

**UK**  
**15 Bowling Green Lane**  
**London EC1R 0BD**  
**tel 0171 490 7040**  
**fax 0171 490 0436**  
**email eiak@gn.apc.org**

**US**  
**PO box 53343**  
**Washington DC 20009**  
**tel 202 483 6621**  
**fax 202 483 6625**  
**email eiaus@igc.apc.org**

# Chilling Facts About A Burning Issue

## CFC Smuggling In The European Union

### References

1. *Independent*, 10 April 1997. Arctic ozone layer at record low in March. p.19.
2. *OzoneAction* 23 April 1997. Ozone thin over Arctic. p.8
3. *New Scientist* 19 April 1997. Northern Exposure. p.13.
4. *OzoneAction* 22 October 1996. New ozone hole begins again. p.8.
5. *OzoneAction* 22 January 1997. Ozone hole report. p.8.
6. Miller, E.L. and Weinstein, M.A. 1994. Non-melanoma skin cancer in the United States: Incidence. *Journal of American Academy of Dermatology* 30(7):774-776.
7. Hader, D.P., Waters, R.C., Kumar, H.D. and Smith, R.C. 1994. Chapter 4: Effects of increased solar ultraviolet radiation of aquatic ecosystems. In: van de Leun, J.C., Tang, X. and Termini, M. (eds). *Environmental Effects of Ozone Depletion: 1994 Assessment*. UNEP, Nairobi.
8. *European Commission Press Release*. Brussels, 25 July 1997. Customs authorizes and the European Commission stop illegal CFC imports. (1997)699.
9. Vallette, J. 1995. *Deadly Complacency: US CFC Production, the Black Market and Ozone Depletion*. Ozone Action, Washington.
10. Longstreth, J.D., de Groot, F.R., Krijpe, M.L., Takizawa, Y., van der Leun, J.C. 1994. Chapter 2: Effects of increased solar radiation on human health. In: van der Leun, J.C., Termini, M. and Teramura, A.H. (eds). *Environmental Effects of Ozone Depletion: 1994 Assessment*. UNEP, Nairobi.
11. Ando, M. 1990. Risk of evaluation of stratospheric ozone depletion resulting from chlorofluorocarbons. *Nippon Eiyo Gaku Zasshi* 45:579-582.
12. Urbach, F. 1989. Potential effects of altered solar ultraviolet radiation on human skin cancer. *Photochemistry and Photobiology* 50:507-513.
13. Henriksen, T., Danibak, A., Larsen, S.H. and Moan, J. 1990. Ultraviolet radiation and skin cancer. Effect of an ozone layer depletion. *Photochemistry and Photobiology* 51:579-582.
14. Lloyd, S.A. 1993. Stratospheric ozone depletion. *Lancet* 342:1156-1158.
15. Diffey, B. and Young, A. (eds). 1996. *The Potential Effects of Ozone Depletion in the United Kingdom*. Department of the Environment, HMSO.
16. Epstein, J.H. 1996. The potential cutaneous effects of stratospheric ozone depletion. *Environmental Review* 4:1-7.
17. Diffey, B.L. 1992. Stratospheric ozone depletion and the risk of non-melanoma skin cancer in a British population. *Physical Medicine and Biology* 37(12):2267-2279.
18. Armstrong, B.K. and Kricke, A. 1995. Skin Cancer. *Dermatopathology* 13:582-594.
19. Gallagher, R.P., Ma, B., McLean, D.J., Yang, G.P., Ho, Y., Caruthers, J.A. and Wardslawski, L.M. 1990. Trends in basal cell carcinoma, squamous cell carcinoma and melanoma of the skin from 1973 through 1987. *Journal of the American Academy of Dermatology* 23:413-421.
20. Glass, A.G. and Hoover, R.N. 1989. The emerging epidemic of melanoma and squamous cell carcinoma. *Journal of the American Medical Association* 262:2097-2100.
21. Marks, R. 1987. Non-melanoma skin cancer and solar keratosis: the quiet 20th century epidemic. *International Journal of Dermatology* 26:201-205.
22. Corona, R. 1996. Epidemiology of nonmelanoma skin cancer: A review. *Annals of the New York Academy of Sciences* 789:1-17.
23. Epstein, J.H. 1992. Nonmelanoma skin cancer overview 1992. *Photomedicine and Photochemistry* 14:49-57.
24. Koh, H.K., Norton, L.A., Geller, A.C. et al. 1996. Prevention and early detection strategies for melanoma and skin cancer: Current status. *Archives of Dermatology* 132(4):436-442.
25. Rice, L.A., Hanley, B.S. and Edwards, B.K. 1990. Cancer statistics review 1973-1981. *National Institute of Health Publication No. 902789*. Division of Cancer Prevention and Control, National Cancer Institute, Bethesda, MD.
26. Slaper, H., Velders, G.J.M., Daniel, J.S., de Groot, F.R. and van der Leun, J.C. 1996. Estimates of ozone depletion and skin cancer incidence to examine the Vienna Convention achievement. *Nature* 384:256-258.
27. zur Hausen, H. 1996. Papillomavirus infections - a major cause of human cancers. *Biochemistry and Biophysics Acta* 1288(2):F55-68.
28. Fry, R.J. 1990. Radiation protection guidelines for skin. *International Journal of Radiation Biology* 57:829-839.
29. Rigel, R.S., Friedman, R.J. and Kopf, A.W. 1996. The incidence of malignant melanoma in the United States: Issues as we approach the 21st Century. *Journal of the American Academy of Dermatology* 34(5.1):839-847.
30. *Independent*, 14 November 1996. The hole that spells cancer for children.
31. Jones, R.R. 1992. Ozone depletion and its effects on human populations. *British Journal of Dermatology* 127(4):2-6.
32. Melia, J. and Bulman, A. 1996. Sunburn and tanning in a British population. *Journal of Public Health and Medicine* 17:223-229.
33. Moan, J. 1994. UV-A radiation, melanoma induction, sunscreens, solarium and ozone reduction. *Journal of Photochemistry and Photobiology B Biol.* 24(3):201-203.
34. Marks, R., Staples, M. and Giles, G.G. 1993. Trends in non-melanoma skin cancer treated in Australia: The second national survey. *International Journal of Cancer* 53(6):585-590.
35. Kalkof, J., Shugg, D., Young, B., Dwyer, T. and Wang, Y.G. 1993. Non-melanoma skin
36. Lee, H.P. 1990. Monitoring cancer incidence and risk factors in Singapore. *Annals of the Academy of Medicine, Singapore* 19:133-138.
37. Chuang, T.T., Reizner, G.T., Eperin, D.G., Stone, J.L. and Farmer, E.R. 1995. Non-melanoma skin cancer in Japanese ethnic Hawaiians in Kauai, Hawaii: an incidence report. *Journal of the American Academy of Dermatology* 33(3):422-446.
38. Tsujigawa, S., de Souza, J.M., Costa, M.L., Mitra, A.P., Godlieb, S.L., Laurent, R., Watanabe, S. 1990. Cancer incidence rates among Japanese immigrants in the city of Sao Paulo, Brazil, 1969-1978. *Cancer Causes Control* 1:2189-193.
39. Young, R.W. 1994. The family of sunlight-related eye diseases. *Optometry and Visual Science* 71:125-144.
40. Taylor, H.R. 1995. Ocular effects of UV-B exposure. *Documenta Ophthalmologica* 88:285-293.
41. Stuart, D.D. and Dougherty, M.J. 1996. In vitro UV-B irradiation of bovine crystalline lens causes cell damage and reduction in leucine aminopeptidase activity in lens epithelium. *Journal of Photochemistry and Photobiology* 32(12):81-87.
42. Babai, V., Maza, R.B. and Joshi, P.C. 1995. Ultraviolet-B effects on ocular tissues. *Biochemical and Biophysical Research Community* 210(2):417-423.
43. UNEP. 1996. *Action on Ozone*. UNEP, Nairobi, p.3.
44. Jovan, A. and Kipke, M.L. 1993. Ozone depletion and the immune system. *Lancet* 342(6):1159-1160.
45. Hartmann, A., Blazynk, H., Cuningham, J.S. et al. 1996. Overexpression and mutations of p53 in metastatic malignant melanomas. *International Journal of Cancer* 67(3):313-317.
46. Yung, R. et al. 1996. Mechanisms of drug induced lupus-II. T cells over-expressing lymphocyte function-associated antigen 1 become over reactive and cause a lupus like disease in syngeneic mice. *Journal of Clinical Investigation* 97(12):2866-2871.
47. Gillardon, F. et al. 1995. Calcitonin gene-related peptide and nitric oxide are involved in ultra-violet radiation-induced immunosuppression. *European Journal of Pharmacology and Environmental Toxicology* 293(4):395-400.
48. Cooper, K.D., Oberhelman, L., Hamilton, T.A. et al. 1992. UV exposure reduces immunisation rates and promotes tolerance of epidermal antigens in humans: relationship to dose CD1a+ epidermal macrophage induction, and Langerhans cell depletion. *Proceedings of National Academy of Science USA* 89:8497-8501.
49. Yoshikawa, T., Rao, V., Bruns-Slot, W. et al. 1990. Susceptibility to effects of UV-B radiation on induction of contact hyper-sensitivity as a risk factor for skin cancer in humans. *Journal of Investigations in Dermatology* 95:530-536.
