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**EVALUATION OF THE
NATIONAL CLEANER PRODUCTION CENTRES IN CENTRAL EUROPE**

US/CEH/94/071: Czech Cleaner Production Centre
US/HUN/96/093: Hungarian Cleaner Production Centre
US/SLO/94/072: Slovak Cleaner Production Centre

Volume 3

**Slovak Cleaner Production Centre
US/SLO/94/072**

Report of the joint in-depth evaluation mission*

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Explanatory Notes

Value of Slovak Koruna (SKK) during the period of the evaluation, according to the UN operational rate of exchange is:

1 US\$ = 49.5000 SLOVAK KORUNA (SKK)

Acronyms

ASPEK	- Association of Industrial Ecology Bratislava
BAT	- Best Available Technologies
CCPC	- Czech Cleaner Production Centre
CP	- Cleaner Production
DBU	- German Foundation of Deutsche Bundes Umwelt Stiftung
DESA	- Department of Economic and Social Affairs (UN)
EBRD	- European Bank for Reconstruction and Development
EMS	- Environmental Management System
HCPC	- Hungarian Cleaner Production Centre
NEAP	- National Environmental Action Programme
PPC	- Pollution Prevention Centre
REC	- Regional Environmental Centre for Central and Eastern Europe
SCPC	- Slovak Cleaner Production Centre
WEC	- World Environment Centre

1. INTRODUCTION

Evaluation of the Slovak Cleaner Production Centre (SCPC) constitutes a part of evaluation of 3 UNIDO NCPCs funded by the Austrian Ministry of Foreign Affairs, the donor of the project. The evaluation of SCPC was carried by a team consisting of:

- Mr. Andreas Windsperger, team leader
- Mr. Martin Hauskrecht, national consultant
- Mr. Jaroslav Navrátil, UNIDO staff.

The field mission was carried out 11 – 15 June 2001. The list of persons met and interviewed is in Annex 6.1.

Conclusions and lessons learned are summarized for all three Centres in a separate text (Volume 1).

2. CONCEPT AND DESIGN

2.1 Socio-economic Context

In the course of political and economic transformation after 1989 the production was significantly reduced. Thus, also environmental pollution was reduced but not only because of protection measures but because of reduction of production as pollution source. On the other hand, a lot of positive changes were done from institutional and legal viewpoints. New environmental state administration bodies were established at federal, national as well as local levels. Green party was established immediately after the revolution and a lot of non-governmental environmental organisations occurred which were prepared to protect the nature and environment.

After establishment of an independent Slovak Republic in 1993 the first Strategy of the State Environmental Policy was approved which determined priorities, principles and objectives of Slovakia's environmental policy until 2010. The Strategy was followed by the first National Environmental Action Programme.

The Ministry of the Environment had to prepare a lot of laws and regulations which are being approved by the Parliament. Thus, for example, Environmental Impact Assessment Act is in force since 1994, Nature and Landscape Act, Air Act, Waste Management Act, Health Protection Act and other contributed to the legal regulation of the environment. It is also important to mention that according to the Art. 45 of the Slovak Constitution everybody has a right to obtain updated information on the state of the environment.

Legal regulations, emission limits and their better enforcement positively contributed to the state of the environment. It must be admitted that a voluntary approach to improving environmental situation in enterprises was very often limited because of lack of financial sources. Top managers were often more oriented towards a simple surviving of enterprises because the privatisation process, ownership problems, new marketing conditions were of the highest priority. Problems as pollution prevention, cleaner production, best available technologies were in many cases considered as less important.

In spite of serious problems in industrial enterprises, there are organisations in which ISO 9001 and ISO 14001 were implemented. Till August 2000 34 companies were certified to EMS according to ISO 14001.

2.2 Institutional Framework

2.2.1 Ministry of Environment

A complex environmental information and monitoring system and legislation in accordance with European Union and OECD and setting limits for air, water and waste has been prepared. National Environmental Action Programme (NEAP) is a basic document for future complex, systemic and specific solutions of environmental issues in the Slovak Republic. It provides an information database for dissemination of cleaner production and environmental management system ideas. NEAP in its content comes from shifting the focus from ex-post management of environmental deterioration to elimination of causes of the deterioration or pollution. That is why the Slovak Ministry of the Environment supports SCPC activity concerning the cleaner production implementation.

