Workshop Report

Recovery & Recycling Seminar
St. Lucia

Organized by:
Government of St. Lucia
Environment Canada
United Nations Environment Programme (UNEP),
Division of Technology, Industry & Economics (DTIE)

Funded through:
Environment Canada’s bilateral contribution to the
Multilateral Fund for the Implementation of the Montreal Protocol

St Lucia 23 and 24 January 2002
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Executive summary

St Lucia’s recovery & recycling (R&R) programme is funded through Canada’s contribution to the Multilateral Fund for the Implementation of the Montreal Protocol and was approved at the 23rd Meeting of the Executive Committee for Environment Canada. UNEP manages the implementation on behalf of Environment Canada and provides technical and policy support.

The programme is part of a comprehensive approach to reduce the CFC consumption in the refrigeration-servicing sector. This approach is defined in St. Lucia’s Refrigerant Management Plan (RMP).

The main objective of the R&R programme is to create a R&R network for CFC refrigerants through the training of refrigeration technicians and trainers from the local training institutes in the use, maintenance and repair of R&R equipment and provision of such equipment to selected service workshops and R&R centers.

The programme consists of three phases: Phase I includes the design and documentation of the operational details of the R&R system and the preparation of a “R&R Presentation”, Phase II the R&R training seminar and Phase III the operation and monitoring of the R&R system.

The immediate result of the R&R training seminar is the availability of 30 trained senior refrigeration technicians and supervisors from selected service companies and 1 trainer from a technical training institute.

The long-term results will include the integration of R&R in the established training modules on good practices in refrigeration of the local training institute. These modules were created as part of the training programme on good practices in refrigeration, held in St Lucia in 1998. In addition, the consumption of virgin CFCs will be reduced and recovered & recycled CFCs will be made available for reuse. This will allow existing CFC equipment to run to the end of its economic life and contribute to a smooth transition to non-CFC technologies.

During the group discussions, the participants agreed on a set of recommendations for Phase III, the operation and monitoring of the R&R system, which will help ensure the participants’ commitment, support and ownership. The National Ozone Unit will consider how to implement the recommendations and how to establish a monitoring mechanism to ensure that the objectives of the R&R programme are met.

The workshop report will be disseminated to the participants and other stakeholders and placed on UNEP’s homepage at: http://www.uneptie.org/ozonaction.html.
1. Background

The recovery and recycling (R&R) programme is part of a comprehensive approach to reduce the CFC consumption in the refrigeration-servicing sector. This approach is defined in St. Lucia’s Refrigerant Management Plan (RMP).

The R&R programme is funded through Canada’s contribution to the Multilateral Fund for the Implementation of the Montreal Protocol and was approved at the 23rd Meeting of the Executive Committee for Environment Canada. UNEP manages the implementation on behalf of Environment Canada and provides technical and policy support.

St. Lucia’s RMP includes and prioritize activities such as public awareness raising, training and certification of service technicians, training of customs officers to prevent illegal trade in ozone depleting substances, the establishment of a national R&R system, policy and regulatory frameworks, data collection and control and monitoring of the CFC consumption.

To date, there have been 41 technicians trained on good refrigeration practices. It has been reported that some technicians have already purchased their own equipment and have been practicing R&R, even though there has been no official hand-over of equipment.

In general, the most important sector in developing countries in which ozone-depleting substances are used is the refrigeration sector, predominantly for the servicing of CFC-containing equipment. Yet, poor servicing procedures such as flushing and venting often lead to the release of significant quantities of CFCs directly into the atmosphere.

The release of CFCs during repair and servicing can be reduced and ultimately avoided through training in good practices in refrigeration and recovery & recycling. The consumption of virgin CFC refrigerants are reduced once recovered or recycled refrigerants are used for recharging of refrigeration systems instead of virgin refrigerants. The availability of recovered or recycled refrigerants will allow existing refrigeration systems to run until the end of their economic life and thus contribute to a smooth phase-out of CFC refrigerants. This is especially important once the availability of virgin CFC refrigerants is reduced through the import / export licensing system in order to meet Montreal Protocol targets. St. Lucia’s legislation aimed at restricting CFCs, was adopted in 2001.

However, the supply of R&R equipment and the establishment of the R&R system alone does not ensure the successful operation of the system. It must be supported by a regulatory framework including legal and voluntary measures as well as incentive schemes. A successful RMP will ensure that recovered or recycled refrigerants can compete economically with virgin refrigerants and that recovery & recycling is profitable for the individual service company as well as for the recycling centre.

