the case for most of its Multilateral Fund activities.

INCREMENTAL COSTS AND PROJECT FINANCING

26. The estimated total cost of the project is US$!THE FORMULA NOT IN TABLE that includes equipment, services, technical assistance, training, physical and price contingencies and net present value of incremental operating costs wherever applicable. The project will be financed by a GEF grant of US$!THE FORMULA NOT IN TABLE and contributions from the beneficiaries amounting to US$ 77,200.

27. All the costs are incremental in nature and calculated in accordance with the "Indicative List of Eligible Incremental Costs" adopted by the Parties to the Montreal Protocol and accepted under the GEF Operational Strategy. Consistent with GEF guidelines, the grant amount limits eligible assistance for enterprises with export markets to OECD countries. Cost-effectiveness of sub-projects where applicable, are at or below the threshold levels stipulated for projects under the Multilateral Fund.

Project	Total Project Cost US $	Government or Enterprise Contribution	Funds Requested from the GEF US$
1. Institutional Strengthening and Capacity Building	**294,569**	**42,000**	**252,569**
1.1. Customs Training			
2. Refrigeration Management Plan			
2.1. Training the Trainers of Technicians in Good Practices in Refrigeration	144,612		144,612
2.2. Refrigerant Recovery & Recycling Programme	595,410		595,410
2.3. SAGA - Phase-out of CFC-11 & CFC-12 in the Manufacture of Commercial refrigeration Equipment	170,716		170,716
2.4 Awareness and Incentive Programme	482,369		482,369
2.5 Monitoring the RMP-activities	54,000		54,000
3. Aerosol Sector			
3.1. Phase-out of CFC11/12 mixture in the Manufacture of Aerosols at the Yerevan Household Chemistry Plant	263,296	35,200	228,096
TOTALS	**2,004,972**	**77,200**	**1,927,772**

Annex 1 provides a more detailed summary of the sub-project incremental costs.

MONITORING, EVALUATION AND DISSEMINATION

28. Project monitoring will be performed by UNEP/UNDP and the cost for it is included in the budgets that are indicated in Annex-1.

29. Standard evaluation will be performed as stipulated in the subproject's documentation.

30. As implementing agencies for the Multilateral Fund of the Montreal Protocol, UNDP and UNEP are presently implementing ODS phase-out projects in over 60 countries. Several lessons have been learnt from experience with these projects :

- The importance of a national phase-out policy as a basis for assuring commitment and ownership by the recipient country.
- The value of strong linkages between the industry and the government to achieve phase-out objective.
- The need for strengthening the institutional framework and training of the local implementation units.
- Identifying a consistent and committed counterpart team with adequate authority and experience.
- Strong co-ordination among key interested parties at the national, regional and enterprise levels.
- Early and detailed attention to procurement and other execution issues.
- Involvement of national experts with thorough local knowledge.
- Involvement of qualified international technical specialists

31. The above lessons have been duly considered in the formulation of this project.

LIST OF ANNEXES:

A. Incremental Cost Annex: (1 page)

B. Log frame Matrix: (1 page)

C. STAP Roster Technical Reviews:

C1. National Programme for Recovery and Recycling
C2. SAGA - Phase-out of CFC-11 & CFC-12 in the Manufacture of Commercial refrigeration Equipment
C3. Phase-out of CFC11/12 mixture in the Manufacture of Aerosols at the Yerevan Household Chemistry Plant

D. Transmittal Letter from the Government: (2 pages)

E. Sub-Project Cover Sheets

E1. Subproject 1: Institutional Strengthening and Capacity Building
E2. Subproject 2.1: Training of Trainers in Good Practices in Refrigeration
E3. Subproject 2.2: National Programme for Recovery and Recycling
E4. Subproject 2.3: SAGA – Phase-out of CFC-11 & CFC-12 in the Manufacture of Commercial Refrigeration Equipment
E5. Subproject 2.4: Awareness and Incentive Programme
E6. Subproject 2.5: Monitoring the Activities of the RMP
E7. Subproject 3.1: Phase-out of CFC11/12 mixture in the Manufacture of Aerosols at the Yerevan Household Chemistry Plant

