



**United Nations  
Environment  
Programme**

Distr.  
LIMITED

UNEP/OzL.Pro/ExCom/43/40  
10 June 2004

ORIGINAL: ENGLISH



EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Forty-third Meeting  
Geneva, 5-9 July 2004

**PROJECT PROPOSAL: NIGERIA**

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

Solvent

- Terminal ODS phase-out umbrella project in the solvent sector (first tranche) UNIDO

**PROJECT EVALUATION SHEET  
NIGERIA**

SECTOR: Solvent ODS use in sector (2003): 198 ODP tonnes  
 Sub-sector cost-effectiveness thresholds: TCA US \$38.50/kg  
 CTC n/a

**Project Titles:**

(a) Terminal ODS phase-out umbrella project in the solvent sector (first tranche)

Project Data	Solvent
	Terminal Umbrella
Enterprise consumption (ODP tonnes)	198.00
Project impact (ODP tonnes)	198.00
Project duration (months)	36
Initial amount requested (US \$)	650,000
Final project cost (US \$):	
Incremental capital cost (a)	
Contingency cost (b)	
Incremental operating cost (c)	
Total project cost (a+b+c)	2,924,000
Local ownership (%)	100
Export component (%)	0
<b>Amount requested for first tranche (US \$)</b>	<b>650,000</b>
Cost effectiveness (US \$/kg.)	18.20
Counterpart funding confirmed?	
National coordinating agency	Federal Ministry of Environment
Implementing agency	UNIDO

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

## PROJECT DESCRIPTION

1. The Government of Nigeria has submitted for consideration by the Executive Committee at its 43<sup>rd</sup> Meeting a terminal ODS phase-out umbrella project in the solvent sector. Implementation of the project will lead to the phase-out of the 167 ODP tonnes of CTC and 31 ODP tonnes of TCA, which represents the remaining consumption of these substances in the country. The funding requested is US \$3,606,000. The project has been prepared with funding of US \$70,000 approved for UNIDO at the 30<sup>th</sup> Meeting in March 2002.

### CTC and TCA consumption

2. The Table below shows the consumption of CTC and TCA in Nigeria between 1999 and 2003. The baseline consumption for compliance of CTC is 152.8 ODP tonnes and for TCA 32.9 ODP tonnes.

	1999	2000	2001	2002	2003
CTC (ODP tonnes)	151	147	143	141	167
TCA (ODP tonnes)	33	33	31.5	31	31

3. For the preparation of the terminal umbrella project, UNIDO engaged a local firm to gather relevant data on major CTC/TCA users in Nigeria. Questionnaires were sent to enterprises of the Manufacturers Association of Nigeria (paints, adhesives, pharmaceuticals, industrial machinery and metal parts), the dry cleaning industry and other CTC/TCA end-users. However, only a limited number of enterprises reported data. Subsequently, through the assistance by the Ozone Unit and the Chemical Society of Nigeria, a number of CFC/TCA users were identified. It is indicated that most of the enterprises identified were audited by the Ozone Unit.

4. CTC and TCA users in Nigeria include the following industries:

- (a) SMEs manufacturing cleaning fluids and related chemical products. CTC and TCA are used as the basis for mixtures of chemicals that remove grease and adhesives from metal and stains from cloth and leather. The production process is relatively simple and consists of mixing and stabilizing of the various chemical components in mechanical mixers followed by quality check and packaging;
- (b) Industrial cleaning contractors that supply cleaning services to large factories (power stations, petroleum producers, refineries and breweries). TCA and CTC are used as cleaning agents for cleaning machinery and buildings. Other enterprises that refurbish old machineries use CTC or TCA in their cleaning operations;
- (c) Larger corporations (Peugeot Automobile Nigeria, a large auto parts and battery manufacturer, and the Scientific Equipment Development Institute) use TCA and CTC to clean metallic parts, glass and ceramics. Existing cleaning machines range from highly sophisticated to locally assembled machines. Trichloroethylene is also utilized in addition to TCA and CTC in the large enterprises; and

- (d) Many dry cleaning workshops are using perchloroethylene instead of CTC; however, there are still others using CTC because of its performance to remove stains. In these workshops, CTC is poured into the cleaning machine designed for perchloroethylene or directly on to fabrics before machine cleaning.

5. Paint manufacturers are no longer using CTC and/or TCA in their processes. CTC might be used in the textile industry to remove any stain on fabric products. Some textile manufacturers reported no consumption of ODS solvents while others were reluctant to provide information regarding their processes. Therefore, users in the textile industry were not included in the terminal umbrella project.

