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**United Nations Industrial Development Programme
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F.Y.R. of Macedonia

**Country Programme
for
Phasing Out Ozone Depleting Substances**

21694

FINALL REPORT

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1. BACKGROUND

Macedonia was a former constituent republic of Yugoslavia. It declared independence on 8 September 1991 and set on building the political and economical system as an independent state. Macedonia joined UN by a temporary name of Former Yugoslav Republic of Macedonia until the settlement with Greece could be attained.

It is located in South-Eastern Europe (The Balkan Peninsula), bounded on the north by Yugoslavia, on the east by Bulgaria, on the south by Greece and on the west by Albania. Macedonia has a total area of approximately 25.713 sq. km.

According to the Census from 1991 the population was 2.033.964 in 505.852 households with an average of 4.02 persons per household.

The government of Macedonia is democratic, represented by a multiparty parliament elected by popular vote.

After independence and during the war in neighboring areas the economy of The F.Y.R. Macedonia suffered heavily, which the government claims it cost USD 3 bn over two years. Per capita income dropped from USD 2.200 in 1990 to some USD 1.500 in 1994. With unemployment officially at 20%, and at least another 10% of workers on unpaid leave, the government worried that for e.g. IMF demands that state owned companies are privatized and restructured (i.e. lay-off of more workers) would cause social chaos. Privatization is going ahead anyway, with the privatization agency planning to sell 800 out of the 1.200 companies on its books within a very short period of time. Restructuring may be going to be brutal - but there is no alternative. The problems are too vast to be solved without external aid. It is estimated that Macedonia is going to receive as much as USD 250 mill in aid and loans in 1996 and is confident of meeting stricter stabilization requirements, including bringing annual inflation down from 50-60 % to some 15-20 %. The economy should start growing. Macedonia is making remarkable efforts to reform in complicated circumstances. But if it does not receive international finance, the result will be somewhat chaotic.

Due to the fact that Macedonia is a very new member in the international community, the country has still a limited contact network with the major international organizations and other key players.

However, using international help, The Macedonian government is trying to participate in international projects in different areas.

The F.Y.R. of Macedonia has ratified the Montreal Protocol in April 1994.

2. Purpose of the report

This report is explaining policies and actions the Macedonian Government and ODS users are aiming to take to phase-out ODS.

The former Yugoslavia has ratified Montreal Protocol in 1989. Yugoslavia operated under the Article 5 of the Protocol. Macedonia, when gaining the independence from Yugoslavia, assumed all the relevant international agreements and commitments of Yugoslavia, among them the Montreal Protocol. Macedonia is considered to operate also under Article 5 of the Protocol since 1994. Due to economic hardships and other irregularities in the region, the Government has not had to chance to initiate the phase-out programme earlier.

The Government of Macedonia has co-operated closely with the local ODS users and is aiming to tackle the ODS issue jointly with the businesses and other organizations now dependent on ODS.

Most ODS users are aware about the formal phase-out requirements and the related business implications. The main end users have produced shames and preliminary designs to reduce and/or totally phase ODS.

The report includes the following components:

- Evaluation of the current situation of Macedonia regarding the imports, exports and use of the ozone depleting substances.
- Outlining the policy for future elimination of the ozone depleting substances.
- Describes the administrative and institutional framework for phase-out ODS.
- Describe the actions and efforts which the different ODS users have made.

3. Current Situation

The Republic of Macedonia is not a producer of regulated substances, transitional HCFC and HFC substitutes. They are imported mostly from the European Union. They are directly imported by end users.

Data of ODS consumption, mainly CFC and HCFC have been evaluated on the basis of information obtained directly from the end users (visits, personal contacts, written reports, questionnaires, discussions). In addition, relevant ministries, agencies, inspectorates, importers and non-governmental organizations were contacted.

3.1. Current Consumption

Macedonia consumes only Annex A substances, i.e. CFC_s and Halons. The total consumption of **Annex substances** in 1995 in Macedonia was 557 metric tons corresponding to **560.5 ODP tons**. The per capita consumption of **Annex A** substances was **0.276 kg**, based on total population figure of 2.03 million. In addition to Annex A substances Macedonia consumed Annex C substance **HCFC 22** approximately 27 metric tons, i.e. **1.5 ODP tons** and Annex E substance **Methylbromide** 20 metric tons, i.e. **14 ODP tons**.

Two thirds (64%) of the consumption was in foam sector, slightly less than one third (30.7%) in refrigeration sector, 3.6% in aerosol sector other uses being negligible.

Tables 3.1 and 3.2 overlap set out the estimated consumption in 1995 by substance and user, respectively.