To support accession to EU the Ministry continues in implementation of relevant EU directives.

2.2.2 Other Ministries

Representatives of the Ministry of Economy, as well as the Ministry of Agriculture are members of the SCPC Steering Committee. Officers from these ministries regularly take part on seminars organised by the SCPC.

A strong support to SCPC was also shown by the Ministry of Foreign Affairs.

2.2.3 Government organizations

The State Environmental Fund was in the past oriented to the end of pipe solutions. Now, the fund is divided into a part for subsidies and a revolving fund. CP solutions are taken into consideration. At the beginning of 2002, Fund will become a part of the Ministry of Environment.

Slovak Agency for Energy co-operates with SCPC since 1997 on the basis of an agreement. Close contacts without formal agreement exist between SCPC and Slovak Environmental Agency.

2.2.4 International organizations

The SCPC co-operates intensively with UNIDO – Investment and Technology Promotion Office, UNDP Country Office, RTC – Basel Convention of the control of transboundary movements of hazardous waste and their disposal and REC – Regional Environmental Centre for Central and Eastern Europe (Budapest).

2.2.5 Non-governmental organizations

The SCPC established relations and co-operation with ASPEK (Association of Industrial Ecology) Bratislava, Chamber of Commerce (branch in Prešov). Informal contacts exist also with small NGOs as for example Movement for Mother Earth.

ASPEK (established in 1993) is an association of approximately 90 industrial and consulting companies interested in harmonisation of environmental and economic interests and decrease of environmental damages caused by industry.

2.2.6 Private consultancy companies

There are two categories of consultancy companies, Slovak (CERTOS Piešťany, Enviconsult Žilina, TopEnvITech Nitra; AJS Management, Bratislava; QES Poprad, IVASO Pezinok, BV Slovakia, Bratislava; DNV Slovakia) and international ones (KWI Vienna, TEBODIN, BKH, IVAM The Netherlands, DNV Det Norske Veritas Norway). Most of them are active in EMS training and implementation.

2.2.7 EMS certifying companies

Slovak market for the EMS certification is not yet too large because of the lack of money for the certification process. There is a big potential for the Slovak local certifying companies (not so expensive), but there are still some legal problems constraining their work (lack of laws, many laws and regulations for accreditation of certification companies are still in the preparation). There are only one or two Slovak companies ready to certify companies according to ISO 14001. Most companies in Slovakia were certified by international certifying companies, or their branch in Slovakia. Till August 2000, 34 companies were certified.

2.2.8 Banks

Všeobecná úverová banka (VÚB) – the biggest commercial bank – intends to implement a scheme for environmentally oriented loans with an assistance of EBRD supplying the bank with know-how, software and technical assistance. VUB contacted SCPC after a UNEP workshop. For the time being the co-operation is oriented mainly to transfer of information about CP. In future SCPC is prepared to act as a consultant to the bank in environmental issues.

2.2.9 Environmental education

Professional certification (bachelor/master/engineer) in environmental protection oriented on ecology and environmental management can be acquired at 13 university faculties in Slovakia.

SCPC has close contract-based co-operation with the Slovak Technology University, Faculty of Chemical Technology and Faculty of Mechanical Engineering.

2.2.10 Other CP related programs

Slovak-Norwegian cleaner production project (1994-1998)

Within this co-operation 45 demonstration projects were completed.

Dutch-Slovak project - Cleaner production in sugar industry

The aim was to promote development of environmental management leading to waste and emission minimisation. The project was carried out in years 1995-1997, with the financial support of the Government of the Netherlands. The project was managed by a Dutch consulting firm TEBODIN.

World Environment Centre (WEC)

A large Waste Minimisation Program was implemented through the World Environment Centre (WEC) supported by USAID, as well as Environmental Health Project, Environmental Training Project. The WEC established and supported also the Pollution Prevention Centre (PPC) hosted by ASPEK with very similar goals and objectives as SCPC. Close co-operation led to establishing of Information Centre for Cleaner Production together with Faculty of Chemical Technology – Department of Chemical and Biochemical Engineering. At that time it was very useful for permanent connection to the Internet and hosting the WEB server at the Faculty. When the WEC program ended, the PPC was incorporated into the SCPC.

