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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirty-fifth Meeting
Montreal, 5-7 December 2001

PROJECT PROPOSALS: KOREA DPR

This document consists of the comments and recommendations of the Fund Secretariat on the following project proposals:

Solvent:

• Conversion of cleaning installations from carbon tetrachloride (CTC) to aqueous and solvent cleaning techniques at the Gumsong Tractor Factory (GST)	UNIDO
• Conversion of cleaning processes from CTC to aqueous and solvent cleaning techniques at Huichon February 26 Factory (HUI)	UNIDO

PROJECT EVALUATION SHEET
KOREA, DPR

SECTOR: Solvent ODS use in sector (2000): 1,065 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Titles:

(a) Conversion of cleaning installations from carbon tetrachloride (CTC) to aqueous and solvent cleaning techniques at the Gumsong Tractor Factory (GST)
(b) Conversion of cleaning processes from CTC to aqueous and solvent cleaning techniques at Huichon February 26 Factory (HUI)

Project Data	**CTC**	**CTC**
	Gumsong Tractor	**HUI**
Enterprise consumption (ODP tonnes)	198.00	209.00
Project impact (ODP tonnes)	198.00	209.00
Project duration (months)	24	24
Initial amount requested (US $)	2,996,766	3,334,827
Final project cost (US $):		
Incremental capital cost (a)	2,115,400	2,355,950
Contingency cost (b)	211,540	235,595
Incremental operating cost (c)	57,901	-1,445
Total project cost (a+b+c)	2,384,841	2,590,100
Local ownership (%)	100%	100%
Export component (%)	0%	0%
Amount requested (US $)	2,384,841	2,590,100
Cost effectiveness (US $/kg.)	12.04	12.39
Counterpart funding confirmed?	Yes	Yes
National coordinating agency	National Coordinating Committee for Environment	
Implementing agency	UNIDO	

Secretariat's Recommendations		
Amount recommended (US $) Project impact (ODP tonnes) Cost effectiveness (US $/kg) Implementing agency support cost (US $)		
Total cost to Multilateral Fund (US $)		

SECTOR BACKGROUND

1. The latest consumption reported in the solvent sector in DPR Korea is 1,065 ODP tonnes for the year 2000. Of this, the consumption of CTC is 1045 ODP tonnes. Two projects are under implementation with a phase out yet to be achieved of 68 ODP tonnes of CTC. The CTC consumption yet to be addressed in the solvent sector is 977 ODP tonnes.

PROJECT DESCRIPTIONS

Conversion of cleaning installations from carbon tetrachloride (CTC) to aqueous and solvent cleaning techniques at the Gumsong Tractor Factory (GST)
Conversion of cleaning processes from CTC to aqueous and solvent cleaning techniques at Huichon February 26 Factory (HUI)

2. UNIDO has submitted for consideration at the 35th Meeting of the Executive Committee two projects for the solvent sector in Korea, DPR. The projects cover the conversion of cleaning processes at two enterprises, namely, Gumsong Tractor Factory (GST) and Huichon February 26 Factory (HUI).

Gumsong Tractor

3. GST is a large state-owned enterprise involved in the production and maintenance of bulldozers and tractors. In 2000, the enterprise consumed 198 ODP tonnes of CTC in the cleaning of engines, gearboxes, pumps and other metal parts. The overall production for the same year was 650 new units and repair/overhaul of an additional 3,500 tractors and bulldozers.

4. The consumption of CTC will be phased out by converting to aqueous and trichloroethylene (TCE) based cleaning systems. The technical requirements of the new cleaning processes require that the existing cleaning machines, mostly conveyorised hot-CTC spraying and dipping machines, be replaced. The main capital cost items of the project as submitted are 8 aqueous alkaline tunnel cleaners (US $1,359,600), 11 TCE-based vapour degreasers (US $738,100), a water jet precision cleaner (US $89,100), one solvent recovery unit (US 33,000), rebuilding of conveyor/hoist systems (US $100,000) and an enclosed steam cleaner system (US $22,000). Incremental costs for the TCE cleaners and the water jet cleaner include a 50% allowance for technological upgrade. Capital costs for installation, trials, training and safety equipment are also requested. Incremental operating costs due mainly to higher electrical power requirements and higher costs for chemicals are requested for a period of four years at US$ 152,298.