Table 3.1. Import and consumption of Ozone Depleting Substances in 1995, by Substance

Substance/Source	Production m tons	Imports m toni	Exports m tons	Consumption m tons	ODP	Consumption ODP tons	%
Annex A, Group 1							
CFC 11		480		480	1	480	
CFC 12		71.7		71.7	1	71.7	
CFC 113							
CFC 114		5.3		5.3	1.1	5.8	
CFC 115							
Subtotal:						557.5	
Annex A, Group 2							
Halon 1211							
Halon 1301		0.3		0.3	10	3	
Halon 2402							
Subtotal:						3	
Annex A Total:						560.5	

Table 3.2. Consumption of Ozone Depleting Substances in 1995, by Use and Application

User Sector/Use	Substance	Application	Consumption in ODP tons	%
Refrigeration and Air-Conditioning				
Domestic Refrigeration	CFC 12	Initial charge	53	
	CFC 11	Insulation	34	
	CFC 12	Recharge	42	
Commercial Refrigeration	CFC 12	Initial charge	4	
	CFC 11	Insulation	13	
	CFC 12	Recharge	17.3	
Cold Stores and Industrial Refrigeration	CFC 12	Initial charge		
	CFC 12, CFC 11	Insulation	3.2	
	CFC 12	Recharge		
Mobile Air-Conditioning	CFC 12	Recharge	0.5	
Stationary Air-Conditioning	CFC 12	Recharge	5	
Refrigeration total:			172	30.7
Aerosols				
Aerosol cans, pharmaceutical	CFC 11/12/114	Propellant	20	
Aerosols total:			20	3.6
Foam Blowing				
Flexible foams:	CFC 11	Blowing agent	361	64.4
Firefighting				
Fixed exiting. systems	Halon 1301	Exting. agent	3	0.5
Solvents	CFC 12	Steriliser	4.5	0.8
GRAND TOTAL:			560.5	100

3.2. Forecast Consumption

Import and consumption since 1986 are indicated by substance and user in Tables 2.3 and 2.4 respectively. The figures show a clear downward trend in consumption among 1986 and 1995, from 1620 ODP tons to 56 ODP tons that is related to the general downward trend in Western Europe as a whole. However the disruption of industrial production also played a role in the decrease of consumption. Generally the peaceful development in the region, since late 1995, is supposed to enhance the industrial production in Macedonia.

Forecasting the consumption of ODS in Macedonia is an extremely complicated task. The country is an economy in transition aiming to restructure its industry to get integrated in the Western European entity and relying more and more in international comparative advantages and trade thus counterbalancing the former (all Yugoslavian) policy of being self sufficient. The other facts to be taken into consideration are the recent economic hardships and embargo, from which the country is recovering, which mean fulfilling immediate needs and increase of industrial production thus increasing ODS consumption in general.

It is assumed that Macedonia is making no attempts to comply with the Montreal Protocol and unconstrained quantities of controlled substances are available from the existing sources, at the current prices, and that the overall economical growth (also the of private consumption) is 4% p.a. Up to year 2000 and 3% after that, the ODS consumption will increase to 700 ODP tons by the year 2010, as indicated in tables' 3.3 and 3.4. However, this forecast consumption in 2010 is only 43% of the consumption ten years ago.

3.3. Forecast consumption of ODS, 1986-2010, by Substance

	year									
	1986	1989	1991	1992	1993	1994	1995	2000	2005	2010
Annex A, Group 1										
CFC 11	668	378	144	124	108	74	480	572	589	601
CFC 12	941	785	318	212	197	130	72	86	87	87
CFC 113										
CFC 114	11	16	2	4	4	2	5	6	6	6
CFC 115										
Annex A, Group 1 total:	1620	1174	478	338	309	206	557	664	682	695
Annex A, Group 2										
Halon 1211	1	1	2	1	-	-	-	-	-	-
Halon 1301	3	2	3	2	5	4	3	3	3	4
Halon 2402										
Annex A, Group 2 total:										
GRAND TOTAL	1624	1177	483	341	314	210	560	667	685	699

Table 3.4. Forecast Consumption of ODS 1986-2010, by Use and Application

	year									
	1986	1989	1991	1992	1993	1994	1995	2000	2005	2010
User Sector										
Refrigeration	70	65	60	80	80	80	172	200	210	220
Aerosol	48	56	50	11	20	16	20	25	30	32
Foam Blowing	1482	1039	358	217	209	110	361	420	438	440
Firefighting	4	2	5	2	1	-	3	3	3	3
Solvents	20	15	10	4	4	4	4	4	4	4
GRAND TOTAL	1624	1177	483	341	314	210	560	667	685	699

3. 3. Industry Structure

Macedonia is not producer of Ozone Depleting Substances. Since the disintegration of Yugoslavia the procurement and import of CFCs seem to many significantly.

The best possible consumption estimate for 1986 is approximately 1620 tons, out of which the consumption has essentially decreased, from some 623 to 483 tons in 1990 and 1991, respectively, i.e. at the time of the disintegration process of the former Yugoslavia, and subsequent economic and industrial problems, started. Preliminary consumption estimates for the years 1992, 1993 and 1994 were 340, 314 and 210 tons.

The 1995 consumption was about 604 tons. The consumption to increase for 200% in one year, from 1994 to 1995, is possible taking into consideration the economic recovery and lifting of the embargo.