50. Scientific Committee on Problems of the Environment (SCOPE) 1992. *Effects of Increased Ultraviolet Radiation on Biological Systems*. SCOPE, Paris, 40 pp.
51. Scientific Committee on Problems of the Environment (SCOPE) 1993. *Effects of Increased Ultraviolet Radiation on Global Ecosystems*. SCOPE, Paris, 47 pp.
52. Hader, D.P. 1993a. Effects of enhanced UV-B on aquatic ecosystems. pp. 152-192. In: Termini, M. (ed.). *UV-B Radiation and Ozone Depletion. Effects on Humans, Animals, Plants, Micro-organisms and Materials*. Lewis Publications, Boca Raton, Ann Arbor, London, Tokyo.
53. Hader, D.P. 1993b. Risks of enhanced solar ultraviolet radiation for aquatic ecosystems. *Progress in Physiological Research* 9:1-45.
54. Welser, C.S. and Penhale, P.A. (eds). 1994. *Ultraviolet Radiation in Antarctica: Measurements and Biological Effects*. American Geophysical Union, Washington D.C.
55. Cullen, J.J. and Neale, P.J. 1994. Ultraviolet radiation, ozone depletion, and marine photosynthesis. *Phycologia* 33:303-320.
56. Smith, R.C. and Cullen, J.J. 1995. Effects of UV radiation on phytoplankton. pp. 1211-1223. In: *US Review of Geophysics, Suppl. US National Report of International Union of Geology and Geophysics 1991-1994*. American Geophysical Union, Washington.
57. Smith, R.C., Termini, M., Baker, K.S. et al. 1992. Ozone depletion: Ultraviolet radiation and phytoplankton biology in Antarctic waters. *Science* 255:952-959.
58. *OzoneAction* 20 October 1996. Cancer in fish linked to ozone depletion. p.8.
59. van de Leun, J.C., Tang, X. and Termini, M. (eds). 1994. *Executive Summary Environmental Effects of Ozone Depletion: 1994 Assessment*. UNEP, Nairobi, p.iii-ix.
60. Department of the Environment. 1996. *UK Use and Emissions of Selected Halocarbons*. HMSO, London, p. 9.2.
61. Brack, D. 22 October 1996. *Addressing Illegal Trade in Europe*. Speech to the International Conference on Ozone Protection Technologies, p.2.
62. *CEFC Press Release* 4 August 1997. EU's first major victory in CFC fraud - only the tip of the iceberg. Appeal to governments to start enforcing the law on CFCs.
63. Second Meeting of the Sub-Group on Illegal Imports of Ozone Depleting Substances into the EU, 9 January 1996. *JN/illimp/2100196*. 8 vii pp.
64. *Per. comm. Visitor*, 21 July 1997.
65. *New York Times*, 17 September 1995. Group sees ozone danger in illicit chemical trade. p.30.
66. Brack, D. 1996. *International trade and the Montreal protocol*, p.106.
67. *Per. comm. UK industry sources and US enforcement personnel*. April, June, August 1997.
68. *Indictment in the United States District Court for the Eastern District of Pennsylvania*. January 1997. United States of America v. R. Colin Deyton, Christopher Farnham,
69. Fax from Martin Sweeney, Northtracem to DG XI, European Commission. 10 August 1995.
70. Letter from President of ANEFRYC to National Refrigerants, Birmingham. 26 July 1996.
71. *Per. comm. ARD Journalists*, 3, 31 July 1997.
72. Fax from Martin Sweeney, Northtracem. 1996/1997. "An associated company of Northtracem, namely Taifun...".
73. *Per. comm. Secretary of European Fluorocarbons Technical Committee, CEFIC*, 18 July 1997.
74. *ENDS Environment Daily*, 23 July 1997. EU busts major CFC Smuggling operation.
75. *Per. comm. Gases representative*. March, April 1997.
76. Letters from ANEFRYC investigators to DG XI, European Commission. 28 June, 11 July (re-sent 14th August) 1996.
77. *European Customs Figures* 1996.
78. *Environment Week/Waters Europe*, 20 September 1996. Fluorocarbon producers urge EU ban on CFCs, p.6.
79. *ENDS Daily*, 4 August 1997. Chemical firms warn of large European black market.
80. *Per. comm. Dehon Services*, Paris, 30 January 1997. Information presented at the Philadelphia Conference of the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), January 1997.
81. *Environment Week/Waters Europe*, 7 October 1994. EU importing "massive" amounts of CFCs illegally, customs data show. p.9.
82. *Brown, I.* 1995. *Vital Signs 1995: The trends that are shaping our future*. Worldwatch Institute, Washington.
83. Global Environment Facility. 5 September 1996. *Special Initiative for Supplementary Funding to Complete ODS phase-out in the Russian Federation*. World Bank, Washington, p.12.
84. Fax from Russian Scientific Centre for Applied Chemistry to Paccro International, US and others. December 1994/January 1995 onwards.
85. *Per. comm. ANEFRYC investigators and representatives*, 14 April 1997.
86. *Per. comm. Member of 17th Implementation Committee of the Montreal Protocol*, 16 July 1997.
87. *Report of the 17th Meeting of the Implementation Committee of the Montreal Protocol*. Geneva, 15-16 April 1997. p.6.
88. *Report of the 15th Meeting of the Open-Ended Working Group of the parties to the Montreal Protocol*. Nairobi, 3-6 June 1997.
89. *Report of the 18th Meeting of the Implementation Committee of the Montreal Protocol*. Nairobi, 2 and 4 June 1997. p.8.
90. Letter from ANEFRYC Investigator to Angel Racon Caballero, Consejero Tecnico, Ministerio de Medio Ambiente, 11 March 1997.
91. *Interprete Service Bulletin*, 14 September 1995. Environment: Black market chemicals are destroying the ozone layer.
92. *New Scientist*, 28 January 1995. CFC smugglers risk the Earth for a few dollars.
93. *Christian Science Monitor*, 23 October 1995. Miami ice: Freon smuggling rivals contraband in drugs. p.3.
94. *Global Environmental Change Report*. VII:20. 10 December 1995. p.5.
95. Vallette, J. 1996. *Allied Signal, Quimobacis and the Frie Bendian*. Ozone Action, Washington, p.15.
96. *Indictment in the United States District Court of the Southern District of Florida*, 3 September 1996. United States of America, Plaintiff v. Refrigeration USA, Inc., a Florida corporation, Roland Wood, Diana McNally, and Lisa Salazar, Defendants.
97. *United States Department of Justice Press Release*, Florida, 29 May 1997. News Release: Refrigeration USA Guilty Pleas.
98. *International Environment Reporter*, 1 November 1995. Two Florida Men charged with smuggling more than 200 tons of CFC-12 into US. Bureau of National Affairs, Washington D.C.
99. *United States District Court of the Southern District of Florida*, 26 September 1995. United States of America v. Bruce R. Burrell, and Keri Raju, s/o/a "Casey", s/o/a "Casey Pate". Case No. 95-797-CR-Ferguson.
100. *Global Environmental Change Report*. VII:24. 22 December 1995. CFC smuggler arrested in Costa Rica. p.4.
101. Dogana di Napoli, 25 September 1996. *Conferenza Stampa del 23.9.96* p.6 pp.
102. *Per. comm. Roberto Ferrigno*, Greenpeace Belgium, 11 February 1997.
103. *Netherlands CFC Committee*. 1994. *CFC Action Program: Annual Report 1994*. p.31 and p.42.
104. *Per. comm. Ery Tijink*, Netherlands Ministry for the Environment, 11 February 1997.
105. [http://www.chemconnet.com/sale\\_bba.shtml](http://www.chemconnet.com/sale_bba.shtml).
106. <http://meta.finishing.com/classified/chemical/ceamagal44.htm>
107. Fax from Polish distributor to EIA, 9 May 1997.
108. Fax from Romil Press, Journalist to EIA, 29 May 1997.
109. *Aldinger*, 31. 1995. *Report of the Obo-Institut 1995 Obo-Institut*, Vienna, Quoted in



An EIA report: New evidence on the illegal trade in CFCs



Introduction	1
Ozone Depletion and Human Health	2
Ecological Damage	4
Illegal Trade – Fridges, Fraud and Phase-out	5
Trans-Cool Trading	7
Conclusions	13
Recommendations	13

## EU Regulations at a glance

Council Regulation EC No. 3093/94 (15 December 1994) determines the phase out schedule for many ODS in Europe and sets up the basic mechanisms of import and export controls, and reporting. Quotas for import, essential uses, feedstock applications (where all of the ODS is chemically converted to a non-ozone damaging substance) and inward processing are adjusted by periodic bulletins.

