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FINAL REPORT

Project No.: MP/CRO/04/023

Project Title: Establishment of a Reuse Scheme
for Refrigerants for the Terminal Phase-
out Management Plan for CFCs (TPMP)
in Croatia

Contract No.: 2005/123

Purchase Order No: 16000878

Project Leader:

Dean

Tonko Ćurko, Ph.D.

Prof. Izvor Grubišić, Ph.D.

Zagreb, December 2006

SYNOPSIS

This paper presents the Final Report on performance of the obligations for "Establishment of a Re-use Scheme for Refrigerants" as indicated in the Paragraph 3. of the Contract No. 2005/123.

Basis for the provision of the contract services is Terms of Reference dated 14 July 2005 and the Contractor's Proposal dated 23 August 2005.

Considering Contract No. 2005/123 and Terms of Reference that are mentioned above, FMENA as the Contractor considers all services completed.

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1. INTRODUCTION

Final Report considers all relevant data for the execution of the Contract No. 2005/123.

Activities that were involved in the project are in accordance to the work plan and time schedule table and includes:

- Coordination with Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC)
- Establishment of cooperation with the servicing industries
- Logistics coordination regarding establishment of a reclamation facilities
- Development of a website.

2. THREE DAY RRR TRAINING

Contribution to the organization and execution of a three day RRR training workshop.

The training was organized at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, in the premises of the national RMP training center Split. Training of three national reclaim center (Rijeka, Split and Zagreb) staff on gas chromatograph, moisture meter and reclaiming machine was planed. Since Reclaim center Zagreb was not established till that moment, only technicians from reclaim centers Split (Frigomotors) and Rijeka (Electrolux) were present.

From FMENA two participants were present, Vladimir Soldo, PhD and Marino Grozdek, dipl. ing., both specialists in the field of refrigeration and air conditioning technologies. Since the official language was agreed to be English and some of the participants were not familiar with it, simultaneous translation was necessary and was provided by Mr. Marino Grozdek who also took the liberty to further explain technical details in depth. Both participants were wary interested in gas chromatograph technology, and during these three days became capable of operating it.

Technicians from reclaim center Split showed high competence in handling GC equipment and running tests. They gained full qualification through training.

Even though the two technicians from reclaim center Rijeka (Electrolux) were present during whole duration of training it wasn't completely useful for them, as they came unprepared. They were not previously instructed what kind of training they will attend, its duration and schedule, their tasks and responsibilities as a participants. Before training in Split they didn't saw GC, that was at that time (actually several weeks before) already distributed to Electrolux in Rijeka. In spite all, they gave their best and during these three

days they were acquainted with gas chromatograph technology but didn't become capable of operating it independently.

Upon revision of Electrolux licence (it will be proposed to the MEPPPC) and decision if they should continue operation as a regional reclaim center or not and after establishment of the third reclaim center Zagreb, additional workshop could be organized where the technical staff from reclaim centers Zagreb and Rijeka should be trained to operate the GC.

The workshop could be organized and executed by FMENA with the help of Frigomotors.

Finally, the three day training course was successful. Training curriculum is completely adequate (in means of duration and schedule, provided materials, equipment and competency of lecturers) for technicians with vocation in field of refrigeration to gain necessary knowledge and qualification in handling gas chromatograph, moisture meter and reclaiming machine.

3. CONSULTATIVE WORKSHOPS

FMENA have organized and executed four consultative workshops in Croatia. Workshops were held in four regional centers in Croatia, in city of Osijek, Rijeka, Split and Zagreb.

1. First one was organized on 17. November 2005 just after three day RRR training, at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split,
2. second on 21. November 2005 at the Faculty of Electrical engineering in Osijek.
3. third on 23. November 2005 at the Technical Faculty in Rijeka, University of Rijeka.
4. and the last one on 24. November 2005 at FMENA, Zagreb.

The workshops were organized in coordination with MEPPPC and regional RMP training centers. For each workshop 100 persons were invited (400 in total). The list of invitees were assembled of representatives from:

- servicing sector, technicians that have successfully finished national three day training course (RMP),
- representatives from industry, refrigeration and air-conditioning sector,
- trade,
- education, high schools and vocational schools,
- faculties,
- governmental agencies, MEPPPC Ozone Unit, MEPPPC Directorate for Inspection, MEPPPC Department for waste.

The Total number of participants that attended workshops was 153.

Number of participants at workshop in city of:

1. Split - 21
2. Osijek - 59
3. Rijeka - 29
4. Zagreb - 44

Even though 400 persons were invited 40% attended workshops. The reason for half response was really bad weather which hit Croatia that week and not indifference for the subject what can be concluded without due consideration. On the contrary it seems that workshops were complete success, since the information's given to the audience did not end there but were disseminated further. It can be derived from responses we were receiving each day regarding technical details on operation of the scheme, regulation etc.