ODS use in Aerosol Production

Macedonia has one ODS aerosol producer, Alkaloid Co. with its headquarters in Skopje. The Company was established in the late 1960s as a state company. Currently the operations are divided in 5 profit centers: 1) pharmaceuticals and veterinary products, 2) fine chemicals, 3) food and extracts from medical plants. 4) cosmetics and 5) paints and varnishes. 1900 workers are employed in Alkaloid Co. The current ownership status, 55% owned by employees, 45% being described as "social capital", is a temporary arrangement the aim being a management buy out (MBO) to reduce the social capital component to 15 % to be held by the Pension Fund.

The top management of Alkaloid Co. is well aware of the Montreal Protocol and the subsequent provisions concerning Macedonia as a Party operating under Article 5.

Regarding aerosols the company is in process of reformulating its strategy aiming to expand exports, possibly enter into licensing arrangements with foreign brand owners.

Out of the total production of Alkaloid Co. approximately 55% is exported the main market being the former Yugoslavia, but Western Europe having "an increasing share".

Pharmaceutical aerosols are produced in patches i.e. not continuously. In 1995 the production of pharmaceutical aerosols was approximately 150000 cans using 20 tons of CFC11/CFC12/CFC114 premixture, brand Caltron, from Germany.

The plant has not produced cosmetic aerosols since 1992, but has been filling cans in Kikinda, Serbia, located almost 1000 km away from Skopje.

The number of cans filled in 1995 for Alkaloid Co. in Kikinda was approximately one million. The propellant used was hydrocarbon. It is understood that all cans, tops, dispensers and ingredients are transported from Skopje to Kikinda, and finished products again to Skopje.

The aerosol plant is procuring cans, tops and dispensers from Croatia, Serbia and Slovenia.

The Company has approximately 10 brand products the can sizes varying between 90 and 500 grams. The company claims to have a market share of 50% of cosmetic aerosol products in Macedonia, whose figure is most likely too high, but may be valid if calculated based on the narrow range of products (excluding for e.g. technical aerosols) the company is producing.

The aerosol plant of Alkaloid Co. has one filling line, originating since 1968, by the Italian Coster Co. The theoretical capacity of the line, filling cans of 90-150 grams, was claimed to be approximately 5500 per shift, 10000 in two shifts, 2.5 mill p.a. The line has a water bath test. Capping operations are manual. The plant management agreed that refurbishing of the line is not feasible.

The aerosol plant has produced a preliminary plan to procure a new hydrocarbon using aerosol filling line taking into consideration the explosives of the new propellant, purity requirements and other necessary components, also the formulations of ingredients needed. The designed capacity of the line will be approximately 5 mill can p.a., i.e. higher than the capacity of the existing line. The preliminary cost estimate of the investment is approximately USD 1.2 mill (DEM 1.8).

From the contact we had with the leading team of REFINERY "OKTA" - SKOPJE we found out that couple of years ago they had a discussion with the leading team of Alkaloid Co. for production of isobutane as a substitute for CFCs applied in cosmetic industry. During the war in neighboring and the embargo of north and closed border on south by Greece, The Refinery has been plagued by supply and distribution problems. That all has reflected with financial problems and subsistence of the company was become in question. So according to a total situation discussions between Alkaloid AD and Refinery were left and nothing else was done. The Refinery is producing a mixture of propane, butane and isobutane. For the separation of isobutane from the mixture and the production is additional new technology require. In the following period the leading team of the company will do a complete analysis (technological and financial).

ODS Use in Foams Production

Macedonia has only one foam producer using ODSs as a blowing agent, Sileks AD Co. located in Kartovo, approximately 100 km east from Skopje. Sileks AD company is a combined trading and industrial conglomerate employing 3500 people. The main business divisions are general export and import activities, retail trade, hotels, mining and quarrying, agriculture and foam production. Export and import volumes were USD 80 mill and 100 mill respectively. The recent embargo on Serbia and other trade sanctions imposed have resulted in serious business problems and losses, for e.g. the capacity use of industrial division was only 20 % of the designed capacity.

Sileks AD is formally a private company all shares being owned by the company employees.

The foam production division started to operate in 1975. The capacity of some 12000 tons of foam products was reached in the mid 80s. The foaming division has approximately 200 employees out of which 150 workers on production lines.

Sileks AD currently runs the following foaming operations:

1. Production of flexible foam (slabstock), 2 lines, densities 18-30 kg/m³. Capacity 2x200kg/min. Actual production in 1995 was 4100 tons and CFC 11 use 257 tons. First foaming line was installed in 1975 ("Viking" from UK). Second line has been recently refurbished, using components from several sources, design and installation was made by the company's own staff. Flexible slabstock foam production is furnished with complete cutting equipment allowing the company to deliver a very wide range of final foam products from simple madrases to digitally cut pieces.