Since January 1996, the European Commission maintains that it has not issued any import licences for virgin CFCs except for essential uses such as asthma inhalers. It is still legal to import recycled, re-used and reclaimed CFCs from outside Europe provided the party is in possession of a licence.

Some bulk CFC shipments enter the EU for Inward Processing Relief (IPR) in which they are repackaged into small cylinders and exported back to developing, Article 5(1) countries. These shipments are also licensed and it is illegal for this material to be sold on the domestic market.

However, some European countries such as Spain and Portugal still lack specific implementing legislation for 3093/94 banning unlicensed imports. In other countries, such as Ireland, Austria and Greece, penalties are very low and of negligible deterrent value.

### Legal

- Import of re-used, reclaimed or recycled CFCs under licence.
- Inward Processing of virgin CFCs for re-export. This trade is licensed but it is unclear whether the licences have any legal weight.

### Illegal

- Since 1996, the Commission has not issued licences for importing virgin CFCs unless licensed for essential uses.
- Diversion of IPR material onto the domestic market.

## Acknowledgements

This report was written and edited by Gavin Hayman, Julian Newman and Steve Trent. Designed by Wulf Grimby. Picture Research by Teresa Flanagan and Ben Rogers. Cover photograph © Mark Edwards/Still Pictures.

EIA wishes to thank all those individuals and organisations who contributed to our investigations and the production of this report.

Special thanks to Brian Emmerson and all at Emmerson Press (Tel: UK + 01926 854400 Fax: UK + 01926 854499) for the printing of this report. Printed on 100% recycled paper.

# Chilling Facts About A Burning Issue: CFC Smuggling in The European Union

## Introduction

The large-scale, widespread and unchecked illegal trade in chlorofluorocarbons (CFCs) and other ozone depleting substances (ODS) within the European Union (EU) is undermining the success of the Montreal Protocol and directly threatens human health and ecological security worldwide.

This spring ozone levels over the Northern Hemisphere were up to 40% thinner than 1979-1982 levels and covered an area half the size of Canada (5.3 million km<sup>2</sup>).<sup>1,2,3</sup> In the Southern Hemisphere during the 1996 winter stratospheric ozone depletion reached 70-80% of pre-ozone hole values and lasted longer than ever before.<sup>4,5</sup>

The resultant increase in ultra-violet radiation (UVR) reaching the Earth's surface is having a devastating impact on human health and the natural environment.

We are now poised on the threshold of a skin cancer epidemic among Caucasians. Estimates project approximately one million cases of skin cancer annually in the USA alone.<sup>6</sup> In the Antarctic Ocean reductions in primary productivity of up to 23% have been recorded.<sup>7</sup>

This report presents detailed new evidence of the extent of illegal trade in CFCs within the EU and illustrates the numerous loopholes which facilitate and encourage smuggling. Three years after the European phase-out began, and long after stockpiles should have been exhausted, large quantities of CFCs are still available for knock-down prices.

The recent arrest of the director of a German company, Taifun GmbH, for illegally importing over 600 tonnes of CFC-12 and 365 tonnes of halon 1301<sup>8</sup>, confirms EIA's claim that there is a large, well-organised illegal trade turning vast profits smuggling ODS contraband into Europe. Although the European authorities are to be commended on their enforcement action against Taifun – which represents a decisive reversal of their earlier policy of denying the problem – Europe remains at the heart of a worldwide illegal trade.

Almost all the 10 000 tonnes of CFC contraband which flooded the market in southern Florida from 1994 to 1996 – costing US

customs over US\$110 million in excise tax fraud alone<sup>9</sup> – first passed through Europe and the hands of a number of companies whose activities have been widely questioned by legitimate industry. Current estimates of illegal trade within the EU range between 6 000-20 000 tonnes annually which will destroy many more thousands of tonnes of ozone.

The information in this report provides a compelling rationale to support the swift implementation of a proposal under consideration by Parties to the Protocol to ban “the placing on the market and sale of virgin CFCs” within the European Union.

EIA applauds this proposal and urges the governments of the EU's member states to act with urgency and to finish the European CFC phase-out once and for all. We also call upon all Parties to the Montreal Protocol to crack-down on the illegal trade and institute a worldwide system of licensing for all ODS with “cradle-to-grave” documentation and a system of prior-informed consent.

It is now abundantly clear that these initiatives are vital if we are to deal effectively with the devastating consequences of continued ozone depletion.

Steve Trent  
Head of Campaigns, EIA  
September 1997.



*The large-scale, widespread and unchecked illegal trade in CFCs directly threatens both human health and ecological security.*

*Left: Northern hemisphere ozone depletion in 1993.*

*Estimates project approximately a million cases of skin cancer annually in the USA alone.*



**A sustained 10% ozone depletion will cause an additional 12 000 cases of BCC (up 21%) and 4 000 cases of SCC (up 31%).**

## Ozone Depletion and Human Health

Ozone depletion has led to significant increases in ground-level ultra-violet radiation (UV-A [320-400 nm] and UV-B [280-320nm]), which will have profound consequences for human health.

Although UVR dosage depends upon a variety of factors, the United Nations Environment Programme (UNEP) and the World Health Organisation (WHO) estimate that every 1% decrease in stratospheric ozone will result in a 2% increase in UVR, leading to a 0.6-0.8% increase in cataracts and a 2% increase in non-melanomic skin cancers (NMSCs).<sup>10</sup>

These estimates are broadly confirmed by other research.<sup>11-13</sup> One report gives these rates as a 2.7% increase in basal cell carcinomas (BCCs), a 4.6% increase in squamous cell carcinomas (SCCs), both of which are types of NMSC, and a 0.6% increase in malignant melanomas for each 1% ozone reduction.<sup>11</sup>

These general increases in impacts hold true for small ozone depletions but larger losses will lead to disproportionate damage. A 10% reduction in ozone is predicted to result in a 24% increase in NMSC, a 30% loss may result in a doubling and a 50% loss in a quadrupling of cases.<sup>14</sup>

### Effects on the Skin – What Price a Sun Tan?

UVR has a number of effects on skin:

**Sunburn** – The most obvious effect of UV exposure is sunburn (erythema) – redness and itching

of the skin due to dilation of superficial blood vessels. Higher UV exposures can result in oedema – blistering, pain and peeling.<sup>15</sup>

**Photo-ageing** – Exposure to UVR causes wrinkling, loss of elasticity and localised alterations of pigmentation on habitually sun-exposed sites. The increased risk of photo-ageing as a result of ozone depletion is likely to be similar to that for skin cancer.<sup>15</sup>

**Skin Cancer** – Numerous studies confirm that exposure to UVR is a major factor for both NMSC and for malignant melanomas.<sup>10-17</sup>

Dramatic increases in all forms of skin cancer have been reported worldwide over recent decades<sup>15-21</sup> but rates of NMSC have increased so significantly that it has been labelled “a quiet 20th century epidemic”.<sup>20,21</sup>

NMSCs are now the commonest form of cancer found in many Caucasian populations.<sup>22,23</sup> Though overall mortality is low, an estimated recurrence rate of about 50% and the local invasiveness of these carcinomas involve high medical costs and make NMSC a major public health concern.

The incidence of malignant cutaneous melanoma is reported to be increasing faster than any other cancer in Caucasians, almost doubling between 1973 and 1990.<sup>24,25</sup> In the US, mortality from melanomas in Caucasians is second only to that from lung cancer in terms of overall cancer mortalities.<sup>24</sup>

Even under the current ozone protection regime after the Copenhagen Amendment (1994), predictions show that the incidence of skin cancer is expected to increase globally. By 2050, more than 33 000 new cases per year in the US and 14 000 in Northwest Europe are expected<sup>26</sup> – a regime which does not account for illegal trade.

### Other Cancers

There is some evidence which suggests that solar radiation may play a role in melanoma of the eye and cancer of the lip, non-Hodgkin's lymphoma and infection with the papillomavirus, which is itself believed to be a significant cause of human cancers.<sup>27</sup>

Clinical and experimental data show the risk of ionising-radiation-induced cancer (ie. from X-rays) is also significantly increased by subsequent exposures to UVR.<sup>28</sup> This means simple comparisons of rates of skin cancer to all other cancers may underestimate the true impact of elevated UVR.