2.3 Project Relevance and Design

Project document for the Slovak CPC is very similar to the one for the Czech CPC. Therefore the strength and weaknesses of the project design are similar:

Strengths (what turned out to be valid/relevant):

- Linkage to (integration with) prior and on-going programmes in cleaner production (the Norwegian Cleaner Production project, the World Environment Centre); using extensively national expertise developed by the above projects and linked to the Association of Cleaner Production Managers (consultants).
- Combining capacity building for direct advisory services to industry with creating conducive environment for CP.
- Capacity building primarily through intensive training and on-the-job training (in-plant demonstrations), with support of a twinning organization from a developed country.
- Conceiving the Centre primarily as pivotal organization promoting CP both directly (awareness raising) and indirectly through policy dialog.
- The concept of the Steering Committee and its composition.
- Well established means-end relationship between the outputs-purpose-development objectives.
- Use of realistic indicators at the Output level (in the "Brief Description").

Weaknesses:

- Assumption that CP financial benefits alone are significant enough to motivate companies for replication; the risk at Purpose level ("companies not interested in following up and applying the concept at large-scale basis") was well identified but not adequately qualified ("MEDIUM" instead of "HIGH"). Consequently, the project purpose ("Wide-scale and sustainable application of CP in industry") turned out to be too ambitious.
- Conceiving CP in isolation, not linking it with EMS and/or quality management system.
- Paying no attention to assistance in accessing financial resources for implementation of CP measures.
- Absence of a firm commitment of the host country to subsidize public functions of the Centre (awareness raising, policy, training, information, etc.).

In the course of project implementation some of the weaknesses were rectified (integration with EMS was established).

The Centre has so far managed to remain a relevant organization particularly due to combining CP concept with quality management and EMS and providing such integrated services.

3. IMPLEMENTATION

3.1 Inputs, Budget and Expenditures

According to the project document the host country was expected to provide office space, salary of the deputy director and the administrative assistant, and logistical support (communication). Office space and communication support was provided by the Association of Industries in the initial phase only and later by the Slovak Environmental Agency. However, as of June 1996 the SCPC made itself fully independent and rented offices from Slovak Technical University for which it had to pay. No salary has ever been paid by the host organization to the deputy director. Thus inputs of the host country were small and were provided for an initial period only.

In 1999 the Pollution Prevention Centre established by a USAID funded project was merged with the SCPC. SCPC took over some office equipment but agreed to share the laboratory equipment with the Slovak Technical University as its full ownership would have implied additional operating costs for SCPC without adequate income benefits.

UNIDO inputs were provided in the framework of the UNIDO budget and its revisions (see Table SLO-1).

Table SLO-1: Budget and Expenditures in USD (US/SLO/94/072)

Budget line		Original Budget	Latest Revised Budget	Total expenditures ¹
11-99	Project Personnel	180,000	162,929	162,929
15-99	Project Travel	39,000	37,719	37,168
16-99	Other Personnel Costs	5,000	1,417	1,316
17-99	Short-Term National Consultants	81,000	156,906	140,041
19-99	Personnel	305,000	358,971	341,454
29-99	Contracts	15,000		
39-99	Training	43,000	115,489	91,682
49-99	Equipment	42,500	25,953	25,953
59-99	Miscellaneous	12,000	17,087	10,229
Total:		417,500	517,500	469,318

Breakdown of the budget and actual expenditures reflect the following features of the implementation modality:

- extensive use of national experts (including salary of the Director) (BL 17)
- use of the twinning organization STENUM (29% of total expenditures) (BL 11)
- modest provision of some office equipment only (no testing or laboratory equipment) (BL 49).

Differences between the original budget and its latest revision are not significant and concern primarily an increased provision for national consultants and training at the cost of equipment, international experts and contracts (and benefiting from an overall increase of the budget). Provision for contracts (BL 29) was completely abandoned because STENUM – having already had a contract with UNIDO for the Czech Centre - would have exceeded the threshold given by the UNIDO procurement rules for waiver of competitive bidding.

Cooperation with STENUM Graz represented a significant support for the Centre in the early stages of the project but it was not the exclusive source of foreign expertise. A few short-term consultants were recruited from other countries as well (USA, the Netherlands).

