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Addendum

PROJECT PROPOSALS: MALAYSIA

Please insert the attached Annex II at the end of document UNEP/OzL.Pro/ExCom/28/37.

Annex II

JUSTIFICATION FOR THE USE OF HCFC-141B
(Extract from the Project Document)

NOTE FROM THE SECRETARIAT

As indicated in paragraph 3 on page 4 of the project evaluation (UNEP/OzL.Pro/ExCom/28/37), justification for the use of HCFC-141b based on technological and economic analysis was provided in each project. The seven Malaysia rigid foam projects for conversion to HCFC-141b were prepared by two consultants. One consultant prepared three projects each for UNDP (FMCP, PKL and Thermo Cooling) and UNIDO (Automated Plastics, Chong Brother and Perniaagan Hower). The remaining project (Polyedge Trading) was prepared by another consultant for UNDP. The analysis and justification provided in the six UNDP and UNIDO projects are similar. Therefore the description in one of the six project documents (Thermo Cooling Engineering) and that of Polyedge Trading have been submitted as samples. The others , if required, will be provided on request.

Phase-out of CFC-11 and R502 consumption at Thermo Cooling Engineering SDN. BHD.

During the formulation mission on 12 March 1999, the expert discussed the different technology options in detail with the enterprise. In it's evaluation of the technology options to replace CFC-11, Thermo Cooling Engineering SDN. BHD. considered the following criteria:

- Environmental acceptability
- Physical properties
- Maturity of the technology
- Safety and applicability in the enterprise factory environment
- Price, product availability, and cost-effectiveness
- Energy efficiency impact
- CFC-11 replacement technology selected by competitors
- MLF EXCOM decisions relating to HCFC and hydrocarbon technologies

To assist the enterprises in the selection of a CFC-11 replacement technology, separate project budgets were prepared for the HCFC-141b, and cyclopentane, technology options.

Whilst recognising the environmental benefits of cyclopentane versus HCFC-141b, Thermo Cooling Engineering SDN. BHD. selected HCFC-141b as a first stage, interim, replacement for CFC-11. The decision in favour of HCFC-141b was based on the better insulation value, lower investment and operational costs, and the fact that it is more appropriate to the existing skill levels of the work forces at these enterprises.

Thermo Cooling Engineering SDN. BHD. understands the implications of the selection of HCFC-141b technology, and the potential cost of subsequent replacement of HCFC-141b at an undetermined future date. They accept and commit to a future change from HCFC-141b to a zero-ODP technology, and that they will have to bear all of the associated costs.

Other factors also influenced the enterprise decisions in favour of HCFC-141b technology:

- HCFC-141b is the technology adopted by most of their existing, or potential, competitors in Malaysia and South East Asia. With no local supplies, no other local demand, and their own very small requirements, the enterprises were concerned about both product availability, and the price of pentanes in Malaysia.

- Whilst MLF EXCOM decisions relating to CFC-11 replacement technology selection may "presume" against the use of HCFCs, such HCFC based technologies are not prohibited and may still be considered eligible for MLF assistance. Department of Environment (DOE), the responsible Malaysian Government counterpart, supports the selection of HCFC-141b as an “interim” CFC replacement technology at Thermo Cooling Engineering SDN. BHD..

- Thermo Cooling Engineering SDN. BHD. expressed concerns regarding the longer term safety issues related to the introduction of a flammable blowing agent technology into their factory environment and their choice at the present time is a non-flammable CFC replacement.

Water blown foam formulations do not yet represent a commercially available option and technically this technology does not meet the Thermo Cooling Engineering SDN. BHD.’s requirement on insulation value/energy efficiency for Cold Room insulation applications. At the present time, liquid HFC technology does not meet the criteria on maturity and commercial availability of the technology. However, liquid HFC technology is considered a likely zero-ODP candidate to replace HCFC-141b in the time frame of 2003 – 2005 subject to successful results from ongoing toxicological and environmental impact studies.