### “A Quiet Epidemic”

- **United States.** The risk of malignant melanoma in the United States has now reached 1 in 87 (or 1 in 70 for a Caucasian), an increase of more than 1 800% since the 1930s.<sup>29</sup> This increase is real and is not an artefact of increased surveillance, better counting methodologies or changes in diagnostic criteria. In 1994, one study estimated that the incidence of NMSC in the US has increased from 480 000 in 1978 to between 900 000 and 1.2 million in 1994; a figure roughly equivalent to the combined numbers of all other cancers.<sup>6</sup>

Incidence and mortality rates for malignant melanoma will continue to rise for at least the next 10 to 20 years.<sup>29</sup>

- **Canada.** An increase of about 60% in mean age-adjusted incidence of basal cell and squamous cell carcinoma was observed in British Columbia, between 1973-1975 and 1985-1987.<sup>22</sup>

- **United Kingdom.** Expected levels of ozone depletion are predicted to contribute 4-10% additional lifetime risk of skin cancer in children alive today.<sup>15</sup> There are around 40 000 recorded cases of skin cancer and more than 2 000 deaths per year, though the actual numbers may be up to twice these figures.<sup>15,30</sup>

According to Department of the Environment estimates, a sustained 10% ozone depletion will cause an additional 12 000 cases of BCC (up 21%) and 4 000 cases of SCC (up 31%).<sup>15</sup> Another study places these increases even higher; up 30% and 50% respectively.<sup>31</sup>

The incidence of malignant melanoma in the UK is rising by 8% per year, faster than any other cancer.<sup>32</sup> Deaths from malignant melanoma have increased 70% from 1974 to 1992.<sup>32</sup>

- **Norway.** The incidence of malignant melanoma is doubling every 12-13 years.<sup>33</sup>

- **Australia.** The last five-year national survey recorded an increase in non-melanoma skin cancers to 944-1187 per 100 000 men and 714-769 per 100 000 women.<sup>34</sup>

Data in the Tasmanian Cancer Registry from 1978-1987 show an overall increase of 7% per year in the age-standardised rates of NMSC.<sup>35</sup> A first NMSC during the study period was associated with a 12-fold increase among men and a 15-fold increase among

women in the risk of developing a new NMSC within five years.

- **Spain.** The incidence of malignant melanoma in Spain has dramatically increased. The relative risk of melanoma to the cohort born in 1952 as opposed to the cohort born in 1892 was reported as 530:1 for men and 280:1 for women. Mortality due to the tumours has increased exponentially, up 11% per year in both sexes.<sup>36</sup>

- **Singapore.** The national cancer control programme in Singapore shows that skin cancers have among the highest rates of increase of all types in both males (3.9%) and females (3.2%).<sup>37</sup>

- **Expatriates.** Incident rates of BCC, SCC and Bowen's disease are at least 45 times higher in the Japanese immigrant population in Kauai, Hawaii than for equivalent individuals back in Japan, a difference attributed to Kauai's intense UVR and an emphasis on outdoor activities.<sup>38</sup> Japanese immigrants in San Paulo show a similar increase in NMSC.<sup>39</sup>

**One study estimated that the incidence of NMSC in the US has increased from 480 000 in 1978, to between 900 000 and 1.2 million in 1994; a figure roughly equivalent to the combined numbers of all other cancers.**

Below: Squamous cell carcinoma of the lip.



Below: Squamous cell carcinoma of the nose.





**A 1% increase in stratospheric ozone depletion is estimated to result in ... 100,000-150,000 additional [cataract] cases worldwide — UNEP 1996.**

**Eye Damage — Blinded by the Light**

There is substantial evidence linking ozone depletion and subsequently elevated UV-B to eye damage.<sup>15,40,41</sup> Cataracts may be a more widespread health effect of UVR than skin cancer because all populations will be affected relatively equally.<sup>10</sup>

**Snow blindness** — Being light receptive, the cornea and the lens are inherently vulnerable to UVR. Intense UV exposure causes photokeratoconjunctivitis or “snow blindness”.<sup>14,15,40,41</sup>

**Cataracts** — Cataract formation is linked to cumulative exposure to sunlight. Recent studies have implicated UV-B as the causative factor in the formation of cataracts.<sup>10,15,42,43</sup>

A 1% increase in stratospheric ozone depletion is estimated to result in a 0.6-0.8 rise in the incidence of cataracts — 100 000-150 000 additional cases worldwide.<sup>44</sup>

**The Immune System**

The immune system helps maintain health by protecting the body against infectious diseases and cancers. UV-B disturbs the regulation of the immune system and antibody response to invasion and may influence the outcome of NMSC<sup>45</sup>; melanomas<sup>46</sup>; auto-immunity<sup>47</sup>; allergies<sup>45,48</sup>; immunotolerance<sup>10,45,49,50</sup>; and may constitute a particularly serious problem in areas where infectious diseases are common.<sup>10</sup>

**A Crime Against Nature — The Ecological Impacts of Increasing Ozone Depletion.**

Increased levels of UVR will also cause significant disruption to terrestrial and marine ecosystems, resulting in direct damage to organisms, decreased primary productivity and shifts in species composition.<sup>7,51-57</sup> However, current

attempts to assess the magnitude of these impacts are hampered by a lack of long term data.

Estimates for reductions in productivity on the Antarctic ice-shelf range between 6% and 23%<sup>7,55,58</sup>; though more recently this range has been revised to an upper limit of 12%. UVR radiation has been shown to damage early developmental stages of fish, crabs, shrimp, amphibians and other animals.<sup>7,51,52,55</sup>



© Mark Edwards/Still Pictures

For example, an astonishing number of a newly discovered species of fish called the murganda (a three-inch, purple-spotted gudgeon species found in Australia) have already been found to have UV-induced cancers. Of the 8 000 animals studied, 500-1000 have melanomas.<sup>59</sup> Before science has even properly studied this fish, it may be exterminated by UVR.

Increases in UV-B radiation will also perturb biogeochemical cycles, increase material photo-degradation and have detrimental effects on air quality.<sup>60</sup>

**The impact of UV-B on Antarctica**

After months of winter darkness, the first shafts of light signal the start of the Antarctic spring. Single-celled phytoplankton bloom underneath the melting pack ice floes, turning them into floating gardens.

These phytoplankton blooms — which make up the basic building blocks of the marine food web — are especially vulnerable to the effects of UVR. Studies have indicated that the increasing UVR has limited their primary production by up to 23%.

This, in turn, may have catastrophic consequences for species within the ecosystem. These “floating gardens” supply the food for 500-700 million tonnes of krill which in turn is the food source for at least 120 species of fish, 80 species of seabirds, six species of seal and 15 species of whale.

Above right: Fish with skin cancer, North Sea.

Below: Child with cataract.



© National Medical Slide Bank

**Fridges, Fraud and Phase-out**

The production of CFCs and halons for the domestic market, except for some essential uses, has been prohibited in the European Union since 1 January 1995. However, current European regulations that are riddled with loopholes, coupled with a low priority ascribed to the enforcement of illegal CFC trade, have conspired to allow thousands of tonnes of CFC contraband into the European market every year. This trade represents a multi-million dollar business with minimal risk of capture.

Large quantities of cheap CFCs continue to be manufactured by developing countries such as China and India which have until 2010 to phase out their production and by the Russian Federation, which is not currently in compliance with the Montreal Protocol. As the price of CFCs in developed countries has climbed, unscrupulous entrepreneurs and profiteers have appeared who can make over tenfold profits by diverting material from legitimate commerce.

Since the phase-out began, Europe has witnessed the sudden entry of dozens of small, fly-by-night brokers in the CFC supply business. These operations have no historical interest in the market and are run out of small offices with little more than a phone and fax machine but seem routinely able to supply large amounts of CFCs on a “no-questions-asked” basis. As offers of sale of products from outside the EU are not illegal and the paper trails generated by import, export and arbitrage activities are bewildering, it is not surprising that these operations have continued unabated.

The distribution market itself has been top heavy for several years and competition for business is intense. The temptation for legitimate distributors to cut corners and buy cheap material may have proved too strong for some.

The scale of the smuggling is well-known to those working in the industry. Europe is awash with CFCs. A UK Department of the Environment report in 1996 stated that “by far the most important barrier to the refrigerant phase-out is the on-going availability of CFCs. Twelve months after the phase-out of production there are still reasonably large supplies available... Providing there are no illegal imports into the UK, availability will drop significantly towards the end of 1996.”<sup>61</sup> One year later, CFCs are still freely available.