An abrupt non-availability of CFC refrigerants in the future may adversely affect the operation of important industries, therefore, it is essential for CFC users to be able to reduce
and subsequently phase-out their consumption in a co-ordinated, planned and cost-effective manner. A combination of containment practices such as recovery and recycling and conversion to alternative technologies are expected to ease the economic consequences of the phase-out.

Training on good practices in refrigeration and an effective R&R programme combined with prudent retrofitting and timely replacement are part of the overall phase-out strategy and will assist St. Lucia in meeting the control measures under the Montreal Protocol - sustaining the freeze of Annex A CFCs from 1999 and the 50% reduction in 2005, the 85% reduction in 2007 and the phase-out in 2010.

2. Objectives

The main objective of the R&R programme is to reduce CFC consumption in the refrigeration and air-conditioning sector in St. Lucia and to assist the country in complying with the phase-out schedule applicable to CFCs under the Montreal Protocol by:

I. Increasing participants awareness about ozone depletion and the Montreal Protocol
II. Increasing participants awareness about the environmental and economic benefits of recovery and recycling of CFC refrigerant
III. Defining selection criteria for the selected service workshops and R&R centre.
IV. Training refrigeration technicians and trainers from the local training institutes in the use, maintenance and repair of R&R equipment
V. Transferring R&R equipment to the selected service workshops and R&R centres.
VI. Creating a R&R network for CFC refrigerants
VII. Stimulating the development of a network for information sharing throughout the sector
VIII. Helping the country to achieve the planned phase-out in a co-ordinated, planned and cost-effective manner
IX. Allowing existing CFC equipment to run until the end of its economic life by using recovered & recycled CFC refrigerants
X. Reducing the consumption of virgin CFC-12.

3. Expected results

The expected results of the R&R seminar include the achievement of the above mentioned objectives as well as:

- Availability of 30 trained technicians and 1 instructor from the local training institute in the use, maintenance and repair of recovery & recycling machines for CFC-12;
- Availability of 7 sets of recovery equipment, 1 set of R&R equipment and 3 sets of MAC R&R equipment in the country;
• Agreement on workshop recommendations on implementation of Phase III of the R&R programme.

The following assumption for successful project implementation are outlined in the RMP:

• R&R equipment includes 7 recovery units plus, 1 recycling unit and 3 MAC R&R units supplied by EC as part of this R&R project.

4. Participants

In total 31 participants attended the R&R seminar - 1 was a representative from the solid waste department, and 1 instructor from technical training institute. All other participants were required to have more than 5 years of relevant work experience.

The instructor for the workshop was Mr. Ron Verch of the Heating, Refrigeration and Air-conditioning Institute of Canada, who had already provided instruction for the train-the-trainers workshop on good practices in refrigeration in St. Lucia held in 1998 as part of the RMP.

The list of participants is attached as Annex B.

5. Methodology

The project is being implemented in three phases:

Phase I: Design and documentation of the R&R system

The R&R seminar required the preparation of a “R&R Presentation” describing the design, operational details and logistics of the R&R system. The Ozone Officer and a technical consultant prepared this presentation. Copies may be obtained from the NOU in St. Lucia.

Phase II: Organization of the 2-day seminar on use, maintenance and repair of R&R equipment

The training seminar addressed both the senior technicians and supervisors who are supposed to use the R&R equipment, as well as the local refrigeration trainer in order to make the training on R&R practices sustainable.

Most of the trainers had already participated in the 5-day training on good practices in refrigeration and had introduced themselves to the relevant modules in the training curricula of the local training institutes. Complementary information from the R&R seminar will be integrated into these training modules.
UNEP’s “Guidelines for Recovery & Recycling Systems”, “Guidebook for Implementation of Codes of Good Practices” and “Training Manual on Good Practices in Refrigeration” were used as resource documents.

During group discussions, the participants planned Phase III of the project – the operational and monitoring phase and prepared detailed workshop recommendations on the operation of the R&R system and its proper functioning. The agreed recommendations will help to ensure the involvement, ownership and support of all participants. They are included as Annex C.

A practical hands-on session was included in the seminar to apply the theoretical knowledge provided by the instructor and to practice the use of the different R&R equipment.

Each participant received a certificate of participation from Canada’s Heating Refrigeration and Air-conditioning Institute (HRAI).

The R&R equipment had not yet been handed over to selected service companies and the corresponding agreements established.

The workshop report will be disseminated to all participants. It will also be placed on UNEP’s homepage at:

**Phase III: Operation and monitoring of the R&R network**

The National Ozone Unit will co-ordinate, monitor and follow-up on the operation of the R&R system and prepare a follow-up report after completion of Phase II.