F. Summary Consumption And Phase-Out Charts

G. Future Benchmarks/Milestones

H. Comparative Table Showing the Cost-Effectiveness of Non-Investment Activities

ANNEX A.
Incremental Cost

a	b	C	d	e	f	g	h
Sub-project	Implementing Agency	Phased-out in ODP MT	Requested Grant w/o Agency Support	Cost Effectiveness in US$ / kg	Total Project Cost in US$ (incl. Agency support and ent./govt. contribution f=g+h	Enterprise or Government Financing US$	Proposed GEF Financing US$* h=d*1.08
1. Institutional Strengthening and Capacity Building	UNEP	N/A	233,860	NA	294,569	42,000	252,569
2.1. Training the Trainers of Technicians in Good Practices in Refrigeration	UNEP	3	133,900	44.6	144,612	0	144,612
2.2. National Refrigerant Recovery & Recycling Programme	UNDP	27.4	551,306	20.1	595,410	0	595,410
2.3. SAGA - Phase-out of CFC-11 & CFC-12 in the Manufacture of Commercial refrigeration Equipment	UNDP	6.5	158,070	24.3	170,716	0	170,716
2.4 Awareness and Incentive Programme	UNDP	5	446,638	8.9	482,369	0	482,369
2.5 Monitoring the Activities in the RMP	UNDP	N/A	50,000		54,000	0	54,000
3.1. Phase-out of CFC11/12 mixture in the Manufacture of Aerosols at the Yerevan Household Chemistry Plant	UNDP	14.33	211,200	14.7	263,296	35,200	228,096
TOTAL		56.233	1,784,974		2,004,972	77,200	1,927,772

* Figures include Executing Agency Support Cost

ANNEX B.
Log frame Matrix

Summary	Objectively Verifiable Indicators	Means of Verification (Monitoring Focus)	Critical Assumptions and Risks
Objective To assist the Republic of Armenia in complying with the provisions of the Montreal Protocol	1. ODS consuming sectors identified by the National Ozone Team. 2. Production of ODS based equipment and processes 3. Presently the country has limitations in complying with the Montreal Protocol.	1. Survey of ODS users carried out by the National Ozone Team 2. Data on imports of ODS, reported by the Government	Accuracy of reported data on ODS imports and consumption
Outcome Phase-out of the consumption of Ozone Depleting Substances by the various users	1. Availability of suitable methods to reduce ODS consumption. 2. Appropriate regulatory framework to confirm compliance.	1. International industry and market data on technology 2. Domestic industry and market data on ODS consumption	Little availability of ODS through imports since 2000, from the Russian Federation and other sources and the availability of non-ODS substitutes
Results Elimination of 56.23 MT annually of ODS within 3 years	Information on pre-project and post-project ODS consumption.	Data on imports of ODS through the relevant Government departments	Accuracy of data and adherence to project schedules
Project Components to be implemented to obtain desired results One recovery/recycling sub-project, one elimination of CFC-11 & CFC-12 in the manufacture of commercial refrigeration, one elimination of CFC-11 & CFC-12 in the aerosol industry, programme and four technical assistance and training sub-projects	Installation of the necessary equipment, processes and introduction of practices envisaged in the sub-projects	1. Reports of vendors of equipment and processes 2. Reports of users 3. Reports of inspection and confirmation of completion by IA experts 4. Project management and evaluation reports	1. Adequacy of the project budgets. 2. Adequacy of financing of the project

ANNEX C.
STAP Roster Technical Reviews
ANNEX C1: National Programme for Recovery and Recycling of Refrigerants

U N D P
GEF Project Proposal Review

Country: **Armenia**
Co-ordinator: **Ministry of Nature Protection of the Arm. Rep.**
Type: **Nat. Programme for Recovery and Recycling of ODS; Training of Service Technicians**
Date: **March 2002**

RTU-UN/WB-LK-02177-dl

Scope
The project under review covers the recovery and recycling of CFC-12 from serviced equipment as well as five training courses for good practice and hands on training of the R&R equipment within the framework of the programme.

1. Project Description; Sector Background and Justification

The project proposal describes the sector background in Armenia and the project justification in an adequate manner. It is logical that the government would like to implement efforts in recovery and recycling at short notice given the production and import situation of CFCs, in this way reducing imports or net consumption. The situation seems logistically manageable given the fact that there are only 42 companies of different size (about 157 ODP tonnes CFC-12 consumption mainly in servicing), however infrastructure and distances may be difficult. It is estimated that there are more thabn 750 technicians in the country, yielding an average of 18 technicians per company.