2. Production of a) roof and facade sandwich panels, average density of 37 kg/m³, average tickles 5 cm. The capacity is approximately 420000 m² p.a. The actual production in 1995 was 145000 m² and CFC 11 use 31.6 tons. b) production of sandwich panels for cold rooms and storages, average density 37 kg/m³, average tickles 15 cm. The actual production in 1995 was 60000 m² and CFC 11 use 41.6 tons. All panels are produced on the same production line, a combination of the German "Admiral" and Italian "Simi", installed in 1985. In addition to this line now in operation the company has one older line which needs some refurbishing to be operational, and a new uninstalled line, which is without foaming unit.

3. Production of pipe insulations, average density 28 kg/m³, average weight per meter 0.35 kg, diameter 1-10 inches. The actual production in 1995 was 950000 meters and CFC 11 use 50 tons. The foaming equipment is Austrian "Steinbacher", installed in 1985.

4. Production of moulded products, mainly seat cushions both of rigid and flexible foams., average weight of 1.5 kg per pieces, density 40 kg/m³. The actual production in 1995 was 310000 pieces, i.e. 465 tons and CFC 11 use 50.8 tons. This production sector has 3 foaming units., out of which one is German "Admiral" and two designed and installed by the company itself.

5. Five movable on-site foaming units installed on trucks operating all over Macedonia. Foaming capacity varies from 100-500 gr/second. The technical characteristics are not available, nor the recent CFC 11 use.

All in all the foam production capacity is some 12000 tons p.a. representing CFC consuming capacity of 1600 tons out of which 360 tons were used in 1995, excluding the use of movable foaming units.

The technical management of the company has some ideas to convert from CFC to non-CFC blowing agents.

ODS use in Refrigeration Sector

Macedonia has one large refrigeration manufacturer AD Frinko Co. located in Bitola, south-west of the country 180 km from Skopje. The company started business in 1947. Up to 1970 the company operated independently, joined in 1990 large Rade Koncar conglomerate Zagreb - Croatia, and became independent again in 1991.

Currently, the company is organized as a share holding Company "AD Frinko". The actual operations are divided in 7 individual units with their own staff, book keeping and other legal structure.

The general and technical management of company is very well aware of the provisions of the Montreal Protocol and the related business implications. Also the technical options to change over non-CFCs both in coolants and Foaming agents are well known.

Household Refrigerators Ltd has a capacity of 300.000 refrigeration and freezer units p.a. The appliances range from 50 to 335 liters in 14 designs different. The company used to have the Italian Zanussi Co. as licensing partner in 1970-80, but this agreement has now expired. The actual production in 1995 was approximately 96.000 refrigerating and 60.000 freezing units. The company is exporting some 60% of its production to Italy, Bulgaria, Greece, Albania, Slovakia, China, Algeria, Chile and Spain. The total CFC use was approximately 89 tons, out of which CFC 12 55 tons and CFC 11 34 tons.

For insulation foaming production the company has 5 foaming units, 3 for cabinets and 2 for doors.

The company imports all compressors, from several countries, based on market situation and pure commercial criteria.

The number of employees is 940, out of whom 775 in the manufacturing.

The Commercial Cooling Units Ltd has a production capacity 27.000 units p.a. Horizontal freezers produced in 5 different designs, volume from 140 to 400 liters, refrigerators in 3 different designs, volume from 340 to 1480 liters and cooling display units in two designs, volumes 1000 and 1330 liters. The actual production in 1995 was 26.000 units. Commercial units are not exported. The total CFC use was approximately 17 tons in 1995, out of which CFC 12 as coolant 4 tons and CFC 11 for foaming 13 tons.

For insulation foaming the company has 2 foaming units, one for cabinets (high pressure) and one for doors (low pressure).

All compressors are imported from Zanussi, Italy.

The number of employees is 210, 190 in the manufacturing.

The Industrial Cooling Units Ltd is specialized in producing turn key cold stores and industrial cooling equipment, all delivered for the domestic market. All cooling and refrigeration equipment installed is using HCFC 22 (4 tons in 1995) or ammonia as refrigerant. Compressors are imported, but ammonia using compressors are produced by the company itself. For insulation panels and foaming the company is using CFC 11 and 12, use in 1995 2 and 1.2 tons respectively. The company has one high pressure foaming unit from "Cannon" Italy.

The company employees 250 persons, 146 in the manufacturing.

Frinko Co. has prepared a detailed plan to convert from CFC 12 to 134-a regarding coolant and two stage plan to replace CFC 11 as a foaming agent with CFC 134a, and in later stage with cyclopentane.

Couple of small companies in Skopje, Gostivar, Struga, T.Veles manufacture refrigerators, mostly Commercial Cooling Units.

The total production of refrigerators in 1995 was around 3000 pieces and usage of approximately 3 tons CFCs (CFC 12 - 1.0 tons, CFC 11 - 1.5 tons and HCFC 22 -0.5 tons).