¹ by December 31, 2000

UNIDO project represented the key support for the Centre during the project lifetime but not the only one. This can be illustrated as follows:

Total budget revenue of the SCPC 1995-2000 [a]	approx USD 500,000
Total UNIDO expenditures [b]	USD 469,318
UNIDO support implemented through the Centre [c]	approx USD 92,000
% of the UNIDO project in the Centre's revenue [d]=[c]/[a]	18
Total resources 500000 + (469318-92000) [e]	USD 877,318
% of the UNIDO project in total resources [f]= [b]/[e]	53

(It should be noted for explanation that only a part of the UNIDO project - [c] - was channeled through the Centre, larger part was spent on direct recruitment - for example STENUM - or procurement by UNIDO.)

Thus the UNIDO project with total expenditures of USD 469,318 in the course of six years did not cover the whole budget of the Centre and the Centre had to secure complementary funding. Most of the complementary funding was from abroad. Generally foreign sources of income (including the UNIDO project) prevailed over national sources. In 2000, when total revenue increased considerably (to USD 140000, almost doubling the revenue level of 1999) the foreign sources (including UNIDO, DESA, EPA/Ecolinks, UNEP) represented as much as 80% of the total. UNIDO (including some contracts outside of the project under review) contributed that year 25% to the total revenue, which signals a sun-set trend.

3.2 Activities

As the activities are embodied in results reported in Chapter 4 (internal activities primarily in Output 1, external activities in the other outputs), this section refrains from duplication and focuses only on some aspects highlighting important features of implementation:

Slow start of activities. For approximately two years project activities could not take off properly. It was only after the nomination of the new Director that the position of the Centre got stabilized and activities unfolded.

Attention to building up managerial competence. After the new Director took over the staff participated in numerous training courses to upgrade management and marketing skills.

Intensive use of external consultants (primarily national ones) in carrying out services to companies. The Centre contracts external consultants recruited from among the core of 6-8 experts associated with the Centre. for conducting training and in-plant assessments. Some external consultant also support the Centre in elaboration of methodological tools (manuals and guidelines). However, the staff of the Centre themselves are also actively involved in training and consultancy services and elaboration of policy papers.

Cooperation with STENUM Graz only in the initial phase. Consultants from STENUM Graz participated primarily in elaboration of methodological tools and provided guidance in conducting training and in-plant assessments. Direct training of company staff by STENUM seemingly was not highly appreciated by the trainees (translation; inadequate concern for technical qualifications of the staff).

Wide networking and cooperation. In order to promote the CP concept the Centre has established numerous contacts at the ministry level, universities, banks, companies, a number of municipal offices and a number of environment management consultants and consulting companies. The most active partners are members of the SCPC (approximately 10 organizations and 40 individual members).

Great efforts in searching for clients. The Centre searches for clients among companies, ministries and municipalities. Two factors proved particularly important: personal contacts (frequently dating back to the pre-project time) and availability of funds for subsidizing the services for companies and municipalities. In some cases (Municipalities) the clients can not pay at all for the services. The Centre tries to make use of funds available with external donors or to do project work (studies etc.) for international organizations (DESA, UNEP, UNIDO).

Evolution of new activities. Confronted with low company demand for CP in-plant assessments the Centre engaged in new activities extending the scope of services, such as integrating CP with QMS and EMS, providing advisory services to companies on health and safety, carrying out audits for foreign consulting companies (for example validation of two projects under the Joint Activities in the framework of the Kyoto Protocol), short-term training of top managers on CP and proactive measures, organizing regional programmes to tackle environmental problems of cities and regions, elaborating studies for international organizations, etc. In the course of time the "new" services prevailed over the CP-alone services which are currently almost discontinued. Other "new" activities such as CP financing are under preparation.

On the whole, implementation could not be guided only by activities specified in the project document but rather had to adjust the activities to reflect acquired experience and meet new challenges particularly in view of completion of the UNIDO project.

3.3 Project Management

On the host country side the counterpart function was only partly and temporarily executed by Associations of Industries. For some time the project was in an institutional vacuum (hosted by Slovak Environmental Agency) which was reflected even by absence of any adequate premises. After constituting SCPC as a professional non-governmental organization any formal national counterpart vanished and the supervisory function was executed by the Steering Committee only.