It is an appropriate decision to place the recovery and also the recycling machines at the most effective locations (where one can find the larger users or the principal refrigerant distributors).

Training of technicians is directly related to proper handling of refrigerants and proper use of the R&R machines. It is stated in the proposal that R&R, improving maintenance through training and training in containment will contribute to an extra saving (it has to be assumed that this saving is only partly related to R&R). Since calculations concerning the amount of ODS saved are made on the basis of a standard amount (1 kg) per day per machine, the influence of training on the consumption cannot be estimated and needs to be closely monitored, in order to an effective planning of follow-up stages. In summary, savings may be larger through the non-investment activities, which could be translated into a cost effectiveness factor.

Where it concerns the servicing of domestic refrigerators, the proposal mentions that they should not be neglected, although the amount per repair is small (however, there are large numbers that are repaired).

It is proposed that there will be five training courses for 20-30 technicians each, which would involve about 15% of all technicians in the country (benefiting from earlier workshops held by UNDP). One may consider that national experts continue training people from (other, perhaps non-identified) workshops following "the train the trainer approach". In fact, it is actually part of the training proposed as attached to most RMPs.

Instead of one day, one may consider at least two days if not three, if it includes hands on training on equipment in small groups. Next to the UNDP experience, material developed by UNEP could/should perhaps be used. The training could also contain some information on new refrigerants, i.e. isobutane (flammables) in domestic appliances and the use of HFCs in new equipment and for retrofits.

The way of distributing the recovery equipment and the siting of the recycling centres is supported, as well as the conditions for the siting of the 10 Recycling Centres (refrigerant distributors).

2. Technology

As far as the recover and recycle technology introduced, no comments. The only important question one may ask is whether the assumption that 50 machines will recover 1 kg per day, and whether the recycling efficiency is 90%, which would yield a saving of 12.1 ODP tonnes.

Although it will be relatively small, the technicians with recovery bags will also recover a small amount (i.e., 2.7 ODP tonnes per year, 17 kg per manual recovery pump per year, which raises a question about feasibility, which should be considered in a positive way at this stage).

The figure that mentions the amounts recycled seems to be somewhat random, and is at least not related to the repair operations. Very much will depend on how many systems are repaired, how many have leaked and what the leakage percentages are; in that case the recycling efficiency may well be lower. However, it can be assumed that no better data are so far available.

It is correct to have the project monitoring done by the Ministry, and to mention that the Inst. Strengthening funds will allow to carry out monitoring.

3. Environmental Impact

The project contributes to a decrease of emissions of CFCs and therefore has positive environmental aspects.

4. Project costs

There are no major comments to the incremental investment costs mentioned. Costs would somewhat increase if one would extend the duration of the seminars, but this would be in the order of USD 5-10,000 which keeps the cost effectiveness still in the same order. The cost effectiveness value of 20.12 USD is acceptable for Armenia as a LVC country.

5. Implementation time frame

No comments.

6. Recommendations

The R&R and training project as proposed for Armenia for 100 recovery units (150 manual pumps and bags), 10 recycling centres and demonstration seminars at USD 28,750 (the seminar component could be extended), as well as one project evaluation mission **is supported.**

Eindhoven, 02 03 08
Kuijpers, LJM

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ANNEX C.

STAP Roster Technical Reviews

ANNEX C2: SAGA - Phase-out of CFC-11 & CFC-12 in the Manufacture of Commercial Refrigeration Equipment

Country of origin: ARMENIA

Project title: SAGA – Phase out of CFC-11 & CFC-12 by conversion to CO2 & HFC-134a and R-404A in the manufacture of commercial refrigeration equipment.