There are large number of agricultural and industrial companies which main occupation is keeping frozen food. They are located in: Skopje, Kumanovo, T.Veles, Negotino, S.Nikole, Strumica, Radovis, Gevgelija, Valandovo, Tetovo, Gostivar, Ohrid, e.t.c. In Macedonia every year around 100.000 tons of food is getting and keeping frozen. Refrigeration systems contain several tons ammonia as refrigerant and the average usage of ammonia is around 20 tons per year. Around 60.000 m² isolation sandwich panels are used with approximately usage of 46.6 tons CFCs (Stip 5.000 m², Gostivar 5.000m², Kumanovo 4.100 m², Kratovo 6.000 m², Skopje 6000 m², Bogdanci 5.000 m², Radovis 14.000 m², Ohrid 10.000 m², e.t.c.).

In some of the trading Companies or food producing companies (Zito Luks, PKB-Skopje, Metropol JP, Srem-Skopje, Slavija, Uniprokom, Unicompany, Konzum, e.t.c.) there are cold rooms and storages which used approximately 5 tons HCFC 22 as refrigerant (in 1995) and for insulation panels and foaming used CFC 11 - 2.5 tons and CFC 12 - 2 tons.

Macedonia is a county with an average summer temperature of 35°C. That is the main reason of the usage of air conditioning systems which is increasing every year more and more.

In Macedonia there are many air conditioning system in public buildings such as big hotels (Kontinental, Grand, Sileks, Metropol, Belvi, e.t.c.) in many shopping centers (City's shopping center - Skopje, Department stores: Skopjanka, Ilden, Most, Skopje, ...) and in many commercial building (like PTT, MRT, ...). In these systems 1.2 tons CFCs employed (HCFC 22 - 0.7 tons and CFC 12 - 0.5 tons) in 1995.

During 1995 were sold in Macedonia around 4.000 pieces of household-air conditioners. The biggest trading companies are: Fonko Co. (with approximately 2000), San-Trade, e.t.c. These systems use an average 5 tons of HCFC 22.

Maintenance of the refrigerators and cooling systems is the main occupation of around 500 services and 400 of them have no authorization and they are without education and training in servicing.

The biggest service network is located in Frinko Co. with 12 different locations through Macedonia and they employ 30 people.

Between the biggest services are also: Rade Koncar, Gorenje. Ladenje, Frigo-Term, Frigo-Tehna, e.t.c.

The owners of these services and the employees are not informed of the ratification of the Montreal Protocol in Republic of Macedonia.

In 1995 in the maintenance of refrigerators approximately 2.5 tons CFC (1.5 tons - CFC 12 and 1.0 tons - HCFC 22) have been used.

There are no recovery and recycling systems in Macedonia.

ODS use in Fire extinguishers

Republic of Macedonia is not a producer of halons. They are imported and mainly used in fire extinguishing substances.

Halons are used as much in the fixed systems as in the portable systems for fire extinguishing. Primarily they are used for the protection of vital electronics facilities, such as computer rooms and communications equipment rooms, museums and art galleries, airports and pumping facilities.

The total usage of halons in Macedonia is:

Halon 1302 - 7 tons

Halon 1211 - 5 tons

The biggest users of Halons are:

	Users	Consumption of Halon in kg		Users	Consumption of Halon in kg
1	MRT - Skopje	2000	7	Elektrodistribucija	1200
2	PTT-Makedonija	1000	8	Airport - Skopje, Ohrid	500
3	Banks	1000	9	ZTP - Skopje	800
4	MVR	500	10	Zelezara-Skopje	550
5	REK - Bitola	1200	11	ZOIL - Skopje	650
6	Alkaloid-Skopje	600	12	Other	2000

The biggest services for maintenance of these extinguishers in Macedonia are: Pastor, Solidnost, Ognoprevent, Unioninvest. e.t.c.

Supplies of halons in these services in this moment are about 300 kg (150 kg in Pastor and 150 kg in Solidnost). That's also the average usage of halons for one year in maintenance of extinguishers.

The Fire Protection Department of the Ministry of Interior is supervising the fixed systems. Former Yugoslavia had a rather well developed fire code for e.g. classifying hazard in several categories and specifying the standard extinguishing equipment to be applied.

Anyhow the need of fixed systems is decreasing because several businesses and industries are technically restructuring production. For e.g. large computer rooms (usually protected by a fixed halon based system) are becoming obsolete.

There are no halon bank or recovery system for halons in Macedonia.

ODS use in production of medical plastic

HEK Jugohrom - Medical plastic is a company in Tetovo (40 km north - west from Skopje). This Factory produces different kinds of plastic products used in medicine. The factory exist since 1980 and that time it was planed to fulfill needs for the market of former Yugoslavia. Today it has 140 employees and it's governmental property (the privatisation is under way). Only 15% of the production is for the internal market and the rest 85% is exported mostly in Yugoslavia and in some of the Western European Countries.

The whole technology and the equipment were produced in Sweden..

In the section where medical plastic is produced for sterilizing of all the products is used a "gas for sterilizing"), which is a mixture of CFC 12 (88%) and ethyl - oxide (12%).

The usage of this gas in 1995 was 20 tons (approximately 17.5 tons of CFC 12). Otherwise, if the factory works with a full capacity, the usage of CFC 12 will be approximately 35 tons for one year.