**6. Content**

The training agenda was designed to ensure that the objectives set out for the seminar (see Section 2) were achieved. The agenda is attached as Annex A.

The seminar included the following sessions:

- Session 1: St. Lucia’s RMP
- Session 2: Good reasons to recover & recycle CFC refrigerants
- Session 3: Design and functioning of the R&R system
- Session 4: Introduction to R&R equipment and tools
- Session 5: Use of recovered or recycled refrigerants
- Session 6: Practical sessions of R&R equipment and tools
- Session 7: Final discussion
- Session 8: Closing session
7. Results

The objectives set out for the seminar were fully met through the appropriate design of the workshop agenda whose sessions addressed all relevant issues.

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<th>RESULTS ACHIEVED</th>
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<td>I. Increasing awareness of ozone depletion issues</td>
<td>Fully - through Sessions 1 and 2</td>
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<tr>
<td>II. Increasing participants’ awareness about the environmental and economic benefits of recovery and recycling of CFC refrigerant</td>
<td>Fully – through Sessions 1 and 2</td>
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<td>III. Definition of selection criteria for the selected service workshops and R&amp;R centre</td>
<td>Fully - as part of the preparatory Phase I and the R&amp;R presentation</td>
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<td>IV. Training of refrigeration technicians in the use, maintenance and repair of R&amp;R equipment</td>
<td>Fully - through Sessions 4, 5 and 6</td>
</tr>
<tr>
<td>V. Transfer of R&amp;R equipment to the selected service workshops and R&amp;R centres</td>
<td>Fully - as part of the preparatory Phase I and the hand-over during Session 8</td>
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<td>VI. Creation of a R&amp;R network for CFC refrigerants</td>
<td>Potentially - through the availability of trained technicians and the hand-over of R&amp;R equipment</td>
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<tr>
<td>VII. Stimulating the development of a network for information sharing throughout the sector</td>
<td>Potentially - through the set-up of the R&amp;R system in Session 3 and the group discussions during Session 7</td>
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<td>VIII. Helping the country to achieve the planned phase-out in a co-ordinated, planned and cost-effective manner</td>
<td>Fully - through the implementation of the RMP as planned</td>
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<td>IX. Allowing to run existing CFC equipment until the end of its economic life by using recovered &amp; recycled CFC refrigerants</td>
<td>Potentially - subject to the availability of recovered and recycled refrigerant during the operational and monitoring Phase III</td>
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<td>X. Reduction of the consumption of virgin CFC-12.</td>
<td>Potentially - subject to the operational and monitoring Phase III</td>
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In addition, the following specific outcomes were achieved:

- Availability of 30 trained senior technicians and supervisors in R&R practices;
- Hand-over of R&R equipment, supplied by EC, including 7 recovery machines, 1 recovery & recycling machine, 3 recovery & recycling machines for MAC sector.
- Agreed workshop recommendations on implementation of Phase III of the R&R programme as included in Annex C.
• Enabling conditions for the establishment of an operational R&R system by promoting networking between the involved stakeholders and service companies participating in the R&R system.

8. Follow-up

The R&R programme is part of St Lucia’s RMP. As such, it will be accompanied by other RMP elements such as public awareness raising, training and policy development.

The NOU will establish a monitoring mechanism to ensure that the objectives of the R&R programme are met and will produce a follow-up report on the operation and performance of the R&R system after completion of Phase II.

The National Ozone Unit will consider and, as far as possible, implement the recommendations which were adopted by the seminar participants. They should also be communicated to the relevant decision-makers and politicians.

Annexes

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Annex A: Agenda

Lead Consultant: Mr. Ron Verch
Heating Refrigeration and Air-conditioning Institute of Canada (HRAI)

Wednesday, 23 January 2002

8:45  Registration of participants

9:00  Opening statement
Bishnu Tulsie, Sustainable Development and Environment Unit, Ministry of Planning, Development, Environment and Housing

9:10  Good reasons to recover & recycle CFC refrigerants:
- St Lucia’s phase-out obligation
- Impact of ozone depletion
- Profitability of R&R and pay-back time
- Availability of recycled CFC for service tail
- Discussion
Trainer Ron Verch

10:00 Coffee break

11:00 Design and functioning of the St Lucia’s R&R system
- Design and operational details
- Feasibility and profitability
- Discussion
Trainer Ron Verch

12:30 Lunch

1:30  Introduction to R&R equipment and tools
- Technical components of the R&R system
- Equipment specifications
- Use, maintenance and repair
- Methods of refrigerant identification and analysis
- Local assembly of R&R equipment
Trainer Ron Verch