Sector/sub-sector Commercial refrigeration

Relationship to country program (UNDP)

Note *This review addresses only the refrigerant conversion part of the project, it does not address the part related to the foam blowing agent conversion.*

Technology

- In this project, HFC-134a is selected as the alternative refrigerant for the replacement of CFC-12. In domestic and commercial refrigeration, HFC-134a technology is a proven and acceptable technology to reduce CFC-12 consumption.
- Next to HFC-134a technology, also HC-based technologies were considered. However, these were not selected because of flammability concerns, mentioned to be more difficult to handle for companies of the size and organisation as SAGA. It was also mentioned that the additional safety requirements for handling HCs would make it less cost effective for the company.
- The company will receive technical assistance in the project by its compressor, component and chemical suppliers. Furthermore, provisions are present in the budget for external support. A successful project implementation is therefore anticipated.
- The project also contains a small component of R-502 replacement (current use 0.3 tons annually). The selected replacement refrigerant is R-404A, which is indeed commonly used as a low temperature refrigerant to replace R-502. The technology for applying R-404A is not further discussed in the project document, but is basically very similar to the HFC-134a technology, so it is also anticipated that this conversion will be successful. Since HFC-134a has a somewhat higher pressure ratio than CFC-12 it may be that for critical appliances now running on CFC-12 a switch to R-404A will be needed rather than to HFC-134a. This is to be dealt with in the redesign phase.

Environmental impact

HFC-134a has an ODP of zero and a GWP of 1300 compared to carbon dioxide (100 year time horizon). R-404A has an ODP of zero and a GWP of 3260. For commercial refrigeration, both HFC-134a and R-404A are acceptable alternatives.

Project costs

Capital costs

- The equipment requested is essential for the conversion process at SAGA.
- In view of the production quantity, the requested charging unit is acceptable (USD 18000).
- Two new vacuum pumps are requested (USD 2500 each). In this particular case, it is indeed not recommended to retrofit existing pumps (compressors ?).
- The cost of the new vacuum gauge is reasonable (500 USD).
- The costs of the new leak detectors are reasonable (700 USD each).
- The cost of the manual charging unit including scale (1000 USD) is reasonable.
- The costs for prototype trials, technology transfer and training (40000 USD total) are relatively high, but argued to be caused partly by the relatively high number of product types to be converted. This is indeed a correct argument.

Incremental operational costs:

- Saga is reported to produce 6000 units annually of commercial type.
- Incremental operational costs are calculated for two years taking the NPV into account. However, these costs are not claimed for funding.

- The incremental cost for the compressor (4.8 USD) is reasonable given the average compressor capacity.
- The incremental cost for the refrigerant is reasonable.
- The incremental costs for the capillary tubes/dryers are reasonable.

General

- The project costs (24.3 USD/kg) exceeds the thresholds for the commercial refrigeration sector. However, it is reported that this is acceptable since Armenia is a low volume ODS consuming country.
- The total project incremental costs (chapter 6.3), also includes costs of an evaluation mission. It is not clear why this is not part of the executing agency fees.

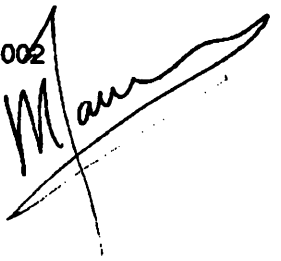
Implementation timeframe

The total time frame is reported to be 4 year, which is relatively long (chapter 9.2). Chapter 10 and 11 contain a similar table including milestones, the difference is not clear. The project cover sheet mentions for the project duration 36 months. Data should be made consistent.

Relevance and adequacy of information provided Reasonable

Recommendations Approval as proposed

Janssen M.J.P., Helmond, The Netherlands, 10 March 2002



ARMENIA – SAGA

GENERAL

The enterprise manufactures commercial refrigeration equipment (chest freezers, cabinets and doors) insulated with polyurethane rigid foam. It proposes to replace the CFC 11, which is currently used as a blowing agent by, CO_2 (water) technology.

A separate review will cover the replacement of the refrigerant.

TECHNOLOGY

The enterprise considered several options before making its technology choice. A transition to a zero ODP blowing agent was a key criterion.

The table on page 5 lists CO_2 (water) technology as a "preferred" technology for rigid polyurethane insulating foams. This claim cannot be readily justified. The technology is basically rarely used because of technical deficiencies in insulation value and, in general, a tendency to shrink with time. The proposed increase in density from the current 42 kg/m^3 to 50.4 kg/m^3 should be sufficient to overcome any tendency to shrink. The reduction in insulation value is not discussed and may become an issue for the enterprise in marketing its products. However, the improved processing afforded by the replacement of the current equipment by a high-pressure dispenser may reduce the insulation reduction.

The foam density considerations of the ExCom (Decision 31/44) cannot be applied because CO_2 (water) technology was not considered in the relevant OORG report. This is another reflection of the non-preferred technology choice.