6. The distribution of CTC and TCA by industry is summarized in the following table.

	Manufacture	Industrial cleaning	Parts cleaning	Dry cleaning	Corporate users	Total
CTC (ODP tonnes)	85.8	9.4	33.0	16.5	22.0	166.7
TCA (ODP tonnes)	15.6	3.4	10.3	-	2.0	31.3

7. The Government of Nigeria is developing legislative measures to secure the sustainability of the phase-out of CTC and TCA. The project proposal indicates that Nigeria considers it essential that the present terminal phase-out project plan be in place as soon as possible to enable Nigeria to meet its 2005 Montreal Protocol obligations for the consumption of CTC and TCA.

#### Non-ODS solvent technologies

8. The possible alternative technologies proposed for Nigeria are:

Application	ODS	Alternative (*)	Major measures
Manufacture	CTC	TCE, PER, HC, MP	Development of new formulation
	TCA	TCE, PER, HC, MP	Development of new formulation
Industrial cleaning	CTC	TCE, PER, HC, MP	Development of new formulation
	TCA	TCE, PER, HC, MP	Development of new formulation
Parts cleaning	CTC	aqueous alkaline	Ultrasonic cleaning machines
	TCA	aqueous alkaline	Ultrasonic cleaning machines
Dry cleaning	CTC	PER	Modifications to workshops
Corporate user	CTC	TCE	Modification of cleaning machines
	TCA	TCE, aqueous alkaline	Modification of cleaning machines

(\*) TCE, trichloroethylene; PER, perchloroethylene; HC, hydrocarbon; MP, methylpyrrolidone.

9. The final selection of technologies is proposed to be based on suitability for local conditions and to be consistent with the priorities of the Government and the industrial sector to ensure long-term sustainability. Additional surveys will be conducted to ensure participation of the maximum number of enterprises and to assess the specific needs at the enterprise level to phase-out ODS solvents (i.e., modifications to baseline equipment, needs for new equipment, technical assistance and training).

10. Technical assistance will be provided to develop adequate formulation of chemical products with non ODS solvents, to make relevant modifications to the baseline production equipment, to modify existing workshop layouts, to identify the feasibility of replacing current solvent cleaning with aqueous cleaning in some industries, and to enhance the ventilation systems.

11. Workshops for personnel of participating enterprises will be organized by the Ministry of Environment, in collaboration with UNIDO, on aspects relevant to the conversion, including alternative technologies and the ODS legislation in Nigeria. Similar workshops will also be organized for officials of relevant Ministries dealing with ODS issues at both the federal and provincial levels, to ensure effective implementation of the project.

#### Cost of the project

12. The total cost of the project, as submitted is US \$3,606,000 (US \$18.18/kg). The project proposal indicates the following cost breakdown (by industry and by project component):

Item	Industrial Sector					Total (US \$)
	Manufacture (US \$)	Industrial cleaning (US \$)	Parts cleaning (US \$)	Dry cleaning (US \$)	Corporate user (US \$)	
Formulation development	370,000	85,000	60,000	-	-	515,000
Modification to production/service facility	1,110,000	85,000	-	150,000	-	1,345,000
Ultrasonic cleaning machines	-	-	900,000	-	-	900,000
Modification of cleaning machines	-	-	-	-	300,000	300,000
Total cost	1,480,000	170,000	960,000	150,000	300,000	3,060,000

Project component	Requested Cost (US \$)		
	2004	2005	Total
Capital cost	500,000	2,560,000	3,060,000
Workshops and awareness	110,000	50,000	160,000
Re-survey and auditing enterprises	20,000	10,000	30,000
Consultancy services	10,000	10,000	20,000
Project monitoring and report	10,000	20,000	30,000
Contingency	0	306,000	306,000
Total project cost	650,000	2,956,000	3,606,000

#### Project implementation structure

13. The Ozone Unit will be the leading agency for project implementation in cooperation with relevant industrial associations, enterprises covered under the project and other relevant institution.

14. The Ministry of Environment of Nigeria (through the Ozone Unit) will be responsible for the overall coordination of the project. The Ozone Unit will assign relevant institutes or national experts for implementation of each step of the project proposal.

15. Procurement of major equipment will be carried out according to the rules and procedures of UNIDO, in cooperation with the Ministry of Environment. The detailed terms of reference for the supplies and services to be provided under the project will be elaborated after project approval and be sent to the counterpart enterprises. After competitive bidding, performed according to UNIDO's financial rules and procedures, contractors/suppliers will be appointed by UNIDO for the implementation of the project components.