Huichon Factory

5. HUI is also a large state owned enterprise. It produces machine tools and engine and other machinery parts for trucks. The enterprise consumed 209 ODP tonnes of CTC in the year 2000. The overall production at HUI for the year 2000 was 1.3 million parts.

6. The consumption of CTC will be phased out by converting to aqueous and trichloroethylene (TCE) based cleaning systems. The technical requirements of the new cleaning processes require that the existing cleaning equipment be replaced. The existing cleaning machines range from Chinese-made conveyorised hot-CTC spraying machines and ultrasonic vapour cleaning machines to large numbers of CTC tanks. The main capital cost items are 11 closed solvent cleaners (US $1,232,000), 12 aqueous alkaline cleaners (US $1,281,900), a water jet precision cleaner (US $134,200), a chemical effluent treatment plant (US $77,000) and a solvent recovery unit (US $33,000). Where the new TCE cleaners replaced open tanks, a 50 percent allowance for technological upgrade has been included in calculation of incremental capital costs. Capital costs for installation, trials, training and safety equipment are also requested. Incremental operating costs for four years of US $88,529 are sought.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

7. In each enterprise, consumption is reported to have increased in the last two years by up to a factor of 3. The Secretariat sought additional corroboration as to the level of activity in the enterprises and thus the level of consumption, and suggested that information be provided on a number of indicators. UNIDO provided detailed information on one indicator in particular, namely numbers of employees used in the cleaning workshops, to indicate the increase in the level of operations.

8. Detailed information was provided in the project document on baseline equipment and on machinery and parts to be cleaned. UNIDO also provided detailed explanations on the capacity proposed to be funded for conversion, indicating that it was less than the nominal baseline capacity and was related to the maximum seasonal throughput being experienced by the enterprises at their current level of operations. The Secretariat's review has been based on the assessments of capacity needs indicated in the project document, noting that capacity estimates for industrial cleaning are always difficult to undertake and can depend significantly on the quality of the information provided by the enterprise concerned.

9. The project document specifies the use of low emission cleaning machines. To justify the essentiality of these, the project document quotes new regulations in DPRK which apply to the use of the replacement solvent chosen by UNIDO for these projects, namely TCE. Letters provided by UNIDO from the DPRK Ministry of Metal and Machine Industry indicate that DPRK "did not appreciate the seriousness of the toxicity of chlorinated solvents until this was brought to their attention by UNIDO and UNEP".

10. In this regard, it is noted that TCE has solvent properties very similar to those of CTC. So much so that in many cases, TCE could be used as a drop-in replacement for CTC in the existing equipment and tanks with generally equivalent results. Furthermore, TCE would be arguably less harmful to the health of the operators in the two enterprises than the CTC now in use, without any improvements in equipment design to reduce exposure. However, TCE is also hazardous, and virtually all developed countries have established maximum operator exposure levels for the solvent. Many of these are around 50 parts per million (ppm). A small number of

countries has adopted the very low level of 5ppm now specified in DPR Korea. Consequently, the funding proposed in this project is based principally on the provision of an adequate standard of health in the workplaces of the enterprises.

11. The calculation of incremental operating costs for all the new machines were reviewed to take account of both technological upgrade and of new-for-old replacement. Modifications were made to the costs as submitted to take account of upgrade for the water jet cleaner and new-for-old replacement where aqueous systems were installed. Technological upgrade was also applied to all TCE machines where these replaced CTC spray cleaners or simple tanks.

12. Proposed costs for test equipment at the Gumsong factory were removed because the equipment was not present in the baseline. Agreement was reached on operating requirements and subsequent amendments to calculation of incremental costs for all other capital equipment items including safety costs.

13. Discussions on the level of reductions in solvent consumption after conversion resulted in recalculation of incremental operating costs. Incremental operating costs for GST were reduced to US $57,901. At HUI, incremental operating savings over four years of US $1,445 are estimated.

14. The cost effectiveness of each project as submitted was almost US $16 per kg. The Secretariat noted that previous projects for CTC conversion in Korea were at US $3/kg and, later, US $9/kg. UNIDO provided some technical perspectives to support the higher figures in these projects, however after taking full account of technological upgrade, new-for-old replacement and savings from reduced solvent use after conversion, the final project costs are:

GST: US $2,384,841 plus support costs of US $272,333; C/E US $12.04/kg

HUI: US $2,590,100 plus support costs of US $253,109; C/E US $12.39/kg

RECOMMENDATIONS

The Executive Committee might wish to consider the two projects on the basis of the information provided above.