Pentane technology is not selected because of safety concerns. This restriction can be supported. However, to state that this would have been the best choice on environmental and economic grounds cannot be supported. The safety-related engineering changes which would have been necessary would have made the application of pentane technology hopelessly cost ineffective for an enterprise consuming only 6.5 tonnes of ODS (1.4 to 2.0 tonnes of CFC 11).

The HCFC 141b technology would be technically suitable for this application but would eventually result in a subsequent technology change to a non-ODS technology. Its eventual replacement with a mixed CO_2 (water)/"liquid" HFC technology would be an alternative strategy.

The enterprise currently uses a stationary mixer and proposes to replace this with one high-pressure dispenser. This change is supported if the enterprise proceeds with its chosen alternative technology. The enterprise currently uses fully formulated polyol mixtures.

The current equipment will be scrapped.

Other project elements are technology transfer, trials and training

SAFETY AND ENVIRONMENTAL ISSUES

There are no significant safety and environmental issues associated with CO_2 (water) technology.

PROJECT COSTS

The overall cost effectiveness is $28.72/kg compared to a sector threshold of $15.22/kg. However, Armenia is a low volume consuming country.

There should be consideration given to a deduction in the capital cost to compensate for the upgrading from a stationary mixer to a high-pressure dispenser. Another supporting arguement is the unknown (old?) age of the current equipment.

The costs of trials/technology transfer/formulation optimisation are very high for such a small foam manufacturing enterprise. The sums requested could purchase chemicals for several months production.

In section 6.1 there is a separate entry of $15,000 for a mixing head and chiller. These items should be included in the cost $80,000) of the high-pressure dispenser.

The chemical raw material prices are high by comparison with those in many other markets. Is there documentary evidence for these prices?

IMPLEMENTATION TIMEFRAME

This is 4 years and should be achievable.

RECOMMENDATION

There are several items to be addressed. There has to be reassurance that the enterprise is aware that it's technology choice is not widely used and of the insulation value considerations. In addition, the items on costs should be reviewed.

M Jeffs

7/03/2002 UNDParmeniaSAGA

ANNEX C.
STAP Roster Technical Reviews
ANNEX C3: Phase-out of CFC11/12 mixture in the Manufacture of Aerosols at the Yerevan Household Chemistry Plant

March 6, 2002

TO : Jacques Van Engel
UNDP
email: Jacques.van.engel@undp.org
email: Risto.ojala@pp.inet.fi

FROM : Harry B. McClain, Consultant
Phone: 318-213-1207
Email: hbmccain@aeropres.com

1. **Country of origin:** Armenia

2. **Project title:** Phase-out of CFC 11/12 mixture in the Manufacture of Aerosols by Conversion to Hydrocarbon Propellant at Yerevan Household Chemistry Plant

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

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

5. **Technology**

(a) Hydrocarbon propellants have long been the preferred substitute for CFCs when used as an aerosol propellant. Hydrocarbon propellants are selected because of their zero ozone depleting potentials. The only environmental shortcoming of the hydrocarbon aerosol propellants (HAPs) is their flammability which can be correctly handled with the appropriate and now well established HAP technology. The U.S.A. has been using HAPs in aerosols instead of CFCs since 1978. In 1999 approximately 3.2 billion aerosol cans were filled with HAPs.

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

(c) It is totally feasible that the HAP technology required for this project can be transferred from the U.S. and Europe.

(i) No technology transfer agreement is required.

(ii) There is no licensing agreement required.

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

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

6. **Environmental impact**

(a) This project will eliminate 14.33 ODP tons of CFC 11/12. The cost effectiveness of this project is US $23.42/Kg (Sector threshold of US $4.4/Kg/year). Armenia is a low-volume ODS-consuming country.

(b) Costs are appropriate to minimize health and safety and other environmental impacts. 14.33 tons of ODP CFC-11/12 can be replaced with approximately 7.2 tons of HAPs due to differences in density The amount of HAPs required to replace the CFC-11/12 in this project is approximately 3,500 gallons. This is a very small enterprise. The total cost to the GEF is US $335,720. One questions the cost effectiveness of the project in relation to its environmental impact.

7. **Project costs**

(a) The total project cost to the GEF is US $335,720, with a requested grant of US $335,720. Agency support cost is US $37,838.