During these workshops major issues were presented and discussed, i.e.

- the need to establish a reuse scheme in Croatia,
- different funding schemes from European and other developed countries, (Sweden, Norway, Australia)
- proposed and accepted funding scheme of the Government of Croatia,
- harmonization of Croatian to European legislation.

In addition new regulation on Substances Depleting Ozone Layer and Law on waste, Regulation on Categorisation of waste, Regulation on handling and treating the waste, Regulation on transport of waste and special waste, were presented to the audience in detail. In that way they were acquainted with existing regulations of their concern and their legal responsibilities.

Examination of special waste legislation was necessary, since it is major issue and key obstacle for successful establishment and operational Re-use scheme. Namely, the compressor oil and any other material contaminated with oil which is left after maintenance or service of refrigeration equipment is treated as a special waste. Emphasis is given on oil, oiled compressors and filters.

Each presentation ended with discussion which gave useful feedbacks in return. The most raised questions during workshops were:

1. Who are going to pay their extra effort invested during maintenance or service of refrigeration equipment, to be in compliance with Regulation and the Code of good practice? The industry and service sector are afraid of black market with dumping prices for the same activities, and again that only those who are in RRR scheme will be monitored and responsible for their actions.
2. Great quantities of refrigerants are released in to the atmosphere from domestic refrigerators and freezers from the moment of disposal on the streets and before the moment when it is picked and transported to disposal landfill by city waste management company. Namely, in Croatia once per year is allowed to leave bulky waste on streets, thus perfect opportunity to get rid of old refrigerators and freezers. Unfortunately in these time period of one hour between disposal and transportation to landfill, many refrigerators are dismantled for valuable copper material (bindings, tubes).
3. Many technicians are aware that installation of new split systems and air-conditioners are carried out by uncertified personnel by low prices.

4. ESTABLISHMENT OF A RECLAIM CENTER ZAGREB

For the time being two of three reclamation facilities are operational (Frigomotors - in Split, Elektrolux - in Rijeka), and the one in Zagreb, still is not. We have proposed to the Ministry of Environmental Protection three potential companies giving all necessary data, one of them to be the reclamation centre for the Zagreb region, but the contract is still not signed.

At this moment there are three possible companies to become regional RRR center, Frigo-plus, Beverages servis and MB Frigo.

Even though at end of October 2005. it was concluded, that company MB Frigo would not participate in Re-use scheme, after several meetings they have decided to stay in the procedure.

Several times we have tried to speed up the procedure in the Ministry (MEPPPC) but so far without success. Unfortunately it is out of our responsibilities.

However the action is in progress.

5. RE-USE SCHEME IMPLEMENTATION PROBLEMS

1. Waste handling.

Material which is left after maintenance or service of refrigeration equipment and is contaminated with compressor oil is treated as a special waste according to the Croatian legislation (Law on waste, Regulation on Categorisation of Waste, Regulation on Handling and Treating the Waste, Regulation on Transport of Waste and Special Waste). Since all components of refrigeration equipment are more or less contaminated with oil, compressors, filters, tubes, evaporators, valves, used cylinders, rags etc. they all falls under regulation on hazardous waste and therefore requires special treatment and licences by persons who are handling with it. Furthermore, since there is no regulation on limit of oil residues on compressor walls, used semi-hermetical and open type compressors, which are drained of oil and are still quite valuable material, are also treated as a special waste.

The most problematical articles in the Law on waste which imposes great obligations to one dealing with waste are:

Article 12. Waste producer who produces more than 200 kg of special waste in period of year is obligated to plan waste management for period of four years. The waste management plan includes:

- information's on categories, quantities, locations, i.e. on process of waste production and trend estimations of future waste production,
- measures for hindering or lowering the quantities of waste production,
- present and future way of waste treatment,
- information's on facilities and waste management equipment in possession

Article 31. The waste can be stored for period of one year in their own premises without special permits. In that case it is referred as "temporary storage". For more than one year, but not more than three years, one should have special permit from MEPPPC.

Article 40. In case when producer of special waste is delivering it to authorised persons it is obligated to submit them physical-chemical analysis of the waste. It follows that each service enterprise is obligated to make physical-chemical analysis of waste before is submitted to collector at least once per year. The analysis can be done only in certified laboratories and the cost is about 1.000,00 EUR per analysis, regardless of waste quantity.

This kind of regulation is currently blocking RRR scheme and behaviour in harmony with Code of good practice, i.e. it leaves technicians only one way, formation of second "back" storages, one official and one unofficial storage, which finally will produce counter effect.

In order to proper implement RRR scheme in Croatia it would be necessary to modify the legislation on waste for material contaminated with compressor oil.

