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Addendum

PROJECT PROPOSALS: THAILAND

Sector: Foam

Please insert the attached Annex I after page 5 of document UNEP/OzL.Pro/ExCom/28/43.

Sector: Foam

Annex I

JUSTIFICATION FOR USE OF HCFC-141B TECHNOLOGY

(Extract from the Project Document)

NOTE FROM THE SECRETARIAT:

Two projects to be converted to HCFC-141b technology (Arco Industry Co. and Makassan Metal Works) were submitted by the World Bank for Thailand. The justification for use of HCFC-141b is similar both project documents. Therefore the text in one of the projects, Makassan Metal Works, has been reproduced below as a sample. The justification for the other project, if required, will be provided on request.

Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works.

The presently available ODS phase-out technologies for *rigid polyurethane insulating foams* are:

CLASSIFICATION	LIQUID TECHNOLOGY	GAS TECHNOLOGY
LOW ODP TECHNOLOGIES (“INTERIM”)	HCFC-141b HCFC-141b/22	HCFC-22, -142b HCFC-22/142b
NON-ODS TECHNOLOGIES (“PERMANENT”)	(CYCLO)PENTANE, WATER, HFC-365, HFC-245fa	HFC-134a

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

a) Proven and reasonably mature technology
b) Cost effective conversion
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 Makassan’s applications are locally available. HCFC-141b can, however, be destabilizing in higher concentrations, being a strong solvent, which would lead to the need to increase the foam density. Being 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. Its insulation value is somewhat less than with HCFC-141b.

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 Thailand. On-site blending would significantly increase the one-time project costs. Being an interim option, the same restrictions as for HCFC-141b would apply.

(CYCLO-)PENTANE meets all selection criteria, except that local availability. The use of hydrocarbons is a preferred solution 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. Pentane technology is cost-prohibitive (at least $450,000 in capital costs, plus costly layout modifications would be required). Even if the capital investment were to be undertaken, there will remain grave safety concerns associated with the use of pentane at the very crowded facility.

WATER-BASED systems are an alternative in cases where pentane is not feasible due to safety concerns, cost efficiency or availability. Water-based systems are, however, 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). They are also currently not available in the regional area. Water-based formulations tend to be most applicable in relatively less critical applications, such as in situ foams and thermoware.

LIQUID HFCs do not meet requirements on maturity and availability.

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 also less energy efficient, and expensive compared to most other technologies.

Based on the before mentioned, the only viable option for the enterprise at this point is HCFC-141b. Therefore, it is recommended to employ HCFC-141b as an interim solution. Water-based technology or liquid HFCs can follow this in the future. The equipment replaced under this project allows these technologies without further adaptations. Intensive contacts with local systems houses to introduce water-based systems indicate that such systems may be available in the 2-3 year time frame.

The enterprise 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.