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

Eighteenth Meeting
Vienna, 22-24 November 1995

PROJECT PROPOSALS: THAILAND

This document includes the Comments and Recommendations from the Fund Secretariat on the following projects:

Refrigeration

- Phase-Out of CFC-11 in the Manufacturing of Equipment for the Food and beverage Industry at Siam Stainless Steel Co. Ltd. World Bank

Solvents

- Conversion of precision cleaning processes from CFC-113 to aqueous and alternative solvent cleaning and conversion of insulator applications from CFC-113 to perfluorocarbons at Thai CRT Company Ltd World Bank
- Conversion of metal cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at BKJ Engineering Co. Ltd World Bank
- Conversion of plastic lens cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to aqueous cleaning at Crystal Lens Corporation Limited World Bank

**PROJECT EVALUATION SHEET
THAILAND**

SECTOR: REFRIGERATION ODS use in sector (1991): 700 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial refrigeration US \$15.21/kg.

Project Title: Phase-Out of CFC-11 in the Manufacturing of Equipment for the Food and beverage Industry at Siam Stainless Steel Co. Ltd. *

Project Data	Commercial Refrigeration
	Siam Stainless Steel
ODS phase-out (ODP tonnes)	14
Proposed project duration (Yrs)	4 months
Incremental capital cost (US\$)	237,000
Contingency (%)	0
Incremental operational cost (US\$)	92,400
Total project cost (US\$)	329,400
Local ownership (%)	100
Export component (%)	0
Amount requested (US\$) { Original	212,900
{ Revised	212,900
Cost effectiveness (US\$/kg)	15.21
National Coordinating Agency	DIW
Implementing Agency	WB
Technical review completed?	Yes

Secretariat's Recommendations	
Amount recommended (US \$)	212,900
Project impact (ODP tonnes)	14
Cost effectiveness (US \$/kg)	15.21
Implementing Agency support cost (US\$)	27,677
Total cost to Multilateral Fund	240,577

* New proposal to the 18th Meeting.

PROJECT DESCRIPTION

Phase-Out of CFC-11 in the Manufacturing of Equipment for the Food and beverage Industry at Siam Stainless Steel Co. Ltd.

1. ODS consumption in the commercial refrigeration sub-sector is estimated at 700 MT. There are several medium and many small size enterprises manufacturing a wide range of commercial refrigeration equipment..
2. Siam Stainless Steel company produces a variety of equipment for the food and beverage industry. Each year, it produces more than 1,000 commercial refrigeration units consuming 12 MT of CFC-11 and 2 MT of CFC-12.
3. Under the project, the company will convert to HFC-134a as a refrigerant and to cyclopentane as a blowing agent.
4. Costs related to conversion to HFC-134a refrigerant will be born by the company itself.
5. Conversion to cyclopentane will involve procurement of pre-mixing station, cyclopentane storage tank as well as provision of required safety measures and training.
6. The company has a new high pressure foaming machine which can be retrofitted for cyclopentane operations. The company has chosen to purchase a larger size piece of equipment so as to expand its capacity and to sell the available high pressure machine. Incremental costs, however, are calculated on the basis of retrofitting the existing foaming machine.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven.
2. The Secretariat discussed with the World Bank the eligibility and incrementality of all cost items.
3. The resold high pressure machine could be used by another enterprise in Thailand in CFC-11 operations. The enterprise in turn, could submit a project for replacing the resold machine.

RECOMMENDATIONS

1. The Fund Secretariat recommends approval of the project with associated support costs at the funding level shown in the table below:

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
Phase-Out of CFC-11 in the Manufacturing of Equipment for the Food and beverage Industry at Siam Stainless Steel Co. Ltd.	212,900	27,672	World Bank

2. The Fund Secretariat further recommends that the World Bank should take the necessary steps through its project appraisal and implementation process to ensure that the old high pressure machine will not be used in another enterprise's CFC-11 operations.

**PROJECT EVALUATION SHEET
THAILAND**

SECTOR: **SOLVENT** ODS use in sector (1991) 3,270 ODP tonnes

Sub-sector cost-effectiveness thresholds: CFC-113 US \$19.73/kg
 TCA (methyl chloroform) US \$38.5/kg
 Mixed N/A

Project Titles:

- (a) Conversion of precision cleaning processes from CFC-113 to aqueous and alternative solvent cleaning and conversion of insulator applications from CFC-113 to perfluorocarbons at Thai CRT Company Ltd.*
- (b) Conversion of metal cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at BKJ Engineering Co. Ltd.*
- (c) Conversion of plastic lens cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to aqueous cleaning at Crystal Lens Corporation Limited*