The SCPC has a complex legal structure. The Steering Committee is elected by General Assembly of the NGO. The General Assembly has currently approximately 50 members (10 organizations, 40 individuals) who pay a small membership fee (organizations 100 USD), receive the Newsletter and are encouraged to participate in the work of the Centre and promote it. The Steering Committee meets twice a year to decide on or approve important measures. The core members are representatives of the Ministry of Environment, Ministry of Economy, Ministry of Agriculture, and the Slovak Technical University Bratislava. The composition of the Steering Committee is adequate except for the absence of any Industry Association (however, one industrial company is among the members of the Steering Committee). Sometimes the meetings of the Steering Committee were conceived as review meetings but the Project Progress Reports in the UNIDO standard format were rarely prepared.

Operational management was in the hands of national Directors. The new Director (as of February 1997) has a dynamic personality with excellent technical, managerial and leadership qualifications, capability to search for innovative approaches and a network of contacts with industry and universities.

The project was executed by UNIDO. The project management function was carried out (during 6 years, if preparatory phase is included) subsequently by three UNIDO staff from the same Branch but no particular problems of management discontinuity were recorded by the evaluation team. Contacts between UNIDO and the Centre, including visits for briefing, training and solving administration issues were quite frequent. (Administration of the discretionary budget was rather laborious.) Monitoring of the project by UNIDO included participation of the UNIDO Project Manager at some meetings of the Steering Committee. Contacts with UNEP increased in recent years.

4. RESULTS

4.1 Outputs

Presentation of Outputs follows the list of Outputs as stipulated in the project document.

4.1.1 Establishment of the Centre

According to the project document the Centre should have had a staff of two professionals and be able to carry various promotional, training and advisory functions.

The contract for the establishment of the Slovak Cleaner Production Centre (SCPC) was signed in 1994 by the Association of Industries as the Slovak counterpart, the centre started in the following year 1995 its operation in offices provided by the Association of Industries. Prof. Blazej was nominated as director of the centre by UNIDO. After some month the Association quit the contract and the SCPC was transformed to a NGO, an independent non-profit association, located in rooms of the Ministry of Environment (Slovak Environmental Protection Agency) until mid of 1996. However, as of June 1996 the SCPC made itself fully independent and rented other offices from Slovak Technical University. In 1997 Dr. Viera Feckova followed Prof Blazej as director and she still holds the post.

In addition to the Director the SCPC consists at the moment of a full time deputy director and a secretary, a part-time employee and two interns. One former employee has become an independent consultant with most of his time allotted to SCPC projects. This is more than what was planned in the project document.

Educational background of the staff is very good. The Director and three other staff are holding an engineering degree, the Deputy Director graduated in environmental engineering. Knowledge of English and communication skills in general are very good. The Director has had extensive experience in consulting industry.

Great attention has been paid to continuous upgrading of staff qualifications. The director and other staff participated at various training courses and conferences (such as Workshop "Environmental Accounting" in Washington, Conference on "Implementation of HSMS in Chemical Enterprises", seminar "EMAS Eastwards" in Ostrava. ISO 140000 Seminar in Bratislava, Internal Auditor training). Beside that English courses were attended by 4 SCPC employees, an Accounting Course by the secretary and a training for Non-profit Associations and a long-term Marketing Course by the director. The office provides adequate space and equipment. The Centre has an easy and contract-based access to measuring and laboratory equipment taken over by the University from the closed Pollution Prevention Centre.

As regards management information system, activities are well documented but there is no monitoring of implemented CP options and of their environmental and financial impact. The Centre prepared a well designed annual reports for 1998 and 1999, report for 2000 is still under review.

An Advisory Committee, composed of three members of the centre, focuses on the financial operations and the balance. The legal situation in Slovakia stipulates that the SCPC keeps double accounting, regularly audited by auditors.

The Centre provides its services only through an office in Bratislava. There are no formal subsidiary offices or regional representations. However, SCPC uses already certified companies as examples and playground for new projects. This may lead to a close network of the CP companies in future.

The Centre is capable of performing all services envisaged in the projects document as well as services that were not envisaged (such as EMS).

Assessment: more than planned.