The price of CFCs has remained unaccountably low. By October 1996, though the price of CFC-12 had increased by approximately 12 times in the US since phase-out, the EU price

had increased by only three to four times despite the phase-out occurring a year earlier. However, the price of R502 (a low temperature refrigerant containing CFC-115 which is not manufactured in Russia), had increased significantly. Stockpiles of the size necessary to keep prices down to this extent do not exist in Europe and if they did, would tie up far more pressurised cylinders than are known to be in circulation.<sup>62</sup> These prices remain accurate in 1997: while reputable distributors quote prices of up to £25 per kg for CFC-12, offers from fly-by-night brokers are as low as £5 per kg.

The ready availability of CFCs is undermining the European phase-out and suppressing the market for alternatives.

For example, the DuPont network, which was convinced the transition to CFC-alternatives would be rapid, made little effort to stockpile material. Three years later, driven by consumer demand, they are again distributing and selling CFCs alongside their alternatives. Maurice Verhille, Chairman of the European Fluorocarbon Trade Council, commented that “sales levels of CFC replacements have remained inexplicably low in comparison to the expected market trend. This points to one thing: a thriving black market in CFCs”.<sup>63</sup>

The European Union is only belatedly waking up to the smuggling threat. While its recent action against Taifun is to be applauded, just last year officials were adamant that smuggling was a minor problem. An enforcement subgroup that met in January 1996 could only find one case of smuggling and put itself to sleep for lack of evidence.<sup>64</sup>

Investigations by EIA have uncovered a sophisticated and thriving illicit market in CFCs. Illegal imports from Russia and China, and to a

**“Sales levels of CFC replacements have remained inexplicably low in comparison to the expected market trend. This points to one thing: a thriving black market in CFCs.”**

Below: Officers from Operation Cool Breeze make an arrest.



© US Customs



Estimates put the illegal trade in the US at around 10 000 tonnes per year (1995-96) with a value of US\$113 million in lost revenue to the US Treasury.

lesser extent India, have entered all the major European markets as well as the United States. Virgin CFCs have been sold under the guise of being recycled, banned products have been labelled as legal alternatives, and material intended for repackaging and despatch to developing countries has leaked onto domestic markets.

These widespread activities jeopardise the achievements of the Montreal Protocol, and bode ill for future attempts to control trade in substances that damage the environment.

Sweeney and Sons

During the course of EIA's investigations, one company and one family name cropped up time and again. The activities of National Refrigerants and the Sweeney family show how easy it is to obey the letter of the law governing trade in CFCs while at the same time acting as a crucial link in an international smuggling chain.

National Refrigerants is a major distributor on the US market and has its headquarters in Philadelphia. The UK subsidiary, National Refrigerants of America (NR) has an extensive warehouse operation in Birmingham. Until last year the UK operations were masterminded by 60-year old Joseph Sweeney, ably assisted by his two sons Wayne and Martin.

Before the production ban NR was known as a refrigerant distributor in the UK, but had no track record as an importer. In 1995, the company received a European Commission license to import recovered CFCs from the Russian Scientific Centre in St Petersburg. Suspicions over the deal centre on the sheer amount of material imported by the Sweeneys, estimated to be over 2 000 tonnes in a single year. At that time no-one was bothering to reclaim material in the UK, so why were such large amounts coming from Russia, a country where domestic production continued unabated?

A visitor to the NR warehouse in Birmingham in 1995 reported seeing huge amounts of Russian CFC-11 and CFC-12 stacked wall-to-wall.<sup>65</sup> An agitated Joseph Sweeney explained it away by saying it was being repackaged for export to NR in the USA under IPR rules.

At this time US customs and other enforcement agencies were actively pursuing CFC smuggling rings through Operation Cool Breeze. A series of high profile raids took place on the east coast, notably Miami, where the street-value of CFCs were only out-ranked by cocaine.<sup>66,67</sup>

Estimates put the illegal trade in the US at around 10 000 tonnes per year (1995-96) with a value of US\$113 million in lost revenue to the US Treasury.<sup>67</sup>

In a number of cases the seized CFCs had passed through NR facilities at some stage of the journey.<sup>68,69</sup> It seems that CFCs brought out of Russia, ostensibly for IPR, were finding their way illegally into the USA, the world's most lucrative market.

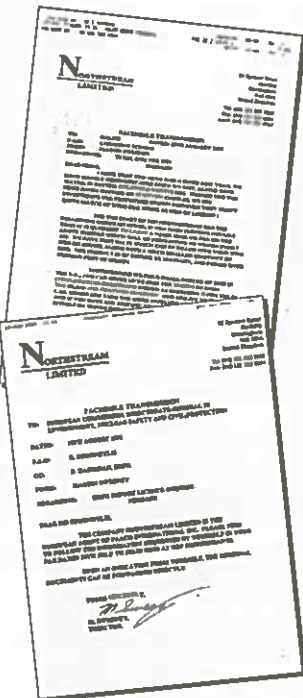
The material was moved out of Russia by rail to Estonia, where Martin and Wayne Sweeney had set up a switch plant to transfer the CFCs from rail tankers to isotanks for shipping. Next stop was the NR plant in Birmingham, which acted as a vital conduit for the CFCs en route to the USA. Under IPR the material should then have gone on to Latin America or the Caribbean, but in fact it was illegally diverted onto the US market.

One UK distributor heard of NR's Russian IPR scheme and investigated the feasibility of a similar operation.<sup>70</sup> The company concluded that it would be impossible to turn a profit due to the low prices offered in developing countries. The only market which would make such a complex undertaking worthwhile was the USA.

The Sweeneys broke away from NR when Joseph fell out with John Reilly. The split led to Martin and Wayne exploiting their Russian and Estonian contacts and forming a company called Northstream. Northstream's registered address in London was provided by a firm offering limited company services and its business address was a jewellery centre in Birmingham. It also boasted an office in Tallinn, capital of Estonia and the site of an influx of fly-by-night traders.<sup>71</sup>

It was not long before the Sweeney brothers were hawking CFCs of dubious origin around Europe. One UK distributor was contacted by Northstream in late 1995 with an offer of recovered CFC-12 from Russia.<sup>72</sup> The large amount of isotanks available raised suspicions, and chemical analysis showed that the material was far too pure to have been recycled. As recently as last January, Northstream contacted distributors boasting of "our ability to source CIS (Confederation of Independent States) goods and take the risks involved".<sup>71</sup>

Northstream was also linked to the German firm Taifun, which in July became the first target of co-ordinated EU action against CFC smuggling (see below). Despite the departure of the Sweeney's, National Refrigerants has continued to attract criticism. Last July, Spanish industry representatives reported that NR products intended for developing countries were leaking on to the Spanish domestic market.<sup>73</sup> Earlier this year Richard Pelati, the company's US sales manager, was indicted for his part in illegally smuggling over 700 tonnes of CFCs on to the US market.<sup>69</sup>



Above: Faxes from Northstream, attesting to their links with Russia and Estonia.<sup>71,72</sup>

Trans-Cool Trading

To illustrate the ease of sourcing CFCs from around Europe and beyond, EIA investigators set up a dummy company, called Trans-Cool Trading. The firm was positioned as a UK broker looking to obtain cheap supplies of CFCs 11, 12, 22, and Halon-1301 in order to undercut established suppliers.

Last month over 20 companies were contacted. They were selected for their involvement in previous suspicious offers or were openly advertising on the Internet. Within days a series of interesting offers arrived by fax, phone and e-mail at TCT's ghost office in London. Some asked the right questions about whether TCT possessed the necessary licences or not, while others simply supplied a price and requested a delivery location.

TT Intertrade from China, involved in the Taifun case, offered CFC-12 in one tonne cylinders at a price of \$2 200 per tonne. This represents a price of about \$2 per kilo, and high profits if sold on the European market. TT Intertrade also offered halon 1301 for \$8 200 per tonne inclusive of shipping to England. False recycled certificates were promised.

Ningbo Sino-Resource Import Export of Zhejiang was slightly more expensive at \$2 450 per tonne. When TCT told Ningbo of import restrictions on Chinese CFCs, company President Joe Koman gave the following advice: "Frankly speaking we are supplying F12 overseas. However some clients ask us to reduce purity and make F12 like to be [sic] recycled for the sake of import licence. The above is our secret between you and me. Please do not leak it out."

He also mentioned having exported CFC-12 to Italy in June.

Sinochem of Tianjan sent a flurry of urgent faxes, telling of their experience in exporting refrigerants to other countries for several years, and offering CFC-12 in a range of containers at prices from \$1 600 per tonne when shipped in isotanks up to \$2 580 per tonne for small cylinders. These prices illustrate the huge profits to be made. At the isotank price it is possible to undercut legitimate business by charging £7 per kg and still make £600 000 on a 100 tonne deal.

