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PROJECT PROPOSAL: VIETNAM

This document includes the following project proposal:

- Conversion to Hydrocarbon Aerosol Propellant Technology at Saigon Cosmetic Company

UNDP

PROJECT PROPOSAL

COUNTRY: VIETNAM

PROJECT TITLE: Conversion to Hydrocarbon Aerosol Propellant Technology at Saigon Cosmetics Company

SECTOR COVERED: Aerosols

ODS USE IN SECTOR: 200 m.t. CFC-12 (200 tons ODP in 1994)

PROJECT IMPACT: Phase out 80 m.t. per year of CFC's (80 m.t. ODP in 1994)

PROJECT DURATION: 18 Months

PROJECT ECONOMIC LIFE: 10 Years

TOTAL PROJECT COST:

Capital Cost	US\$ 418,200.00
Minus net operation savings	75,443.00
Total	\$ 342,757.00

PROPOSED MF FINANCING: U.S. \$ 342,757.00

PROJECT COST EFFECTIVENESS: Grant Effectiveness - US \$ 4.28/kg.
Unit Abatement Cost 0.55 /kg.

COORDINATING NATIONAL BODY: Hydrometeorological Services (HMS)

IMPLEMENTING AGENCY: United Nations Development Program

APPRAISAL DATE: March 1995

PROJECT SUMMARY

Saigon Cosmetics is a large public sector company manufacturing many different cosmetics for the domestic market, including an extensive line of aerosol perfumes and colognes. Sales are about 5,000,000 units per year.

This project will address the equipment needs and installation modifications required to fill hydrocarbons safely. Major items included an aerosol filling machine, a water bath, a modular safe gassing room, and storage tanks for HAP's which must be imported. A complete fire protection system will be installed. There is foreign technology and an extensive training program is also incorporated.

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Reviewed by: Harry McCain, UNDP Technical Reviewer

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PROJECT OF THE GOVERNMENT OF VIETNAM

CONVERSION TO HYDROCARBON AEROSOL PROPELLANT (HAP) TECHNOLOGY
AT SAIGON COSMETICS COMPANY

1. PROJECT OBJECTIVE

To phase out the use of 80 tons of CFC-12 annually by converting Saigon Cosmetics products from CFCs hydrocarbon propellants.

2. SECTOR BACKGROUND

Vietnam imports all CFC's. Due to the closed nature of the Vietnamese economy, no aerosol filling technology has entered the country, and current filling is done in a completely outmoded fashion, which is adequate for the use of hydrocarbons.

The Vietnamese aerosol market is estimated at over 6,000,000 units; and CFC usage in aerosol is believed to be above 200 metric tons, in accordance with the Country Program for ODS phaseout. This is mostly CFC-12. Some HCFC 22 has been observed, and it is being used because it was available in the marketplace when CFC-12 was not. The market breakdown would appear to be:

Perfumes and colognes	5,800,000	units/yr.
Hair Spray	<u>350,000</u>	units/yr.
Total	6,150,000	

3. ENTERPRISE BACKGROUND:

Saigon Cosmetics is a large public sector (capital 100% Vietnamese) making an extensive line of cosmetics, including aerosol perfumes and colognes. Their products are sold nationwide, and distribution is excellent. The market survey done in Ho Chi Minh City found their products everywhere. They include the "Jackson" brand for men and the "Saigon" and "Miss Saigon" products for women. sales prices are very low under or at US \$ 1.00 per bottle which has led to very high sales.

They reported a sale of about 5,800,000 units per year consumption of about 80 m.t. (1994) of CFC-12 used as propellant. They make their own aerosol valves. Filling is done manually. They reported two sites for filling; one site on the third floor of their offices in the center of Ho Chi Minh City was visited. They had 10 manual filling machines working in two groups of five each with a rotary crimper, 20 ml to 100 ml. uncoated glass bottles were being filled. This site alone could, in theory, fill the 5,000,000 bottles reported.