(b) Many cost components are present that will facilitate the conversion to hydrocarbon aerosol propellants.

(c) Cost of equipment

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

(ii) Page 7,5.1. *Essential Incremental Capital Costs,* indicates that a "Soft roof as an explosion relief" will be a part of the prefabricated filling room. The explosion relief should be in the form of an in-wall, tethered blow-out panel. If there are heavy snows in Armenia, that would render roof explosion relief ineffective. It is also recommended that nine gas detection sensors be purchased: seven catalytic (hot wire) and two infrared. Two infrared sensors with three sensing stations each would be equally effective and safer than the catalytic sensors.

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

(iv) Modification of present equipment will be required at Yerevan.

(v) All discarded equipment will be destroyed for the enterprise.

(vi) There will be no salvage value for the destroyed equipment.

(vii) There will be no increase in capacity at the enterprise with the installation of new equipment.

(d) The technology transfer services of US $20,000 and a safety audit expense of US $5,000 is appropriate.

(e) Operating costs

(i) The operating costs are appropriate.

(ii) The total incremental savings cost for four years is US $22,586.

(iii) The savings is significant for such a small project.

8. **Implementation time frame**

The time frame of 33 months is appropriate for this project.

9. Recommendations

(a) This project is approved as proposed.

(b) Comments: After having initial discussions with Mr. Risto Ojala who prepared the Burundi project report (my review October 9, 2001) and Dominique Kaiser of UNDP, it was determined that because FADI SA is a low-volume ODS consuming country, they were (theoretically) allowed by policy to receive the money requested in that proposal, and I approved the report as written. One assumes that this is the case in this report. However, it was also agreed that I, as the reviewer, would forward my concerns about this project as well.

Yerevan is a very small consumer of ODS: 14.33 tons. The equivalent amount of HAPs required to replace the CFCs is 3,500 gallons/year maximum. Consequently, Yerevan cannot possibly be a full time, daily, producer of aerosols.

One assumes that since Yerevan has operated three aerosol production lines in the past, that this represents significant, but now unused, capacity. The installation of new equipment proposed by this project hopefully will allow Yerevan to once again produce to this capacity and would, in time, make this project more cost effective.

The cost effectiveness of this project (US $23.42/Kg) is six times the sector threshold of US $4.4/Kg. Is this an efficient use of GEF monies?

Some cost effective threshold limits should be set for "Low Volume ODS Consuming Countries."

Harry B. McCain

UNDP Technical Reviewer: Harry B. McCain
Date Review Completed: March 6, 2002

RESPONSES TO STAP REVIEWS:

A. Review from Dr. Lambert Kuijpers on Recovery/Recycling & Training Projects.

1. Longer training courses. It has been UNDP's experience that repair technicians in the refrigeration sector first of all have their business in mind, and consider time out for training as a nuisance and a loss of money. Whenever training courses were offered of over 1 day, trainees would simply not show up during the second/third days, or they would not attend at all. Longer training periods are therefore not recommended. In fact, the 1-day training period used in all UNDP R&R programmes are found to be adequate to teach technicians the basics on "good practices" and to give them hands-on experience on the use of the recovery/recycling machines that will be used in the projects.

2. The estimated amount recovered per operation may be high. This may be true today, but prices of CFC's per kg are already on the rise, and the higher they become, the more incentive there will be to recover / recycle.

3. The project is recommended for approval.

B. Review from Mr. Martien Janssen on SAGA Refrigeration Manufacturing.

All costs are found to be justifiable, and the project is recommended for approval as is.

C. Review from Mr. Mike Jeffs on SAGA Refrigeration Manufacturing (Foam part).

The issues were addressed by UNDP's consultant (Mr. Risto Ojala) and incorporated into the sub-project document. Thereupon Mr. Mike Jeffs (STAP-reviewer) sent an addition to his review which is attached to this note.

D. Review from Mr. Harry McCain on Yerevan – Aerosols.

The comments were incorporated into the project document. Regarding Mr. McCain's comments on the poor the cost-effectiveness, it was decreased to ????. Our comments in this regard provided earlier are as follow:

"As for the Aerosols (YHCP) project it should be noted that the programs for Russia and Ukraine were developed in 1994-95, i.e. well before the severe economic downturn which hit CEIT countries. YHCP has followed the same trend and its operations were much larger during the time of the Soviet Union and also a few years afterwards. This is why the "installed capacity" at YHCP is much larger than what the last few years of CFC consumption may lead to believe. Taking this into account, it is of utmost importance for the Armenian economy, that this enterprise be assisted just as their competitors in neighboring countries which also received GEF assistance.