When asked about import restrictions, Sinochem's Xing Li replied that the company supplied CFC-12 to a German client in 1995 and the issue of a license was never raised. Sinochem's view was that while production in the EU is banned, imports from countries such as China are perfectly legitimate.

After faxing requirements to German broker Kehr-Klejnocki, TCT was contacted by Terra of Lublin, Poland. The firm's director said she could get supplies of CFCs from St Petersburg in Russia and ship them to the UK, depending on the provision of a licence, presumably for IPR.

After receiving responses from both Polar Cool and David World Trading in Spain, an EIA investigation team travelled to the country, posing as executives of TCT, to meet with the potential suppliers. During an hour-long, secretly filmed, meeting with three officials from Polar Cool at their office near Madrid, CFC-12 was offered in 50lb disposable cylinders, clearly intended for the export market. Interestingly the product was said to be of European origin and a supply of hundreds of tonnes a year was guaranteed by international manager Guillermo Garcia.

The company was keen to start trading as soon as possible, fearing that a sales ban could scupper CFC trade within a year. They also advised TCT to offer the full range of CFC refrigerants to clients, otherwise distributors who could not get supplies of CFC-12 would encourage them to switch to replacements. Polar Cool also spoke of their exports to eastern Europe, north Africa, and Latin America, as well as supplying the Spanish market.

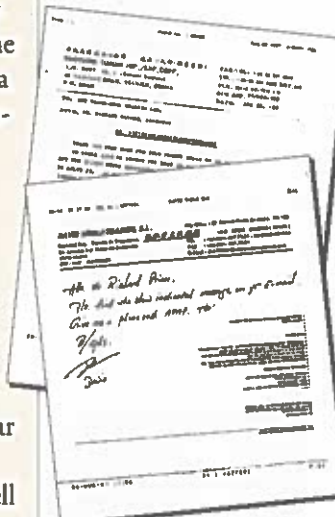
A chemical test sheet supplied by Polar Cool showed their CFC-12 to be labelled as Ozeon, the trademark of French distributor Calorie.

David World Trading contacted TCT after being passed a fax addressed to Dong Feng, flagged as a suspicious dealer over two years ago. David Wang said he was the sole agent for exporting Chinese chemical gases, and spoke of supplying the Italian military. His city office turned out to be a residential apartment in a tower block outside Madrid.

In a subsequent communication Wang said he doubted TCT could get a licence to import Chinese CFC-12, but offered instead to supply 20 tonnes recycled at a Spanish factory. He also wanted to sell TCT 11 tonnes of HFC-227, a replacement refrigerant. Production of this material in China is illegal as it is patented. It was also the label used to disguise CFCs and halons in the Taifun case.



Above: TCT's request for supply of CFCs.



Above: Suspicious fax responses, received by TCT.



Below: Polar Cool - This small Spanish firm appeared in late 1996, and offered to supply an EIA investigator hundreds of tonnes of CFCs.



**Taifun GmbH**

The most startling illustration of illegal trade in Europe has been provided by Taifun Feuerloeschgeraetebau und Vertrieb GmbH, a fire-fighting equipment company based in Frankfurt. Georg Guedemann, Taifun's director was arrested in July this year for the unlicensed import of 630 tonnes of CFC-12 and 365 tonnes of halon 1301.<sup>874</sup> The company acted in concert with a number of unsavoury "entrepreneurs", including ADER (Abwasser Ellensiteistung Elektromotation Recycling in Bruschal) – whose director was alleged to be involved in sanctions busting, selling SCUD missile parts to Iraq<sup>74</sup> – Martin Sweeney of Northstream and Hans Rienke Handelsgesellschaft GmbH in Hamburg.<sup>74,75</sup>

Taifun et al. perpetrated a classic fraud on a series of legitimate refrigerant distributors and end-users from 1995 onwards, offering bargain prices from as little as DM10 (US\$5-6) for CFC-12.

In early April 1996, the Paris-based distributors Dehon Service were alerted by ADER to large quantities of halons available for purchase through Taifun. Subsequently, Taifun offered to supply 20 tonnes of halon 1301 immediately and also provided an option on purchasing the vast amount of another 400 tonnes. After asking for more information, Dehon were faxed a photocopy of the Solvay sales brochure and told the product was German military surplus. A transaction for a sample quantity took place; payment was directed to Raymond Bassiez, an arbitrageur who later approached Dehon and offered dubiously-sourced CFC-12 from Taifun.

When the first five tonnes of 1301 arrived, it was contained in Chinese cylinders which were

not configured for EU markets and which came from the Shanghai High Pressure Vessel factory. It transpired that the cylinders had been passed to an obscure Dalian-based brokerage firm called TT Intertrade, which then sent the material to Taifun via Rotterdam. The bill of lading stated that the material was R-227, a legal replacement (HFC) for 1301. Dehon duly notified the authorities.

Clearly, the fraud began in China. It seems incredible that the labelling ploy could have been successful given that R-227 has only been legally manufactured by one or two companies in the world in test quantities as a medical aerosol so far.<sup>76,77</sup>

In August 1996, similar cylinders turned up at the warehouse of Gasco, a Belgian distributor.<sup>78</sup> The company was expecting ex-German military CFC-12 and so was surprised to be charged duty for an import from outside the EU. Once again the cylinders were Chinese and falsely labelled as R-227. Enquiries traced these back to Taifun via Northstream.

When this case came to light there were six other shipments en route from China to Gasco. These were turned back, but only until earlier this year by which time a new series of supply contracts had been arranged in Germany and the Netherlands. But this time customs agents were waiting and seized over 150 tonnes of CFC-12 in Rotterdam.

Even while under investigation, Guedemann and his contacts continued their activities. ICI/Klea in the UK were sold 69 tonnes of CFC-12 when Guedemann provided a certificate from the Frankfurt Chamber of Commerce attesting to the German origin of their material. ICI provided their own numbered and registered cylinders for the trade and so were unaware where the material might have come from. The Frankfurt Chamber of Commerce has since admitted that they signed the certificates without checking Guedemann's claims about the origin of his material.<sup>74</sup> Other companies that bought material from Taifun were Pittas S.L. in Athens, and HRP Refrigerants in Wales.

**Spanish connections**

Spain probably has the biggest problem with unlicensed imports of CFCs in Europe and is crippled by inadequate legislation and confused bureaucracy. Since the 1995 phase-out, the Spanish market has been flooded by offers of cheap CFCs in non-returnable cylinders intended for developing countries which fail to meet European pressure and recycling standards.

**What is the size of the black market?**

Data held by the European Chemical Industry Council (CEFIC) on the European refrigeration market show that stockpiling of CFCs before the phase out amounted to only 4 000 tonnes, an amount that could not ensure the ready availability of CFC-12 in Europe three years later.

In 1994, forward sales from CFC manufacturers inexplicably crashed by over 10 000 tonnes even though production for domestic sale was still legal. These observations have led industry representatives to place the size of the black market in Europe as between 10 000 and 20 000 tonnes in the each of the last two years.<sup>81,82</sup>

A more detailed analysis was made available to EIA by a representative of the Dehon Group, Europe's largest distribution company. Total volume of end-use sales can be calculated based on their and their competitors' market shares and the total legal supply can be calculated from allowed production, stockpiling and recycling capabilities. The gap between the two figures is a relatively sound estimate of the volume of illegal trade. In 1995, illicit sources of CFCs accounted for approximately 8 000 tonnes of material on the market and in 1996, for around 6500 tonnes.<sup>83</sup>

These cylinders provide compelling evidence of a thriving illegal trade as they have either come from outside the EU or from material repackaged in the EU for export.

In early 1996, the Spanish Air-Conditioning and Refrigeration Society, ANEFRYC, denounced over 20 companies that had been formed after the phase-out for laundering contraband CFCs. Two companies were cited as particularly active: Ditergas S.L. based in Zaragoza and Nelson Trippa S.L., a subsidiary of Electro Torres Nelson Trippa – a large Portuguese refrigerant contractor – which suddenly settled in Badjzoz.<sup>79,88</sup>

Ditergas offers large quantities of CFCs at unrealistically low prices. Most of its sales have been un-invoiced, cash-in-hand affairs and products were routinely supplied in bottles that were either non-returnable or that had been "appropriated" from larger refrigerant suppliers.