The selection of HCFC-141b technology by the enterprises as the immediate replacement for CFC-11 is a realistic and sensible choice under the prevailing circumstances. The enterprises understand that HCFC-141b is an interim solution that will require a change to an appropriate zero-ODP technology at some future date. Based on the present status of non-flammable zero-ODP technologies, they expect to utilise HCFC-141b technology until approximately 2005.

Polyedge Trading - Conversion from CFC-11 to HCFC-141b Technology in the Manufacture of Rigid Polyurethane Foam (Spray and blocks)

ODS phase-out technologies for rigid polyurethane foams in thermal insulation applications are:

CLASSIFICATION	LIQUID TECHNOLOGY	GAS TECHNOLOGY
LOW ODP TECHNOLOGIES (“INTERIM”)	HCFC-141b HCFC-141b/HCFC-22	HCFC-22
NON-ODS TECHNOLOGIES (“PERMANENT”)	(CYCLO)PENTANE, WATER, LIQUID HFCs (-365,-245fa)	HFC-134a

The selection of the alternative technology is governed by the following considerations:

a) Proven application and reasonable maturity of the technology
b) Cost effective conversion, in view of one-time as well as recurrent costs
c) Local availability of substitute, at acceptable pricing
d) Support from the local systems suppliers
e) Critical properties to be maintained in the end product
f) Meeting established standards on environment and safety

HCFC-141b has an ODP of 0.11. Its application is proven, mature, relatively cost-effective and systems that fit the enterprise's applications are locally available. HCFC-141b can, however, be destabilising in higher concentrations, being a strong solvent, which would lead to the need to increase the foam density. As an interim option, its application would only be recommended if permanent options do not provide acceptable solutions.

HCFC-22 has an ODP of 0.05 and is under ambient conditions a gas. It is not offered in the applicable regional area as a premixed system and would require an on-site premixer.

HCFC-141b/HCFC-22 blends can reduce the solvent effect of HCFC-141b alone and therefore allow lower densities while maintaining acceptable insulation values. The blends are, however, not available in the region. On-site multi-component blending would significantly increase the one-time project costs. In addition, the technology is not proven for PIP applications. Being an interim option, the same restrictions as for HCFC-141b would apply.

Hydrocarbons are a preferred solution only when feasible from a safety and cost effectiveness standpoint. The relatively high investments for safety costs tend to limit pentane use to relatively large CFC users. In addition, the use of pentane is limited to those enterprises whose facilities can be adapted to meet safety requirements, and can be relied on to maintain safe operations.

Water-based systems are more expensive (up to 50%) than other CFC-free technologies due to reductions in insulation value (requiring larger thickness) and lower cell stability (requiring higher densities). Water-based formulations tend to be most applicable in relatively less critical applications, such as in situ foams and thermoware. In PIP for insulation applications, while in principle feasible, it would require an increase in panel thickness, which is not practical or cost effective. Where insulation is not the primary function of the foam, water-based foams can be effectively implemented. In spray foam, while in principle feasible, it is reported that the current technology does not yet allow for overhead spraying and is therefore of limited applicable.

Liquid HFCs do not currently meet requirements on maturity and availability. Trials show that systems based on these permanent options would be feasible in both spray foam and PIP applications. In case of HFC-245fa, the use of high pressure equipment may be required in tropical countries to cope with the low boiling point.

HFC-134a is under ambient conditions a gas. It is not offered in the applicable regional area as a premixed system and would require an on-site premixer. It is not suitable for spray foam applications. It is also less energy efficient, and expensive compared to most other technologies.

For spray foam, the only option commercially available in Malaysia is HCFC-141b. For boxfoam, theoretically, n-pentane could be used. Besides being very expensive, the fact the Polyedge cuts the blocks almost immediately and sparks from the cutting operation could be a source of considerable danger, does not allow the use of this substance. Therefore, the selection for all operations is HCFC-141b.

The enterprise has been informed of the available technical options, and has accepted this recommendation. It has also been informed that HCFC's are transitional substances, and that under present Multilateral Fund rules, they will not be able to seek additional funding from the MPMF at a later date to convert to zero-ODP technologies.