4.1.2 Dissemination of information

Dissemination of information on CP and the Centre was very intense through the whole time of operation. 47 articles in newspapers were published, press conferences were organized when particular projects could be completed. Information brochures provide an easy and comprehensive access to the service of the centre. Moreover the SCPC issues a Newsletter with 4 issues per year, each consisting of 8 pages. Besides that the Annual Report is sent to the members and main actors in the field of CP, providing detailed information about the activities and the development.

The SCPC was also presented at congresses and exhibitions, like the ENVI Brno in the Czech Republic, where there was a common desk together with CCPC. Contributions were presented at the "Environman 99" in Kosice, the seminar on "Regional Agenda 21" in Banska Bystrica and at the "Quality 99" in Ostrava (Czech Republic). The participation in the network of CPCs in the UNIDO/UNEP Programme and the PREPARE Programme allows close links with other institutions and an intense exchange of experiences. Handbooks and manuals on CP or EMS (see Output 4.1.6) and their wide distribution either by SCPC or the Ministry of Environment also helped in disseminating the CP-activity. The SCPC webpage is well structured and provides a comprehensive and updated overview on the activities and the framework of the Centre. The webpage has a considerable number of links to other CP-relevant webpages, including UNIDO and the UNEP database of CP case studies. (However, demand for technology-related information by outsiders is very low.) The webpage serves more and more as a central platform for information about CP and related fields in Slovakia.

As a result of these activities SCPC is well recognized as the focal point for CP in Slovakia and the CP concept is well known among environmental professionals and within a certain segment of government organizations, municipalities and industry. The CP concept has not yet become known by all industrial and service companies but it would be unrealistic to expect such a result under this output.

Assessment: as planned

4.1.3 Demonstration projects

This is the core and the most difficult output of the project to build up capacity in enterprises and municipalities. It was planned to carry out and least partly implement CP demonstration projects in at least 20 companies. More than 80 projects could be performed in more than 100 companies. Most of them were carried out in the Chemical Industry, Machinery and Food Industry, as well as in the services sector.

The demonstration projects (case studies) followed different patterns:

- CP-alone Sectoral Projects – focused on case studies in enterprises of the same branch.
- CP-alone Regional Projects – creation of a model of a city improving its environmental, economic, social and cultural status, involving relevant municipality office(s) and local industrial and service companies.
- Integration of CP and EMS – implementation of ISO 14000 standards and integration of EMS and QMS.
- Health and Safety Projects – especially in Paper Industry (benefiting from the director's profound expertise in this field).

Experience has shown that involvement of participants from different sectors is extremely useful. People not biased by operational blindness could sometimes contribute to innovative solutions. Therefore projects were organized frequently on a regional basis.

The following results were reported for the period 1997-2000:

	Projects	Participating companies	People trained
CP-alone	74	105	221
CP + QMS/EMS	4	10	170
Health and Safety	5	5	105
Other	13	20	124
Total:	98	140	620

While the number of CP-alone projects prevails in the whole period, no CP-alone project was started in 2000: the trend to "new" categories of projects is apparent. Another difference is significant: the number of trainees per company is higher in the case of "new" projects. In all cases the projects consist of training and consultancy services. In the case of CP+QMS/EMS projects the training takes 18 days altogether and consultants work with the company approximately 60 person/days.

The evaluation team visited VIPO Partyzanske, CALENDULA Nova Lubovna and the Municipality Office of Martin (see 6.2 Annex).

Assessment: more than planned.

4.1.4 Training

SCPC provides training in connection with demonstration projects as well as training-alone events in which other people, not involved in projects, can participate. According to the annual report 1999, training programmes are offered for:

- CP-implementation
- EMS-Manager and auditors
- Training for EMS Trainers
- Safety and emergency issues
- Integrated systems

As indicated in the table under 4.1.3, in total 620 people were trained in the period 1997-2000, out of which 221 in the CP-alone demonstration projects, exceeding by far the target set in the project document ("at least 50 people... trained in cleaner production practices and application"). Training in the context of CP-alone demonstration projects lasted approximately 120 hours in total (stretched over several months).

Training associated with the other categories of projects (EMS, Health and Safety) involved more trainee per company. However, it should be understood that in the "new" projects different staff from the company may participate at different components of the training programme so that the duration of training of individual trainees is shorter compared to CP-alone demonstration projects. It should be also realized that CP becomes only a component in the CP+EMS projects which in itself makes exposure to CP methodology less extensive and subordinated to the higher objective of introducing EMS as a system of continuous improvement.