Electro Torres Nelson Trippa was an export agent for National Refrigerants in Birmingham and was meant to have re-exported large quantities of repackaged material to ex-Portuguese colonies in Africa. However, this material appears to have been diverted onto the Spanish domestic market. Canisters of CFC-12 bought in Seville from Nelson Trippa were clearly National Refrigerants' product in non-returnable cylinders intended for export.<sup>73</sup>

Industry complaints finally prompted the Spanish authorities to search the warehouses of both companies, finding large standing stocks of CFCs. Lacking any legislation banning unlicensed imports or the diversion of export or repackaged material onto the domestic market, the authorities could only sanction the companies for failing to meet EU Regulations for vessels under pressure.

**Inward Processing Relief: A Smugglers' Charter**

The European Inward Processing Relief (IPR) regime has also been subject to censure as a "smugglers' charter".

Russia and several developing countries suffer chronic shortages of small cylinders of the type required by end-use clients. To compensate for this problem, the Commission allowed the unrestricted entry of CFC shipments so that European firms could repackage and re-export the material. It is believed this "open border" regime has been substantially abused.

In 1995, there was a 2 500 tonne discrepancy (equalling 10% of the EU total trade in that year) between what EU customs data reported had entered Europe and the Commission's actual issuance of licences.<sup>84,85</sup> Material intended for IPR had been recorded as official imports.

The Commission has tried to address this problem through licensing IPR but mis-reporting is still routine. Also as material is allowed to lie fallow in the EU for up to 18 months and may be re-exported by a different company to that which originally imported it, the fate of much of the material is anyone's guess. In the course of its investigations, EIA found repackaged material from IPR readily available for sale on the EU domestic market.



Left: Gasco's warehouse in Belgium.

**Reclaimed material from dubious sources?**

In the summer of 1995, the European Commission granted two of Europe's leading distributors exclusive rights to import large quantities of reclaimed and re-used CFC-12 from the Russian Scientific Centre for Applied Chemistry and an associated company, KOMKON.

The centre itself is a small pilot plant on the outskirts of St. Petersburg, only capable of producing about 100 tonnes per year of CFCs 11 and 12 and small quantities of specialist CFCs 113 and 114.<sup>86</sup> How could the centre have the capacity to reclaim and export large quantities of recovered material to Europe and elsewhere? Why were the "recovered and re-used" CFCs of virgin quality (over 99.8% pure<sup>87</sup>)? Why were CFCs being reclaimed in Russia when CFC production was still in full swing and nobody was bothering to reclaim material in Europe at that time?<sup>88</sup>

Other European companies complained bitterly, and threatened to import the material as well if the situation continued. The Commission acquiesced and withdrew the licences.



Above: Bill of lading for one shipment from TT Intertrade, Daillan to Taifun, of "R-227 Cooling Agent".



Below: Herr Guedemann, Director of Taifun, who is currently helping police with their enquiries into unlicensed CFC and halon shipments from China.





**Tallinn, Estonia – CFC entrepot**

Tallinn is the major Baltic Sea port for transit of Russian cargo to Europe. It comes as little surprise that many fly-by-night CFC brokers, such as Northstream in the UK, Marine and Aviation Supplies and Frinco in Gibraltar and Madrid and SJB Chemical Products in the Netherlands, all opened offices there.

Russian export data presented to the Implementation Committee of the Montreal Protocol is believed to have identified Estonia as a recipient of over 400 tonnes of CFC-12.<sup>89</sup> The Committee commented: "The data provided was detailed but there were some items that were hard to understand, such as the

reported exports to parties not operating under Article 5 and to Estonia, which had only recently become a Party to the Protocol".<sup>90</sup> They also expressed concern "at the exports and imports referred to in the report and questions were raised about the intended uses of the substances concerned".<sup>90</sup> The Russian Federation placed the blame for illicit shipments on CIS parties who "upon examination" frequently do not honour Russia contracts forbidding re-export of material.<sup>91</sup>

The subsequent meeting confirmed that the Russian Federation's records for exports to the EU fail to match the EU's own import figures; a situation that urgently needs to be clarified.<sup>92</sup>

In October 1996, a new company called Polar Cool S.L. suddenly appeared and flooded legitimate distributors with offers of cheap CFC-12. The company is run out of a warehouse and a suburban house on the outskirts of Madrid with an unregistered, national-rate phone number.<sup>93</sup>

Financial analysis by Dun and Bradstreet show total capitalisation of the firm was only 500 000 ptas (about £2 000), an impossibly small amount for a serious distribution business.

Analysis of material supplied by Polar Cool showed it to be below European or American standards, and it is believed to come from the Orient. Customs figures for 1996 show that Spain was the recipient of 29.4 tonnes of CFC-12 from India and 41.1 tonnes from China despite a Commission decision setting the import quota to zero (for all Annex A, Group 1 CFCs across the Union).<sup>90</sup> The import licences were granted to two companies, one of which

was Polar Cool. The registered address of their imports turned out to be neither a factory nor a depot, but a town-house in the Laz Rozas district of Madrid.<sup>93</sup>

The other recipient of the Spanish imports from India and China is even more mysterious. The company's name was given as David World Trading S.L. but the registered address for their imports turned out to be an office belonging to a different firm called Ibercondor, S.A. who specialise in international shipping, transport and customs arrangement for goods.<sup>93</sup> However, EIA investigators discovered that this was not the first time the man behind David World Trading has appeared in the illicit CFC business. Previously, the company operated as Dong Feng, S.L. out of the back of a Chinese restaurant in Madrid. Claiming to be the "sole import agent for Chinese chemical gases for refrigeration", David Wang's "world trading" business address turns out to be on the top floor of a block of flats in an outer suburb of Madrid. Wang has offered considerable quantities of CFC-12 on behalf of the two companies from 1994 onwards.

The widespread evidence of illegal trading in Spain, plus the fact that the Spanish government has yet to put in place any penalties for smuggling, has prompted the industry association to launch a voluntary sales ban from the start of 1998 in the hope that the authorities will finally take the problem seriously.

Below: Marine and Aviation Supplies, based in Estonia, Gibraltar and Madrid offered 40 tonnes of virgin CFC-12 in non-returnable cylinders in March 1996. Tests showed the product originated from DuPont in the Far East.



Below: Headquarters of David World Trading, "sole import agent for Chinese chemical gases for refrigeration".



**A Burgeoning Black Market**

There can be no doubt about the extent of CFC smuggling and its implications for the recovery of the ozone layer. However, while US authorities have responded with cross-agency co-operation and a series of high profile prosecutions, enforcement in Europe has lagged behind.

The following cases illustrate the widespread reach of the black market within Europe:

- Vast quantities of CFCs seized in the US first passed through Europe.

In May 1995, both Homi Patel and Adi Dubash pleaded guilty to smuggling 126 tonnes of CFC-12 into the New York area in seven shipments from the British port of Felixstowe.<sup>94,95</sup>

In September 1995, Jose Prieto of Florida was sentenced to 26 months in prison for illegally importing CFC-12 from a UK company called The Gas Man.<sup>9</sup>

In August 1995, Ms Irma Henneberg, manager of a Florida shipping company, was found guilty of filing false shipping manifests and diverting 3 000-4 000 tonnes of CFC-12, worth over US\$52 million, onto the domestic market.<sup>96,98</sup> Much of this material was believed to have been handled by National Refrigerants in Birmingham but because Henneberg doctored import and export papers, the truth may never be known. She received 57 months in jail with a \$10 000 fine and restrictions on future employment.<sup>62,97</sup>

In March 1996, Robert Pennell of The Radiator Factory, Ronkonkoma NY, was sentenced to one year in prison and ordered to pay back \$4.3 million for illegally importing over 300 tonnes of CFC-12 during 1994 from Nigeria and the UK.<sup>9,98</sup>

In April 1997, Colin Deyton of Refrigerant Management Services, a former employee of National Refrigerants (US), was accused of illegally importing over 700 tonnes of CFC-12 into the US market between June 1994 and April 1995.<sup>69</sup> One of his accomplices was named as Richard Pelati, sales manager of National Refrigerants, who filed false shipping manifests showing the material had been exported to Venezuela. The CFCs were shipped from National Refrigerants in the UK.