This mixture is imported from Germany.

The leading team is very well informed about Montreal Protocol directly for the producers and in a last period they have some problems because the price of this gas is rising on the west - European market. That's the reason why they suggest and they do very serious analysis about the substitution of HCFC 22 with a CO₂. According to their program, only to adapt the sterilization (for materials only) they need 150.000 DM and for changing the bottles they need 100.000 DM. In this moment there are big financial problems for successful realization of this project.

For taking out the grease from the products in ultra - sound baths CFC 113 is used. The usage of CFC 113 for this purpose is around 2 tons for one year. There are some plans CFC 113 to be substituted with HCFC 134a , but it shows that this freon leaves some spots on products, so that's the reason for additional analysis.

ODS use in tobacco industry

Methylbromide is used in a tobacco industry actually in a raising up a transplant.

From contacts that we made with a Ministry of Agriculture and Forestry, Tobacco Institute "Jugotutun" from Prilep and Makedonija Tabak from Skopje, we found out that the usage of a methylbromide is different and depends of annual sowing of tobacco.

Methylbromide is imported from Israel and the importer is "Makedonija Tabak" from Skopje.

The usage of methylbromide in 1995 was 20 tons.

Procedure for import - told :

1. Agreement between the producer from Israel and the importer for Macedonia "Makedonija Tabak".
2. Request for issuance of a license from the Ministry of Agriculture and Forestry for importing methylbromide, Ministry of Health and "Jugotutun" - Tobacco Institute from Prilep (that understands sending samples of methylbromide to all above mentioned for analysis).
3. On the base of the request the above mentioned three independent institutions analyze the quality of the methylbromide and they give their opinion to the board for insecticides and pesticides under the Ministry of Agriculture and Forestry (for procedure Makedonija Tabak has to pay 12.000 DM). According to the researches Ministry of Health, Ministry of Agriculture and Forestry and Tobacco Institute "Jugotutun" give their opinion to the Ministry of Foreign affairs which is authorized to issue a license for import.

This License is valid five years and there is no limit in the quantity of imported methylbromide.

4. Institutional Framework

In the F.Y.R. of Macedonia, protection of the Ozone layer is a part of a general politics for protecting and promoting of a living environment and a nature which is included in the constitution of the F.Y.R. of Macedonia, in all laws which are concerned with problems of protecting and promoting a living environment and nature and in all ratified international acts such as (agreements, protocols, conventions, etc.).

Protecting of the Ozone layer in the F.Y.R. of Macedonia is based of ratified international law acts such as:

- The Vienna Convention for protection of the Ozone layer ratified with the law for its ratification (Sluzben list na SFRJ N° . 29/90).

After the separation of Macedonia from the Former Yugoslavia, these law acts have been accepted as valid with the Macedonian Constitution's law (Sluzben Vesnik na R.M. N° 52/91).

On the base of these regulations, production and usage of products which are destroying the Ozone layer are placed under definite control.

Country Programme for Phasing Out Ozone Depleting Substances in Macedonia

In accordance with the fact that all these substances are not produced in the F.Y.R of Macedonia under the usage and trading are placed with the same. The usage and the trading with all kinds of ODS in agreement with a decision of spreading products, of forms of export and import itself (Sluzben List na SFRJ N° 75/91). are placed under control, in other words trading with this products is possible only with special licenses issued from the competent Ministries. Licenses and the quantity of imported substances are registered. Competent Ministries annually have to inform the Government about the situations with the usage of these substances about the main goal to build a politics for permanent decreasing of the usage of these substances.

Till 1994 these special licenses were issued by the Ministry for Urbanism, Civil Engineering & Environment.

With the new decision for distribution of goods into import and export groups (Sl. vesnik na R. Macedonia br.81/93) brought up by the Government of Republic of Macedonia from December 29.1993, the authorization for issuing licenses for import of substances that are depleting the Ozone layer was awarded to the Ministry of Health. So, from the beginning of 1994, till today this Ministry is carrying out this function.

For issuing a license first a request is needed with the next informations: the name of the importer, the name of the country exporter of these substances, the description of the place where these substances will be stored, information of the substances, the quantity etc. On the base of this request in some time the Ministry of Health is giving an answer.

The Ministry of Health during the 1995 issued the following licenses for import:

	The name of importer	Freon	Quantity (kg)
1	"Sileks" - Kratovo	11,12,22	351.200.
2	"Frinko" - Bitola	11,12,22	61.000.
3	"Tehnoprogres" - Kocani	11,12,22	10.000.
4	"OHIS" -Skopje	11,12,22	5.060.
5	b.b. "Komerco" -Skopje	11,12,22	5.000.
6	Servis "Elektron" - T.Veles	11,12,22	5.000.
7	PTP "Saluri Komerco" -Gostivar	11,12,22	3.380.
8	OP HEK "Jugohrom" - Tetovo	mixture	4.320.
9	"Makklima" -Skopje	12,22	5.600.
10	"Zito Luks" -Skopje	22	2.000.
11	TP "Trgovija Komerco" - Skopje	12	750
12	"Alkaloid" - Skopje	11,12	3.000.
13	"Astimeks" - Skopje	11	800
14	El. rab. "Frto" - Skopje	12	1.500.
15	"Dakom" - Gostivar	11	1.000.
16	"Vemaks" - Skopje	11	150
Total:			459.760.