They reported having a plant site far outside the city where they can install HAP's filling.

4. PROJECT DESCRIPTION:

Under the project, Saigon cosmetics will eliminate the use of CFC-12 by switching to Hydrocarbons Aerosol Propellants (HAPs) . For this, an automatic 40 cpm pneumatic filling line is needed, along with an air compressor (30Hp), water bath to test the finished aerosol bottles, and a safe room for filling the hydrocarbon propellant. Pucks will be used to control the bottles. The enterprise accepts that they will destroy the old filling apparatus to avoid its future use for CFC's. Scrap value is negligible. Conveyors will transport the cans outside, where they would be gassed in the modular safe gassing room, and then returned to the main plant for water bath testing and finishing.

Any machinery for filling will constitute a technology upgrade. The recommended machine is the smallest possible that can fill 5,800,000 bottles per year on a 2 shift basis. Three shifts would result in little savings and definitely increase risks. A one shift operation would be better from a safety standpoint but increase investment substantially.

ADDITIONAL EXPENSES INCLUDE:

- Three 6,000 gallon (12,000 kilogram) "isotainers" for ocean transporting of the hydrocarbon propellant.
- Two transport conveyors to take cans to and from the gassing room
- One 25,000 litre storage tank to off load the HAPs from containers.
- A fire control (fire fighting) system will be installed. A water reservoir will be constructed and a fire fighting system established with a high pressure pump, hydrants, hoses, etc. More fire extinguishers will be purchased.
- Technical services will include quality gauges for testing, a foreign safety specialist for training the plant personnel and on-going safety audits, and a specialist for formulations assistance. Because of the very rudimentary technology available, this will have to be a very extensive technical support program.

5. JUSTIFICATION FOR ALTERNATE TECHNOLOGY SELECTION:

Hydrocarbon aerosol propellants have been the principal alternatives to CFC-12 and CFC-11-12 blends employed worldwide. They are approved by the 1993 UNEP Technical Options Report on Aerosols. Sterilants and Miscellaneous Uses and Carbon Tetrachloride. At this time they are the principal acceptable alternate for substituting CFC's as aerosol propellants.

Aerosol grade hydrocarbon propellant (HAPs) is not available in Vietnam. This project is predicated on imported HAPs from Europe, Japan,

or the USA.

6. PROJECT COST:

6.1 Capital Cost

The total project incremental cost of \$ 429,200.00 is itemized below:

No.	Quant	Description	Cost USD
1.	1	Automatic pneumatic straight line aerosol filling machine (40 cpm with these very small bottles) with 2 liquid fillers, 1 vacuum filler, and 2 gassers	80,000
2.	1	Explosion proof modular gassing room (complete with water bath, conveyor system, gas detection system, ventilation and exhaust system)	115,000
3.	2,000	Pucks (5 Sizes)	10,000
4.	lot	Piping	5,000
5.	1	30 HP Air Compressor	12,000
6.	3	6,000 gallon (12,000 kilogram) "Isotainer" container	90,000
7.	1	New 22,000 litre gas tank, complete with LPG compressor, fence tank farm construct driveway	25,000
8.	lot	Site preparation for HAPs tank, safe room	6,000
9.	lot	Reservoir, fire control, pump and sprinkler system	15,000
10.	1	Set of Quality Control Gauges (crimp height, crimp diameter, pressure, vacuum	3,200
11.	1	Portable gas detector	1,000
12.	lot	Formulation assistance (1 trip)	8,000
13.	lot	Plant safety training/monitoring/audit	10,000
		Sub-Total	380,200
		10 % Contingency	38,000
		Sub-Total	418,200

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6.2 RECURRING COSTS/SAVINGS:

There are substantial savings involved in this project, and also large increases in costs.

SAVINGS:

The following is the cost per bottle calculation for the savings involved in the conversion of the "Saigon" perfume product.