2. Lack of dialog and coordination between creators of the law Department for waste, MEPPPC and executive body Directorate for Inspection, MEPPPC.

Laws are written and in force but the Ministry did not invest any extra effort to inform industry on new regulations in form of consultative workshops, pamphlets or any other form. Furthermore the RRR scheme is not fully functional yet. It means that register of persons and companies who are dealing with refrigerants is not complete yet. On the other side Directorate for inspection uses the same register to practice the law on these several registered enterprises which are playing by the book (Reclaim centers, larger enterprises) and not bothering with those that are not even registered but perform same activities (black market), since it is easy to find and fine those registered but difficult to find those who are not even existing.

3. Number of inspections and implementation of legislation on those who are not in the RRR scheme and should be.

Inspections should be carried on at installation sites, during service, maintenance and installation of refrigeration and air-conditioning equipment, i.e. during handling with refrigerants. The refrigerant needs to be forced to flow from the bottom to top, small enterprises to regional centers.

4. Infrastructure and shortage of re-usable cylinders.

In the new regulation it is clearly stated that recovered refrigerants shall be delivered to reclaim centers in re-usable cylinders, but there is no obligation on importers to distribute refrigerants in re-usable cylinders. From the other side it is clear that any service company working with recovery must have at least one recovery cylinder per refrigerant they are working with. From their perspective that means large initial investment.

The problem gets even more complicated while there is no standard on what kind of reusable cylinders should be used in RRR scheme. Reclamation in RRR centers will be difficult and inefficient if whole variety of cylinders types is going to be permitted for use. Therefore obviously some tacitly agreement on cylinder management should be accepted.

5. Certification of home made recovery units.

In the new regulation is clearly stated that each legal or natural person who performs activities of service/maintenance of refrigeration equipment, i.e. handle with refrigerants shall poses recovery equipment and by registration

shell submit proof of possession. Since on the Croatian market such recovery units costs from 600 to 1000 EUR many service technicians have no funds to afford it, but they are able to assemble it by themselves. Thus certificate of conformity for those home made recovery units will serve as proof of possession.

Before and during workshops number of coordination meetings with representatives of Ozon Unit, MEPPPC, Directorate for Inspection, MEPPPC and Department for Waste, MEPPPC were conducted during which above mentioned problems were discussed.

As a conclusion to these meetings number of constructive solutions are proposed:

6. PROPOSED SOLUTIONS

1. Hazardous waste material left during maintenance.

Since it is very difficult (in technical sense totally unpractical) and expensive to comply with current legislation on waste and special waste, in refrigeration and air conditioning sector, amendments to existing by law are proposed. Oils, compressors and all waste material left during service of refrigeration equipment could be handled as with refrigerants, i.e. it could be collected by Regional Reclaim centers who will be responsible to organize their disposal in accordance with current by-law. In this way technicians could be able to work by the book, and not spending time worrying if they will be fined or trying to find bypasses in law. Expensive physical-chemical analysis of waste oil will be made when needed for grater quantities on Centers request, and could be financed from environmental fee on refrigerants. In this way bond between service sector and centers will be even tighter.

To define limit of oil residues on compressor walls or other valuable used material, i.e. when this component could be treated as nonhazardous material.

2. Re-usable cylinders.

Each importer/distributor should sell refrigerants in re-usable cylinders. Subventions on re-usable cylinders will be placed.

Cylinder management for refrigerants could be formed as for propan-butan gas cylinders, while almost all the customers will be aware on these systems. Large volume cylinders could be used for temporary storage of refrigerants in workshops (26 – 40 litres) and for transportation to the regional reclaim centers. Upon submission of refrigerant, empty cylinder of the same volume will be received back. Smaller cylinders could be used for every day use and transportation (12 litres).

Agreement on standard volume shell be accepted.

3. Revision of Reclaim Center Rijeka (Electrolux).

4. Revision of Recovery center Osijek (Konikom).

If recovery center Osijek (Konikom) shows competence and strength to continue their work as a regional center, equipment for reclamation (GC – gas chromatograph, reclaim and moisture content measurement equipment) shall be provided for them in order to upgrade their status to reclaim center.

5. Usage of home made recovery units will be encouraged.

7. DEVELOPMENT OF A WEBSITE, DISSEMINATION OF INFORMATIONS

Website is formed and fully operational. Website is being upgraded and refreshed. Domain and location under which is placed are <http://www.fsb.hr/r-centar> and <http://www.fsb.hr/rmp>.

Active mail addresses are rmp@fsb.hr and r-centar@fsb.hr.

Article on TPMP project and held workshops was written and published in professional journal EGEE.

8. CONCLUSION

FMENA as the Contractor considered that obligations deriving from the Contract No. 2005/123 have been fulfilled. Also it may be considered that the purpose of the project as well as quality of performed services have met the contract requirements.