With the request for distribution of goods into import and export groups, the substances that they are depleting the Ozone layer are classified in special scales and cods:

code number	name	the code of the scale	form	
			import	export
2 903.4011	CFC 11	2 903 40187	L	L
2 903.4012	CFC 12	2 903 40128	L	L
2 903.4016	HCFC 22	20903 40160	L	L
2 903.4013	HCFC 134-a	2 903 40136	L	L

L - license

From the licenses that have been issued by the Ministry of Health it's evident that importers are not only the final users but some others trading firms.

4. Policy framework

The Government of Macedonia has not earlier been in very good position to apply accurate regulatory and command & control measures because of the external factors (embargo and blockade) in the region to tackle both imports and use of all the controlled substances. Comprehensive and accurate information collection (and for i.e. application of Harmonized System in import classification) is, anyhow valuable tool for the government in case tight command and control measures are needed.

Macedonia is developing an economic policy relying more on international cooperation. This policy aims to a quick structural renovation of industries, exchange of technology and larger international trade. Thus an overall command and control policy are not in line with the general economic and industrial policy. Extensive technological cooperation and trade is supposed to lead automatically, and business wise profitably, to decreasing use of ODS so that specific command measures are not needed. It is also thought that accelerated phase-out will enhance businesses to increase exports.

The structural and technical renovation of industries may lead to decreased employment opportunities in several industries. This development must be monitored and exploiting of the full grace period, which Macedonia is allowed for as an Article 5 country, might be retained as a policy tool of last resort.

5. Government and Industry Responses to the Protocol

The former Yugoslavia ratified the Vienna Convention and the Montreal Protocol in 1989. Yugoslavia operated under Article 5 of the Protocol. Macedonia, when gaining the independence from Yugoslavia, assumed all the relevant international agreements and commitments of Yugoslavia, among them the Montreal Protocol. Anyhow the unclear international position delayed the formal accession to the Protocol, and Macedonia started operate under Article 5 as an independent country in 1994.

The ODS consumption has substantially decreased since 1991, which decrease was partially caused by external conditions. The Government has not issued any specific rules or regulations to reduce the imports and consumption, but has applied a comprehensive licensing system for ODS imports.

UNIDO provided Macedonia with preliminary consultative services. Also the Government has approached UNIDO regarding envisioned larger industrial/technical phase-out projects. UNIDO representatives have paid a short visit to Macedonia and collected some preliminary background information.

The ODS issue has received publicity in the local mass media, so the general public is somehow aware about the things to come.

Most ODS importers and users are basically aware about the formal phase-out requirements and cooperation with the ODS suppliers and foreign buyers of products containing ODS or made using ODS.

The viability of alternative technologies has been discussed. ODS users are aware of the technical options available to convert from ODS using production to non-ODS. The main issue is not a technical one but economical and commercial: how to organize the conversion without risking employment, export market and, naturally, the local market, which is also open for foreign competitors. Most of the main end users have produced schemes and preliminary designs to reduce and/or totally phase ODS.

6. GOVERNMENT ACTION

The Government of Macedonia is aware of its responsibilities as a member of the global community to promote the protection of the Ozone Layer.

It is the policy of the Macedonian Government to attempt to assist those industries in Macedonia which used ODS to reduce their consumption in order to make them environmentally acceptable and to improve their competitive position in markets. In this way it is hoped to obtain both environmental and economic gains. For the reasons mentioned above the Macedonian Government aims to develop a strategy to assume its global responsibilities in promoting the phase - out of Ozone Depleting Substances, at the same time as assisting those industries which have market potential to reduce and phase out their consumption of ODS in order to make their products more environmentally acceptable.

It will consist next following elements:

- Continue the close monitoring an licensing system and amending it with user wise consultations.
- Set up a responsible unit at the Ministry of Urbanism, Civil Engineering and Environment (as a Focal Point) so that it will be able to provide users with more technical and commercial information regarding ODS alternatives and markets.
- Develop and establish appropriate laws and regulations, which will enforced in case any adverse devolpment (for e.g. dumping of obsolete equipment from abroad) is taking place.
- Identify and detail priority projects for presentation to the Multilateral Fund and other financial sources.
- Follow - up very carefully, that the maintenance needs of existing domestic refrigeration equipment can be fulfilled without causing unnecessary burden to citizens.
- Develop publicity campaigns through mass media to increase the consciousness of the general public on the harmful effects of the continued use of ODS , and thus preparing in for increased economic costs which may be unavoidable in the phase out process.

The actual phase-out process in Macedonia will be the responsibility of the individual private and public sector companies concerned. Nonetheless the Government of Macedonia , through its Ministry of Environment will provide technical guidance, seek funding and generally provide enabling environment to the companies.