Cost per can calculation			30 ml. (27 ml. full) Presentation = 24 grams with CFC					
CFC Product			HAP's Product					
Material	%age	cost /gm.	gram used	cost/ can	%age	cost/ gram	grams used	cost/ gram
Perfume	10.0	.07	2.40	.168	12.00	.0700	2.40	0.168
Alcohol	65.0	.0006	15.60	.009	63.00	.0006	12.60	0.008
CFC	25.0	.003	6.0	.018				
HAPs					25.00	.0020	5.00	0.010
Totals	100.0		24.00	.195	100.0		20.00	0.186

Saigon is still working on the formulation aspects of this project. The above calculation is based on;

- Volumetric fill is maintained. Their bottles are 90% full now. Weight is not a factor with small heavy odour in the HAPs.
- Perfume is maintained the same (therefore increased on a weight basis) to compensate for a residual odour in the HAPs.
- The landed cost of HAPs may be far higher than expected there is no certain manner to predict this. The risk is entirely Saigon Cosmetic's.

Based on 5,800,000 cans per year, this savings amounts to US \$ 52,200.00 per year.

COSTS:

All cost concerning HAPs are reflected in the cost of the propellant used in "Savings" above and are thus already included. There

are still two additional costs.

The largest cost increase in total plant insurance. This typically effects the entire plant area, not just the aerosol filling section, and this is a very large plant. As Saigon has no proper aerosol filling plant now, there is no baseline to use to easily calculate this, and without the existence of the new facilities no quotation can be obtained. The estimate is that this will increase about \$ 20,000.00 per year.

The other increase is in staff. At least three position will have to be staffed for Saigon Cosmetics to fill aerosol safely with pneumatic equipment head of maintenance, safety manager and quality control inspector. None of these positions currently exist, and unnecessary to fill CFC's manually. The estimate of costs are US \$ 300.00, \$ 250.00 and \$ 150.00 per monthly respectively, totalling US \$ 700.00 per month or \$ 8,400.00 yearly.

The total for these two concepts is US \$ 28,400.00 per year.

SUMMARY - Calculation of Net Operating Savings and Cost:

The cost increases over 4 years are deducted from the calculated savings, giving a net savings of 23,800.00 for four years (23,800 X 4 = \$ 95,200). The net present value of this amount at a discount rate of 10% is US \$ 75,443.00 which is deducted from the grant amount.

TOTAL NET INCREMENTAL Cost:	US\$ 418,200
	75,433
Total	\$ 342,757

6.3 PROJECT COST EFFECTIVENESS:

6.3.1 COST EFFECTIVENESS:

Total MLF Grant:	US\$ 342,757
ODP Phaseout:	80,000 tons
Cost Effectiveness:	\$ 342,757 / 80,000 = \$4.28/kg.

6.3.2 UNIT ABATEMENT COSTS:

The calculated unit abatement costs for this project is \$ 0.55/kg, calculated as follows:

Using the formula $A = \frac{C(F)}{W} + (OC - OS)$

Where C=	\$ 418,200.00	OC=	28,400.00
(C)F=	\$ 67819.00	OS=	52,200.00
F=	0.16217	W=	80,000

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Doing the calculation, unit abatement cost = \$ 0.55 per kg.

7. FINANCING PLAN:

The enterprise requests payment of the net incremental cost relating to this conversion, which amounts to US \$ 342,757.

8. IMPLEMENTATION:

The project will be implemented, in 4 phases during 6 quarters:

TASK	1Q	2Q	3Q	4Q	5Q	6Q
Purchase filling equipment /room	XXX					
Formulations assistance / Safety Training			XXX			
Install machine, safety Training				XXX	XXX	
Start-up / Testing/ Safety Training						XXXX

Commissioning - UNDP will oversee the successful implementation of this project in collaboration with the government of Vietnam, and will provide technical assistance during project execution.