In addition to the long-term training course the Centre carries out short term course (1-5 days), including courses for top management. In 28 courses more than 500 people were trained (or their awareness raised) during 1997-2000. Training of top management increased particularly in 2000. This indicates a favorable development that the top management in companies could be reached increasingly.

Assessment: more than planned

4.1.5 Research Institutes

The project document envisaged initiation of research work in selected research institutes on prevention of industrial pollution. Some research work was initiated already in 1996 at some universities, including the Chemical Faculty. Recently the most significant effort was strengthening of CP considerations in the work of a R&D organization VIPO Partyzanske in the course of supporting the company in introducing EMS. The organization did achieve some research results in their long-term programme to utilize waste from leather processing. Though this R&D programme was not initiated by SCPC, participation of the company in the SCPC project further supported the work.

Assessment: As planned

4.1.6 Documentation and Manuals

The project document required preparation of documentation describing Slovak experience in cleaner production and a waste audit reduction manual. SCPC prepared a number of manuals and handbooks:

• Waste Minimization Manual	96,97	sk, eng
• CP and EMS Manual (joint publication with STENUM)	97, 98	cz, sk
• CP and Sustainability, Textbook	97	sk
• CP principles and implementation	98	eng
• Auditor Manuals	99	sk
• Pollution Prevention	96	sk,eng
• Handbook for CP and for Trainers, Training set	00	sk, eng

Most of them are in Slovak, but in the last years an increase in the share of bilingual or English publications is conspicuous.

Assessment: more than planned

4.1.7 Policy advice

The project document aimed at increased awareness among key policy makers and financial institutions. SCPC established close and very effective working contacts and dialog particularly with the Ministry of Environment. SCPC prepared a number of inputs for their work and decision making and participated in several national and international working groups on behalf of the Ministry.

Recently SCPC has been working for the Ministry particularly on the following projects:

1. *Climate Change Convention* – validation of projects in the context of Flexible Instruments (Joint Implementation and Clean Development Mechanism), already completed for two companies with funding from Norway, continuation for the MoE is planned.
2. *IPPC* – how will companies be able to comply? - a strategic study about the necessary input data for compliance with environmental law is under work by the Danish EPA, SCPC works for MoE on a detailed investigation in 300 companies about the requirements for IPPC. Focus is on what data are needed in the companies and how can they be compiled.

Ministry of Environment staff appreciate the quality of SCPC support due to its contacts with and detailed information about companies in Slovakia and excellent understanding of technical issues. This lead to high acceptance of SCPC in companies and at the Ministry as well.

There are several issues envisaged by the Ministry for further cooperation with SCPC (such as environmental accounting in companies). A Memorandum of Understanding was prepared for signature by the Minister.

As regards financing institutions, one bank is a member of SCPC, discussions with financing organizations started.

Assessment: As planned

4.1.8 Integration of CP in University curricula

This output was not envisaged in the project document.

The integration of CP in University curricula is another channel of diffusing the CP concept, the more so as a University has a typical multiplication function. This channel was not in the focus of attention by SCPC but there was some cooperation with Universities, notably with the Slovak Technical University, Technical University Kosice and Technical University Trnava. About 30 University teachers are familiar with CP and include it in the lectures, but there was no clear indication about the extent and no evaluation about the effects. Five theses (Diploma or Master) were supervised by SCPC in 1999.

4.1.9 International projects

SCPC did not implement large CP projects abroad (like CCPC) but carried out several CP-related assignments abroad (such as a project for the Regional Environment Centre in Budapest, UNIDO project in Kenya, etc.) and managed to get contract work for preparation of studies for some international organizations (UN DESA, UNEP, UNIDO). The study "National Strategies for Cleaner Technologies Transfer in CEE and NIS countries" is probably the most extensive project consisting of two parts:

- International Meeting to annotate methodology and discussion on National strategies, which was attended by 28 countries.
- Elaboration of a methodology for diagnostic studies.

As mentioned elsewhere, SCPC managed to get contracts for a number of foreign funded CP-related projects in Slovakia.