It should be noted that under the MLF 110 investment projects were approved in the Aerosols sector so far, of which 9 were in Low Volume Consuming countries (LVC) and with a threshold above US$4.4/kg. Most recent case approved for Burundi had a cost effectiveness of US$14.7/kg. We therefore propose to reduce the project cost of YHCP to the highest cost effectiveness value already approved under the MLF (US$14.7/kg) and we will try to work with the enterprise so that the budget would become US$210,210 (14,300kg x 14.7US$/kg = US$210,210). This proposal was found acceptable by the GEFSEC, and we have contacted the enterprise and found that they were willing to proceed with this funding level.

SUPPLEMENT TO REVIEW ON SAGA, ARMENIA

INTRODUCTION

These comments were written after discussion with the consultant (Risto Ojala) who is developing the project. They are to be used in conjunction with the earlier comments on this project, dated 7/03/2002. R Ojala will change the project document to reflect the comments below.

TECHNOLOGY

The enterprise is aware that the CO_2 (water) based polyurethane technology does not give the optimum insulating properties. The optimum insulation value is not critical for its products. Furthermore, the use of the high-pressure dispenser, giving a more homogeneous foam, is likely to compensate for much the reduction in insulation value.

PROJECT COSTS

The item for production trials and formulation optimisation will be reduced from $5,000 to $3,000 to reflect the low foam consumption of the enterprise. It is agreed that the training amount be retained at $5,000 due to the low technical capability of the enterprise. The technology transfer/technical assistance item should be retained at $10,000 due to the relative inaccessibility of the enterprise.

The amount allocated for the purchase of a high-pressure dispenser ($80,000) will be reduced by 30% to reflect the age and low technical capability of the base-line equipment.

The items are now better understood by the reviewer and the $15,000 refers to the electrical supply and not the mixing head and chiller.

RECOMMENDATION : Approval.

M Jeffs
8/03/2002 UNDParmeniaSAGA2

Subject: VS: Commercial ref. project in Armenia
Date: Thu, 7 Mar 2002 22:22:09 +0200
From: "Risto Ojala" <risto.ojala@pp.inet.fi>
To: "Mike F Jeffs" <mike_f_jeffs@huntsman.com>
CC: "Jacques Van Engel" <jacques.van.engel@undp.org>, <yerzhan.aisabayev@undp.org>, <lambermp@wxs.nl>

Dear Mike,

Further to our discussion over the phone I would like to agree / clarify following:

1. Saga is presently using stationary mixer, which can be considered almost zero baseline. Therefore, and in line with our phone conversation, we will reduce budget so that Saga needs to participate with 30% shouldering for this item.

2. Enterprise is aware that the water based PU foaming technology is not giving the best insulation properties to the PU foam. However, most of their products do not really require optimum insulation properties and thicker insulation can be used in the critical areas/products. Hence, lambda-value
is not really seen as a big issue, and in particular, the resulting foam, when using high pressure dispenser, will be much more homogeneous and resulting insulation properties are not too far from the insulation
properties obtained, when using the stationary mixer with the CFC-technology.

3. We agree also that trials/technology transfer/formulation optimization is on the upper side. Therefore," PRODUCTION TRIALS & FORMULATION OPTIMIZATION" cost will be reduced to USD 3,000. Training needs to be kept at proposed level of USD 5,000 due to the low technical capability of enterprise. The "TECHNOLOGY TRANSFER/TECHNICAL ASSISTANCE" includes also travel, therefore, is foreseen that all USD 10,000 is required for successful implementation of this project.

Your note for a separate entry of USD 15,000 for the chiller and mixing head is most probably mistake from your side or the lines must have jumped during printing the document. The USD 15,000 is for "ELECTRICAL SUPPLY FOR HP FOAMING UNIT" and necessary for upgrading the electrical supply for almost 50 kW HP foaming machine.

In line with our phone discussion I will change the project document accordingly.

Thanks and best regards
Risto Ojala