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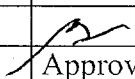
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<b>Cannon</b> polyuretane technology	DOC N.	CR98/103
	Object	Phasing out of CFC's at NRC
	Contract	UNIDO N. 97/098

## FINAL REPORT

### RETROFITTING OF THE REFRIGERATOR CABINET AND DOOR FOAMING PLANTS FOR THE REPLACEMENT OF CFC WITH CYCLOPENTANE AS BLOWING AGENT

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A	27/04/99	FIRST ISSUE	M. BARALE		
Rev.	Date	Description	Prepared	Controll.	Approv.

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## 11. INTRODUCTION

With the present document the Contractor wants to describe the works performed at the plant site for the conversion of the National Refrigeration Company factory to phase out the use of CFC in the production of Domestic Refrigerators

Here below it is briefly summarised the activities performed under the Contract step by step according to The terms of Reference

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## 2. LAY OUT OF THE PLANT /REDISIGN OF EXISTING

After the award of the order the Contractor visited the Counterpart between May 10<sup>th</sup> and 11<sup>th</sup> 1997 in order to verify the conditions of the site and to identify the best engineering solutions for the conversion of the existing foaming lines.

During the visit, the Contractor discussed and checked with the Counterpart the following main subjects:

A - Technical details regarding the supply of the equipment; in particular The Contractor emphasised the Premix Unit, the Polyol and Isocyanate Module, Safeties of the plant (as i.e.: gas sensors, exhaust system with fan groups), cyclopentane storage tank and relevant accessories .

B - The suitable site where the new equipment had to be installed and the required modification to the new layout.

Regarding the C5 storage tank, The Contractor inspected and defined the area where it had to be positioned.

After the visit the Contractor prepared the first progress report including the preliminary lay-out and the Basic requirements and specifications for the site Preparation.

The first progress report covered all the subjects listed during the discussion and gave to the Counterpart, as much as detailed as possible at that phase of the project, a list of all the works and materials to be provided by them.

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### 3 REDISIGN OF EXISTING EQUIPMENT/ AWARD OF SUBCONTRACT FOR MODIFICATION OF THE PLANT

In October 1997 the Contractor provided the Final Technical Documentation for the Conversion of the plant.

The above mentioned documentation included the following kind of detailed drawings and specifications:

- civil works for the storage tank and foaming lines
- grounding of the equipment
- piping arrangements and support details
- piping sketches
- box buildings construction
- ventilation construction
- cable run lay-out
- gas sensor positioning
- electrical drawings
- safety requirements

All the documentation was discussed with the Counterpart and some modifications have been agreed during the next period.

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#### 4. DELIVERY OF EQUIPMENT/INSTALLATION

In December 1997 all the new equipment have been shipped.

A team of engineers attended the training at Contractor site ( abroad)

The installation started in May 1998 , after the customs clearance of all the equipment.

The Contractor engineers followed the installation phase with the supervision of the job at Counterpart charge.

The Contractor's actions basically concerned the following zone of the modified plant:

- Cyclopentane storage tank area
- Wet area
- Process fluid connection piping between wet and dry areas
- Cabinets /doors foaming areas

The installation phase was completed in July 1998

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## **5. COMMISSIONING. TRIAL PRODUCTION OF THE FIRST MODELS, TEST RUN OF PRODUCTION**

After the installation phase the Contractor performed the Commissioning phase of the modified plant in accordance with the contract.

In November 1998 the commissioning phase has been completed.

The training on the job activities has been carried out during the commissioning phase

The commissioning , trial production and test run phases mainly concerned the following operations:

- Pneumatic and Electric circuit check
- Grounding check
- Flushing of the tanks and the piping with nitrogen
- Pressure test
- Check of the operating sequences
- Operating test
- Service simulation test
- Setting start-up parameters
- Foaming quality check
- Performance test

The training on the job activities has been carried out during the commissioning phase.

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## 6. SAFETY CERTIFICATION

The safety inspection was performed in July and October 1998 by TUV ULM .  
Enclosed please find the TUV final report and the TUV safety certificate.



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## 7. STARTING MASS PRODUCTION

After the commissioning phase the Contractor performed the starting of the mass production in February 1999.