9. REQUIRED REGULATORY ACTIONS:

Once all aerosol manufacturers have had an opportunity to convert, and once the technical expert contracted to do the training had certified that plant personnel are fully trained, the use of CFC in aerosols in Vietnam should be prohibited by the GOV.

10. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The substitute propellant, a mixture of butane and propane, does not damage the ozone layer. It does not contribute to acid rain, nor is it carcinogenic, mutagenic, or toxic. This mixture is a volatile organic compound (VOC) that contributes somewhat to ground level contamination. This mixture does have a global warming potential, albeit very low.

Hydrocarbons are extremely flammable, and explosive. The storage of the hydrocarbon propellants must be accomplished by strict adherence to the National Fire Protection pamphlet # 58 Standard for the

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Storage and Handling of Liquefied Gases or to some other national or foreign authoritative regulation.

The controlling concept for the proper handling of LPG is to minimize the risk of ignition to the vapour. Safety plans must be in place in the aerosol filling to assure that no accidents occur with this propellant.

11. PROJECT IMPACT:

The project will result in the immediate reduction of a minimum of 80 m.t. of CFC-12 in the first year, and potentially much more due to the rapid growth of the enterprise.

AEROPRES

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June 12, 1995

TO : Ms. Laurence Reno
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FROM : Harry B. McCain
Vice President-Technical Services
Phone: 318-429-6736 / Fax: 318-429-6739

1. **Country of origin:** Vietnam
2. **Project title:** Saigon Cosmetics Company Conversion
3. **Sector/sub-sector:** Aerosols
4. **Relationship to country programme**
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 1994 approximately 3 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 Western Europe and the U.S.A. using the free market system.
 - (i) No technology transfer agreement is required.
 - (ii) There is no licensing agreement required.

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- (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 result in the phaseout of 80 tons/year of CFC-12 and CFC-11/12 (ODS). Global warming potential is negligible. Unit Abatement Cost is \$0.58/Kg U.S.
- (b) Costs are appropriate to minimize health and safety and other environmental impacts.

7. Project costs

- (a) The cost for three isocontainers 6,000 gallons each is quoted at \$90,000. This is incorrect. A high-pressure isocontainer suitable for the transport of hydrocarbon aerosol propellant costs \$40,000 U.S. each. Therefore, the true cost is \$120,000 and not \$90,000. Additional cost, approximately \$1,500 each, would be required to transport the isocontainer from its manufacturing site to the HAP manufacturer for the first filling for shipment to Vietnam. Consequently, this cost for the project should be increased by \$34,500 U.S.
- (b) There are no cost components present that will facilitate the conversion to hydrocarbon aerosol propellants.
- (c) Cost of equipment
 - (i) See Item 7(a) above (cost of [3] isocontainers).
 - (ii) The reviewer agrees with the finding that all of the base line equipment in the report should be acquired.
 - (iii) No additional equipment requests are essential for the conversion.
 - (iv) All of the base line equipment will necessarily have to be replaced.
 - (v) The old equipment will be destroyed once the new equipment is installed.
 - (vi) The equipment, if destroyed, would have no salvage value.
 - (vii) With the installation of new equipment, one may expect a slight increase in capacity at Saigon Cosmetics Company.
- (d) Training costs are appropriate, although the number of persons to be trained per the \$10,000.00 U.S. was not given.
- (e) Operating costs
 - (i) The operating costs are appropriate.
 - (ii) There is a net operating cost savings of \$75,443 that is to be subtracted from the capital cost.
 - (iii) This cost savings is reasonable, based on other similar projects.

8. Implementation time frame

The time frame of six quarters is appropriate.

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9. **Recommendations**

- (a) This project is approved after a cost modification for the purchase of isocontainers, discussed in Item 7(a) of this report.
- (b) The report states that Saigon Cosmetics **reportedly** has another facility outside of Ho Chi Minh City. Since relocation is mandatory for this project, the reported facility must be confirmed.

OORG/UNDP Technical Reviewer: Harry B. McCain

Date Review Completed: June 12, 1995

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