2:30 Use of recovered or recycled refrigerants
- Labelling
- Use of recovered refrigerants in same system
- Use of recycled refrigerants in same / different system
- Quality control and liabilities

*Trainer Ron Verch*

5:00 Wrap-up and discussion

**Thursday, 24 January 2002**

9:00 Up-date on new refrigerants
- Retrofit procedures
- Advice to end users on replacement, retrofitting or use until end of economic life

*Trainer Ron Verch*

9:30 Practical session on maintenance and repair of R&R equipment (including a coffee break)

*Trainer Ron Verch*

12:30 Lunch

1:30 Final discussion St. Lucia’s Management Plan
- Status of RMP
- Legislative framework and import/export licensing system
- Design and Functioning of R and R System
- Data collection, monitoring, evaluation and review
- Outlook and duration
- Seminar recommendations and evaluations

*Donnalyn Charles, Ozone Officer*

3:45 Coffee break

4:00 Closing session
- Closing remarks
- Presentation of Workshop Certificates

*Bishnu Tulsie, Donnalyn Charles, and Ron Verch*
Annex B: List of participants

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Annex D: Recommendations

1. Participants strongly recommended that a loan system should be established to allow Technicians the opportunity to purchase recovery and recycling equipment and accessories at low interest rates.

2. Participants recommended that Government make it compulsory for all hotels, refrigeration and air conditioning companies and other establishments, to provide appropriate recovery and recycling equipment and their accessories to their technicians.

3. With respect to the current environmental levy placed on certain goods, participants recommended that a portion of this levy be channeled to recovery and recycling activities in St. Lucia.

4. Participants recommended that Government explore fiscal measure that would increase the cost of importing CFCs, making the alternative refrigerants cheaper to import.

5. Participants recommended that St. Lucia adopt the semi-decentralized recovery and recycling system. Technicians should be encouraged to develop their capacity to recovery and recycle ODSs. However 2 centres, one at the Sir Arthur Lewis Community College northern branch and the other at the southern branch should be established to service those technicians unable to establish recovery and recycling capacity within their workshops.

6. Participants recommend that the St. Lucia Solid Waste Management Authority be in charge of collecting old equipment using CFCs, for contracting to certified technicians for recovery of gas.

7. Participants recommended that this workshop be offered to all Technicians at regular workshops along with training in good refrigeration and air conditioning management practices.
Responses to direct questions

Question: What measures could be taken in the future, to promote R&R practices?

- assist technicians to own their own equipment through a loan system
- provide equipment free to technicians
- train all technicians in good practices and R&R
- increase the cost of CFCs over replacement ones
- increase public awareness at the building manager level and encourage them to provide R&R equipment for their technicians.

Question: What additional equipment/tools do technicians require?

- R&R equipment and tools (including MACs)
- 19 out 30 technicians indicated that they do not own R&R equip
- 6 technicians stated they or their company owned R&R equipment
- 5 technicians did not respond
- 18 out of 30 are willing to purchase their own if a loan was provided

Question: Number of technicians requiring R&R/good practices training

- an estimated guess would be 25 technicians

Question: Other actions to completely eliminate CFC 12?

- fiscal incentives
- fiscal disincentives to purchase R12
- up to date R&R equipment
- public awareness when licensing is implemented
- general public awareness on issues with respect to recycled CFCs
Annex E: Further references

[8] Reducing CFC in Refrigeration: Strategic Options for Countries with Low CFC Consumption, ICF for USEPA and UNIDO, 1996
[9] Report on UNEP’s continued work on addressing the needs of Low Volume ODS Consuming Countries, UNEP, (UNEP/Ozl.Pro/ExCom/20/60), 1996
[10] Selection of standards:
    - ISO 11650 Performance of Refrigerant Recovery/Recycling Equipment
    - ARI 740.98 Performance of Refrigerant Recovery/Recycling Equipment
    - ARI 700.93 Specifications for Fluorocarbon and Other Refrigerants
    - ARI 700.95 Standard on Recovered Refrigerants
    - SAE J1991 Standard of Purity for Use in Mobile Air Conditioning Systems
[14] Designing a Program to Recover CFCs from Domestic Appliances, Environment Canada
[17] 13th IIR Informatory Note on Refrigerants: Standards for Flammable Refrigerants
Annex F: About the UNEP DTIE OzonAction Programme

Nations around the world are taking concrete actions to reduce and eliminate production and consumption of CFCs, halons, carbon tetrachloride, methyl chloroform, methyl bromide and HCFCs. When released into the atmosphere these substances damage the stratospheric ozone layer — a shield that protects life on Earth from the dangerous effects of solar ultraviolet radiation. Nearly every country in the world — currently 183 countries -- has committed itself under the Montreal Protocol to phase out the use and production of ODS. Recognizing that developing countries require special technical and financial assistance in order to meet their commitments under the Montreal Protocol, the Parties established the Multilateral Fund and requested UNEP, along with UNDP, UNIDO and the World Bank, to provide the necessary support. In addition, UNEP supports ozone protection activities in Countries with Economies in Transition (CEITs) as an implementing agency of the Global Environment Facility (GEF).