In May 1997, three officials of Refrigeration USA pleaded guilty to smuggling 4 000 tonnes of CFC-12 into the US from the UK.<sup>99,100</sup> The plea involved them surrendering property in Miami and London worth over \$3 million. The material passed through Rabtherm in Walsall, near Birmingham in the UK, before being diverted onto the US market.<sup>99</sup>

Rabtherm also handled the trans-shipment operations for Bruce Burrell and Kersi Raja of Miami who were charged with smuggling 288 tons of CFC-12 into the US from 1993 onwards.<sup>101,102</sup> Burrell fled to Costa Rica and had the dubious honour of being the first environmental criminal to be extradited.<sup>103</sup>

- In September 1996, Italian customs announced that they had uncovered a network of CFC smugglers as part of "Operation Clear Skies".<sup>104</sup> Chemical tests showed the material seized had been produced in Europe for export to developing countries. The tip-off came from SIMI, the Italian Military Secret Service, who uncovered the information "in the context of activity over the last few months countering the proliferation of NBC [Nuclear, Biological and Chemical] arms." The implication is that brokers in one trade are linked to those in another. The mechanism of smuggling bears a resemblance to "triangulation", a standard arms trade procedure for obscuring origins and true destinations of material.<sup>105</sup>

- The Netherlands CFC Committee charged six firms with illegal import of ozone



Above and Below: CFC canisters seized during Operation Cool Breeze, having passed through Europe.





depleting substances in 1994 and during check-ups on a number of depositories in Spring 1995, the Dutch Environment Inspectorate came across "several dozen tonnes of virgin CFCs which had wrongfully and deliberately been provided with the label 'regenerated'".<sup>106</sup> To date, there have been 11 enforcement actions of CFC trade regulations.<sup>107</sup>

- In a fax dated June 1995, the Netherlands-based SJB Group advertised its ability to bring bulk quantities of CFC-12 from Vocco in Volgograd into Europe. The operation is said to have been running for over a year, and involves transporting the material via rail to Estonia and then by sea to Rotterdam. The company's director states: "The actual Russian origin of the product is of no influence on sales performance as the product will be packaged in Holland, thus obtaining the Dutch origin after packaging." As far as import restrictions went, SJB offered the following advice: "I can confirm that the importation of CFCs into the European Union under IPR is freely allowed and is in no way restricted or controlled by a quota system."
- Faxes and Internet postings show a number of Chinese firms keen to supply the European market. On the ChemConnect web site, the Ningbo Free Zone Sino-Resource Import & Export Company offers CFCs 11 and 12, as well as HCFC-22, stating: "You can trust us for a reliable supplier [sic] of all freon gases and halon extinguisher with best quality and price in China."<sup>108</sup> In a fax dated August 1996, the Sinochem Tianjan Imp/Exp Co. offers to supply CFC-12 to European

customers and looks forward to doing "business with you in large quantities".

- In November 1996, German trading firm Kehr-Klejnocki of Augsburg faxed distributors with an offer to supply 300 tonnes a month of recovered Russian CFC-12 – a vast amount of material – yet specifications show the material was too pure, and in too great a quantity, to have been recycled.
- In June 1996, distributors around Europe were faxed by an Indian firm, Sunita Exports. The company offered to supply CFCs 11 and 12 claiming to be the marketing agent for one of the largest integrated fluorine chemical plants in the South-East Asia/Pacific region.
- A leading refrigeration market specialist in Poland told EIA he had been offered CFC-12 smuggled out of Russia in both one tonne and much larger railway tank quantities.<sup>109</sup> He says it is being falsely-labelled as HCFC-22 or HFC-134a and is smuggled in large quantities into Poland. A small amount of around 200 tonnes enters the Polish market, but the majority moves westward to Germany and beyond. Russian organised crime groups are alleged to be involved in the trade.
- CFCs from Russia and Eastern Europe have also found their way into Austria falsely labelled as recycled material or as legitimate replacement refrigerants, crossing the Black sea to Vienna, Linz and Krems. In contrast with much of the rest of Europe, the material is frequently shipped as 13.6kg cylinders rather than in bulk because Austria's emphasis on light industry means most end-use applications are piecemeal. In 1996, two car service companies based in Upper Austria and Vienna were penalised for receiving illegally imported Russian products in non-returnable cylinders.<sup>110</sup>

Austria may also play an important role as a transit country. Trade statistics compiled by the Austrian Finance Ministry show that imports of CFCs more than doubled between 1993 and 1994, from 744 tonnes to 1 518 tonnes. But most of these imports were unregistered with the Environment Ministry.<sup>111</sup> Companies are believed to have stockpiled CFCs in 1994, when such imports were still unlicensed in Austria, with the specific intention of shipping them to other member states after Austria joined the EU on 1 January 1995.

## Conclusions

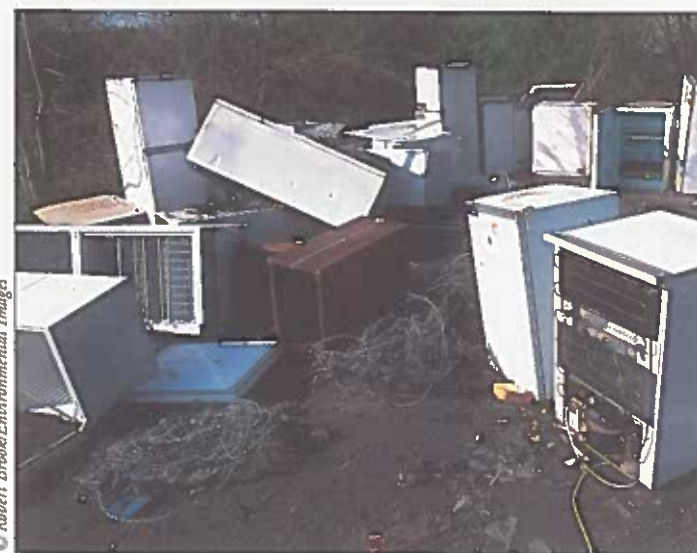
There exists a widespread illegal trade in CFCs within Europe. Virgin CFCs have entered Europe under the guise of being recycled or reclaimed, banned products have been labelled as legal alternatives and material intended for repackaging and re-export has ended up in domestic European commerce.

Europe remains awash with CFCs, despite the fact that legitimate stockpiles are at their end, and illegal trade is undermining the impetus of the European phase-out. As long as the facility to sell the material remains available, smuggling will continue as the profits to be made from a relatively simple deception are large and sanctions are unlikely and comparatively small.

EIA suggests that a near-term ban on the placing on the market and sale of CFCs (except for substances covered by essential use exemptions) and the recycling and disposal of existing CFCs within the EU is the most effective solution to this problem of European enforcement. The European Commission proposed a resolution to this effect at the 15th Open-Ended Working Group of the Montreal Protocol in Nairobi in June. The EU must see its bold initiative to ban the domestic sale of CFCs through to a successful conclusion. Other Parties to the Protocol must recognise as their highest priority, the clear and compelling need to remove sources of illicit supply and initiate a final phase-out of CFC use.

Former UK Secretary of State for the Environment, John Gummer, told the first UK Department of the Environment seminar on environmental crime:

"The reasons we have global agreements on the ozone layer is because the ozone layer is something that affects all of us, and if it is depleted then our children are more likely to have skin cancer. Therefore if you traffic in CFCs, you are, in a real sense, trafficking in the lives of our children... So I want to emphasise that we are not merely in the administration business here."<sup>112</sup>



© Robert Brook/Environmental Images

## Recommendations

- 1 The EU should initiate a final and comprehensive phase-out of CFC use in Europe through the ban on "the placing on the market and sale" of CFCs (currently under discussion in the Montreal Protocol and new Commission regulations).
- 2 A number of enforcement provisions should be imposed. The EU must:
  - Establish a central enforcement database.
  - Harmonise domestic legislation.
  - Identify remaining stockpiles and their purchase history. These should be exported for non-Article 5(1) use when the sales ban has been implemented to remove a source of illicit supply and sale.
  - Institute a review of recent customs imports and exports in all member states to identify whether imports are being routinely passed by customs who are simply unaware of the licensing requirement.
  - Institute a programme of training and awareness in EU customs personnel.
  - Nominate ports of entry to handle all Group A, B and C ODS transactions and concentrate enforcement activities at these points.
- 3 The EU should promote discussion and initiation of a sales ban on virgin material for all non-Article 5(1) countries to re-invigorate the Parties' commitment to a final removal and destruction of ozone depleting substances. Recycling activities should be licensed and controlled by nominated, government-inspected facilities or re-exported.
- 4 Furthermore all Parties to the Montreal Protocol should:
  - Adopt a licensing system based on prior informed consent.
  - Report all exports and imports and notify the Secretariat of their capabilities to recycle and reclaim material.
  - Require that all imports detailed as recycled material should attach proof from one of the centres nominated in (3). Concurrent with the operation of the petitioning system, dubious imports should be seized.
  - Parties should be obliged to submit reports detailing their efforts to suppress illegal trade, to publicise successes and identify weaknesses.
  - Penalties for any unlicensed import should be uniformly severe amongst Parties. To this end, the Secretariat should draw up model legislation.
  - Multi-lateral funding should be made available to Article 5(1) countries with production facilities to assert export controls and train customs operatives.
  - Parties that do not comply with the above procedures in the near-term should not be allowed to import or export ODS.

Below: CFCs being transported by sea; huge amounts of customs documents are left incomplete every year.



© Greenpeace/Greg