The Government will, through its membership of the Parties to the Montreal Protocol provide the companies with technical and professional contacts and will arrange to assist, where possible, for companies to be up-dated on the latest non-ODS technologies through attending seminars and Workshops. Wherever possible the Government of Macedonia will seek to engage the cooperation of industry in the phase-out process, and to provide individual industries with contacts with similar industries and industrial associations in other countries. Especially newly privatized and companies to be privatized are encouraged to enhance close contacts with their prospective foreign partner and seeking support from industry associations and the local Chamber of Economy.

7. Industry Action

7.1. Sector: Aerosols

Alkaloid Co. is the biggest ODS aerosol producer in Macedonia.

The top management of Alkaloid Co. is well aware of the Montreal Protocol and subsequent provisions concerning Macedonia as a Party operating under Article 5. Regarding aerosols the company is in process to reformulate its strategy aiming to expand exports, possibly enter into licensing arrangements with foreign brand owners.

The plant has not produced cosmetic aerosols since 1992. In this period the company has been sending cans for filling 1000 kilometers north to Kikinda in Serbia with deodorized iso-butane. The plant has producer plan to switch this production back in Skopje (Macedonia) in order to exploit local resources of hydrocarbons at the Refinery Okta (The Macedonian National Oil Refinery). It is assumed that Refinery will be able to produce the necessary deodorized product.

Detailed technical/economic feasibility study of supplying Alkaloid AD with at least 60 tones of deodorized hydrocarbon propellant will be necessary. This will have to examine comparative prices of CFC versus hydrocarbon propellants.

The implementation of the project will totally **phase-out 120 tons of CFC 12 consumption capacity.**

The estimated cost for the study is approximately **USD 20.000** and the estimated incremental cost of the investment are about **USD 400.000**. The incremental cost might be a high USD 1.2 million if the price of the hydrocarbon propellant is not less than that of the CFC.

Both Alkaloid AD and Oil Refinery have been consulted on the project.

Hek Jugohrom medical products factory produces different kinds of plastic products used in medicine

In the section where medical plastic is produced for sterilizing of all the products is used a "gas sterilizing", which is mixture of CFC 12 (88%) and ethyl-oxide (12%) .

The leading team suggest and do very serious analysis to eliminate the use of sterilizing gas mixture of ethylene oxide/CFC 12 and substitute it with an ethylene oxide/CO₂ mixture, by adapting the existing sterilization chambers to the requirements of the new mixture.

Technical equipment has been thoroughly investigated by Swedish experts and it recommended that the Swedish Ministry of Environment be approached for bilateral assistance.

At full capacity utilization up to **35 tons CFC 12 could be phase out.**

Incremental cost of conversion of sterilization to non-ODS technology is approximately **USD 120.000.**

7.2. Sector: foams

Sileks AD is only one foam producer using ODS as blowing agent in Macedonia.

Foam production capacity of company is some 12000 tons p.a. representing CFC consuming capacity of 1600 tons out of which 360 tons was used in 1995. The company has faced recently some problems in procuring CFC_s .

The technical management of the company has some preliminary schemes to convert from CFC to non-CFC blowing agent.

The technical equipment and new formulations have not been specified in detail and the project may need some technical feasibility study and detailed designs before the actual investment could take place.

The implementation of the project will totally **phase out approximately 500 tons of CFC 11** consumption capacity.

The incremental investment cost will be in region of **USD 3.2 - 3.8 million.**

7.3. Sector: Refrigeration

Frinko AD is the largest refrigerator manufacturer in Macedonia.

The management of company is very well aware about provisions of the Montreal Protocol and the related business implications.

Frinko AD has prepared a detailed plan to convert from CFC 12 to 134a regarding coolant and a plan to replace CFC 11 as a foaming agent with CFC 134a.

Technical equipment will be selected after detailed project proposal prepared by the implementing agency UNIDO is completed.

The implementation of the project will totally **phase out approximately 110 tons of CFC 11 and CFC 12** (combined).

The incremental investment cost estimated at USD 2.1 million.

It is estimated that there are about 2 million refrigeration units in Macedonia.

All in all in Macedonia has approximately 100 licensed refrigeration service workshop and several hundred minor "ad hoc" maintenance operators in the market.

There are no recovery or recycling systems in Macedonia.

It is needed to introduce a national system of recovering and recycling of refrigerant to save at least 50% of the ODS used for servicing purposes. Its elements are to provide simple recovery equipment and recycling machine to the major recovery/servicing companies throughout Macedonia as well as several reclaiming machines to clean the more contaminated refrigerants recovered within the system.

The basic skills of the maintenance technicians are good, but it is also needed to train about 100 service technicians in up-to-date non-polluting servicing technologies by means of workshops and literature.

With recovery and recycling of refrigerants and training of service technicians will totally **phase out about 40 tons of ODS**.

The incremental cost estimated at **USD 300.000** for the recycling/reclamation component and **USD 100.000** for the training.