Project Data	CFC-113	TCA	Mixed
	Thai CRT	BKJ	Crystal Lens
ODS phase-out (ODP tonnes)	5.04	6.67	1.86
Proposed Project Duration (Yrs)	Implemented	0.75	0.5
Incremental capital cost (US \$)	982,730	261,475	103,170
Contingency (%)	-	15	15
Incremental operational cost (US \$)	60,230	(99,312)	(68,530)
Total project cost (US \$)	1,042,960	162,163	34,640
Local Ownership (%)	70	100	100
Export component (%)	20	-	-
Amount requested (US \$) {Original	102,442	192,082	41,030
{Revised	102,442	192,082	41,030
Cost Effectiveness (US \$/kg)	19.73	27.96	21.0
National Coordinating Agency	DIW	DIW	DIW
Implementing Agency	World Bank	World Bank	World Bank
Technical Review Completed?	Yes	Yes	Yes

Secretariat's Recommendations			
Amount recommended (US \$)	99,440	186,487	39,830
Project Impact (ODP tonnes)	5.04	6.67	1.86
Cost effectiveness (US \$/kg)	19.73	27.96	21.0
Impl. Agency Support Cost (US \$)	12,927	24,243	5,178
Total Cost to Multilateral Fund	112,367	210,730	45,008

* New proposal to the 18th Meeting

PROJECT DESCRIPTION

- (a) Conversion of precision cleaning processes from CFC-113 to aqueous and alternative solvent cleaning and conversion of insulator applications from CFC-113 to perfluorocarbons at Thai CRT Company Ltd.

1. This project has eliminated the use of CFC-113 in the cleaning of electron gun parts used in the manufacture of television picture tubes at Thai CRT Company Ltd. It also eliminated the use of CFC-113 as a dielectric in the testing of picture tubes. Thai CRT is the first manufacturer of cathode ray tubes (CRT) and colour picture tubes (CPT) in Thailand. The phaseout of CFC-113 in cleaning applications has been accomplished by replacing the current vapour degreasing cleaning process with both an aqueous-based and a solvent-based cleaning process. CFC-113 is also used as an insulator when parts are tested using high voltage. The use of CFC-113 in this application has been accomplished by substituting the use of perfluorocarbons (PFCs) but effective technologies to minimize losses will keep consumption to only 50 litres per year.

- (b) Conversion of metal cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at BKJ Engineering Co. Ltd.

2. This project will eliminate the use of 1,1,1-trichloroethane (TCA) in the cleaning of a wide variety of both large and small parts prior to heat treatment at BKJ Engineering Co., Ltd. BKJ is a 100 percent Thai-owned company that performs heat treatment services for a number of product manufacturers. The company receives parts to be treated from product manufacturers, and must remove oils, grease, dust and dirt from the parts prior to heat treatment. The phase-out of ozone depleting solvents (ODS) will be accomplished by replacing the current TCA dip tank with an aqueous-based cleaning process. Facilities for treating the aqueous effluent are included in the project.

- (c) Conversion of plastic lens cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to aqueous cleaning at Crystal Lens Corporation Limited

3. This project will eliminate the use of CFC-113 and 1,1,1-trichloroethane (TCA) in the cleaning of eyeglass lenses at Crystal Lens Corporation Limited. Crystal Lens is a 100% Thai-owned company that manufactures plastic lenses of various sizes for use in eyeglasses. There are two separate cleaning processes to be replaced at Crystal Lens. The first is the use of CFC-113 to clean the molds used to form the lens. Contaminants typically removed in this process include grease, fingerprints, and excess monomer. The second cleaning process currently uses TCA to remove grease and excess monomer from the mold while the lens is being formed and before the mold is opened. The phase-out of ozone depleting solvents (ODS) will be accomplished by replacing the current CFC-113 and TCA cleaning processes with two separate aqueous cleaning processes.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Fund Secretariat notes that in the Thai CRT Company project, flammable solvents are able to be used without resort to extensive safety measures and explosion-proofing throughout the plant through the use of well-designed equipment providing virtually zero leaks. This technology should be examined for use in future projects involving either flammable solvents or solvents which could pose a health risk to workers to enable their safe use at minimum cost.

2. Projects (a) Thai CRT, (b) BKJ Engineering and (d) Crystal Lens Corporation Limited, include a financial contribution by each enterprise. The Fund Secretariat considers that incremental costs to the level of grant sought are eligible. However, the Fund Secretariat makes no comment on the validity or otherwise of the total level of incremental costs included in the project submissions.

RECOMMENDATIONS

1. The Fund Secretariat recommends approval of the projects with associated support costs at the funding level shown in the table below:

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Conversion of precision cleaning processes from CFC-113 to aqueous and alternative solvent cleaning and conversion of insulator applications from CFC-113 to perfluorocarbons at Thai CRT Company Ltd	99,440	12,927	World Bank
(b) Conversion of metal cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at BKJ Engineering Co. Ltd	186,487	24,243	World Bank
(c) Conversion of plastic lens cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to aqueous cleaning at Crystal Lens Corporation Limited	39,830	5,178	World Bank