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

#### Issues related to ODS solvent consumption

16. The Secretariat raised with UNIDO a number of issues related to the ODS solvent consumption in Nigeria. Specifically, the project document indicated in detail the existing impediments to data collection, but concluded that data reported are consistent and reasonably reliable. Information was requested on the activities undertaken to determine the consumption of CTC and TCA at the level of enterprises or groups of enterprises, because the data reported in the project proposal was presented only on a geographic basis: i.e., no consumption figures were provided for any of the user industries listed, even the corporate users or the industry groups. Also, additional information was requested about the import, national and enterprise level consumption of non-ODS and ODS solvents indicating how the distinction between the two types of solvents had been made. Enterprises frequently use both ODS and non-ODS solvents. Identification of the type of solvent used is not straightforward when it is incorporated into a cleaning product and this can lead to inaccuracies in the determination of ODS consumption and use at the enterprise level, leading to uncertainties in determination of the eligibility of requested funding.

17. In the project as submitted the Secretariat was unable to assess eligibility for funding at the enterprise level, since there was no indication given for any specific enterprise that it is a consumer of ODS. Additional information on enterprise-level consumption was requested.

18. UNIDO reported that almost all ODS solvent users in Nigeria are small consumers (average consumption of CTC and TCA of 0.5 to 3 metric tonnes per annum). Considering that the majority of the users are SMEs, the project was prepared in the form of several group projects. In the process of the survey conducted for the preparation of the project proposal, detailed consumption data and information was collected from enterprises. UNIDO stated that the ODS consumption data from enterprises that mix and sell cleaning products (formulators) are reliable as they are based on the quantity of products sold. Since some of the consumption is from stocks, the data was carefully analyzed in order to compare it with data reported by the Government of Nigeria under Article 7 of the Montreal Protocol. Average consumption of CTC

and TCA for sub-sectors in the various geographic areas was determined based on these original data and the information of the industrial structure in the country.

19. Regarding the usage of TCE and PER, UNIDO indicated that import and export data on these solvents are not easily available from customs as they are not controlled substances; also, the survey undertaken in 2003/2004 did not specifically target TCE and PER and as a result UNIDO could not provide reliable data on them. However, the survey has revealed that some enterprises are using non-ODS solvents (TCE and PER) on a trial basis, and most of enterprises claimed that they were not as effective as CTC and TCA. According to discussions with the industry in Nigeria, TCE and PER are less available particularly in the east and south-east regions where a larger number of SMEs are established.

#### Structure of the sector

20. The Secretariat pointed out that the industrial structure described in the project is basic, comprising cleaning solvent formulators with relatively simple production processes, end-users and enterprises that refurbish old machinery and clean it with CTC sprays or in open baths. Little information about the baseline of the enterprises covered by the project proposal was provided or the date when the enterprises were established. The Secretariat indicated that if costs for conversion of these enterprises were to be assessed, then more definition of the baseline status of the enterprises would be needed, including dates of installation of cleaning machines that are proposed for replacement/retrofit. Subsequently, UNIDO submitted a table listing the enterprises that had been surveyed during the preparation of the project proposal; for each enterprise, the equipment baseline and ODS solvent consumption was provided and the costs of conversion were estimated.

21. It is reported in the project that the dry cleaning shops are presently using CTC and will switch to use of PER (a less hazardous substance), with no change of equipment. The Secretariat pointed out that no capital costs should be requested and noted that so far, no funding has been specifically approved for conversion of dry cleaning equipment in this sector. UNIDO advised the Secretariat that the requested funding was to be used for modification to improve the ventilation systems. However, these costs would not be claimed and the phase-out of CTC in dry cleaning workshops would be achieved through the technical assistant component.

#### Issues related to costs

22. The Secretariat noted that the overall incremental cost proposed was similar to the cost-effectiveness threshold for CFC-113, established principally on the basis of conversion of machinery for the vapour degreasing of metal or electronic parts. However the industrial structure in Nigeria is entirely different to that upon which this thresholds was based, i.e., the majority of the sectoral activity appears to be firstly by formulators of cleaning liquids, who appear to be preparing formulations mainly for hand cleaning or other non-equipment related purposes and secondly by the end-users themselves, in the form of companies providing cleaning services, who are likely to be using the formulators' products. Furthermore, no basis had been provided in the proposal for establishing the incremental costs for any of the activities proposed. The Secretariat also noted that the cost structure as proposed appeared to result in double counting because funding is for both the formulators and for the users of the same formulations.

23. On the basis of the comments raised by the Secretariat, UNIDO reviewed the project proposal and made a number of adjustments to costs. The requested cost of the project as revised is US \$2,924,000 with a cost effectiveness of US \$14.80/kg.

24. The Secretariat is analysing the additional information that was provided by UNIDO on enterprise equipment baselines and ODS solvent consumptions in order to assess the eligible incremental cost of the phase-out of ODS solvents in Nigeria. Additional information will be provided on the outcome of the discussions with UNIDO, in accordance with the requirements of Decision 41/80.

## **RECOMMENDATIONS**

25. Pending.

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