Since 1991, the UNEP DTIE OzonAction Programme has strengthened the capacity of governments (particularly National Ozone Units or “NOUs”) and industry in developing countries to make informed decisions about technology choices and to develop the policies required to implement the Montreal Protocol. By delivering the following services to developing countries, tailored to their individual needs, the OzonAction Programme has helped promote cost-effective phase-out activities at the national and regional levels:

**Information Exchange**
Provides information tools and services to encourage and enable decision makers to make informed decisions on policies and investments required to phase out ODS. Since 1991, the Programme has developed and disseminated to NOUs over 100 individual publications, videos, and databases that include public awareness materials, a quarterly newsletter, a web site, sector-specific technical publications for identifying and selecting alternative technologies and guidelines to help governments establish policies and regulations.

**Training**
Builds the capacity of policy makers, customs officials and local industry to implement national ODS phase-out activities. The Programme promotes the involvement of local experts from industry and academia in training workshops and brings together local stakeholders with experts from the global ozone protection community. UNEP conducts training at the regional level and also supports national training activities (including providing training manuals and other materials).
Networking

Provides a regular forum for officers in NOUs to meet to exchange experiences, develop skills, and share knowledge and ideas with counterparts from both developing and developed countries. Networking helps ensure that NOUs have the information, skills and contacts required for managing national ODS phase-out activities successfully. UNEP currently operates 8 regional/sub-regional Networks involving 114 developing and 9 developed countries, which have resulted in member countries taking early steps to implement the Montreal Protocol.

Refrigerant Management Plans (RMPs)

Provide countries with an integrated, cost-effective strategy for ODS phase-out in the refrigeration and air conditioning sectors. RMPs have to assist developing countries (especially those that consume low volumes of ODS) to overcome the numerous obstacles to phase out ODS in the critical refrigeration sector. UNEP DTIE is currently providing specific expertise, information and guidance to support the development of RMPs in 60 countries.

Country Programmes and Institutional Strengthening

Support the development and implementation of national ODS phase-out strategies especially for low-volume ODS-consuming countries. The Programme is currently assisting 90 countries to develop their Country Programmes and 76 countries to implement their Institutional-Strengthening projects.

For more information about these services please contact:

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About the UNEP Division of Technology, Industry and Economics

The mission of the UNEP Division of Technology, Industry and Economics is to help decision-makers in government, local authorities, and industry develop and adopt policies and practices that:

- Are cleaner and safer;
- Make efficient use of natural resources;
- Ensure adequate management of chemicals;
- Incorporate environmental costs;
- Reduce pollution and risks for humans and the environment.

The UNEP Division of Technology, Industry and Economics (UNEP DTIE), with its head office in Paris, is composed of one centre and four units:

- The International Environmental Technology Centre (Osaka), which promotes the adoption and use of environmentally sound technologies with a focus on the environmental management of cities and freshwater basins, in developing countries and countries in transition.

- Production and Consumption (Paris), which fosters the development of cleaner and safer production and consumption patterns that lead to increased efficiency in the use of natural resources and reductions in pollution.

- Chemicals (Geneva), which promotes sustainable development by catalysing global actions and building national capacities for the sound management of chemicals and the improvement of chemical safety world-wide, with a priority on Persistent Organic Pollutants (POPs) and Prior Informed Consent (PIC, jointly with FAO).

- Energy and OzonAction (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition, and promotes good management practices and use of energy, with a focus on atmospheric impacts. The UNEP/RISØ Collaborating Centre on Energy and Environment supports the work of the Unit.

- Economics and Trade (Geneva), which promotes the use and application of assessment and incentive tools for environmental policy and helps improve the understanding of linkages between trade and environment and the role of financial institutions in promoting sustainable development.

UNEP DTIE activities focus on raising awareness, improving the transfer of information, building capacity, fostering technology cooperation, partnerships and transfer, improving understanding of environmental impacts of trade issues, promoting integration of environmental considerations into economic policies, and catalysing global chemical safety.