4.2 Achievement of the Purpose

The purpose as formulated in the prodoc is identical with the one in the prodoc for the Czech Centre: *"The purpose of the project is to achieve a critical mass of awareness, expertise and experience in the application of cleaner production in industry so that the application and dissemination of the concept can proceed on a sustainable basis"*. Another quotation from the project document defines project objective as *"Wide scale and sustainable application of cleaner production to Slovak industry"*.

As in the case of the Czech Centre, no quantitative indicator was set for evaluating the success as defined above and the evaluation team acknowledges the difficulty of specifying a realistic and verifiable indicator for a purpose conceived as above. Thus the evaluation of this aspect is based on qualitative information only.

It can be concluded that a critical mass of expertise and experience in the application of cleaner production was actually achieved. There are enough consultants acquainted with and experienced in application of CP methodology.

As regards awareness of CP, much has been achieved through training of top managers and dissemination of the Centre's newsletter which presents insightful methodological and technical information on CP. In spite of that the demand for CP advisory services (in-plant assessments) by companies remains rather low and it can hardly be concluded that CP is widely applied in Slovak industry. Thus, in spite of good results in production of outputs in general and in building up sufficient CP expertise and experience in particular, the objective of wide scale and sustainable application of CP to Slovak industry has not been fully achieved and needs to be further pursued.

4.3 Impact

Implementation of CP options identified during demonstration projects at company level and resulting environmental and financial benefits were not monitored by SCPC so that no estimation of impact of the project at company level can be made. From the company visits and the visited institutions the evaluation team learned about success of the Centre's activities, although it concerned in many cases support for improving performance in the sense of good management and legal compliance. From the visits of companies supported by SCPC in introducing EMS the evaluation team concluded that immediate environmental and financial benefits were rather small. Partly it is the consequence of integrating CP in an EMS project. In an EMS project the focus is on introducing a system of continuous improvement and not so much on immediate environmental and financial results. Correspondingly, the CP component is less extensive in such a project so that the immediate results are usually in the category of improved housekeeping, such as separated collection of waste, whereas investment options, if identified, remain usually "in the pipeline".

In the case of CP+QMS/EMS projects it seems more appropriate to assess the impact in terms of number of companies/organizations in which EMS was actually applied. As a result of the SCPC support several companies were certified ISO 14000 or are close to complete preparatory work for certification. One Municipality Office is among those preparing for certification.

It is hoped that CP changes with environmental and economic impact will be continuously introduced in such companies. CP is introduced also in other companies in the course of their on-going technology upgrading but these changes result from decisions not necessarily influenced by SCPC.

5. SUSTAINABILITY

Sustainability of the Centre depends on the actual demand for its services and on professional and managerial competence to deliver such services to the satisfaction of the clients. From all the visited institutions, public bodies, representatives of companies which were in contact with the centre, the evaluation team heard satisfied up to enthusiastic assessment of their experience with the work of SCPC. The centre could reach a high degree of reputation mainly due to expertise of the Director Ms Feckova. Partners appreciate her technical expertise as well as her business-like manners. The government acknowledges close contacts to industry and gets her involved in their programs. The well acknowledged expertise of the Director promises enough demand for service of the Centre in the future.

Currently her contract is signed by the Steering Committee only for the period when there is no other personal contract of the Director. Actually not all her services are provided via SCPC, some services are provided on the basis of personal contracts of the Director. This is a flexible solution but it may also imply a drawback for the centre's income, if activities under personal contracts could also be assigned to SCPC. Thus the key and dominating role of the Director in the team signals that the future of the Centre depends primarily on continuation of her service. This seems not to be a problem in the present situation because of dedication of the current Director to the Centre but under different staffing it may present a threat of weakening the centre's human capital. This risk was further strengthened recently by departure of two experienced professionals from the core team so that building up and consolidating a modified team is currently in progress.

In financial terms there has been clear positive development on the income side. Starting in 1995 with about 1 million SKK the income could be increased up to 3 million SKK in 1997. After a drop in 1998 the level of 3 million SKK could again be exceeded in 1999 and further increased to 7 million SKK in 2000. A further increase is envisaged for 2001 so that mid-term prospects appear to be very good.

Generally the income from international sources is responsible for that development, whereas the domestic financing remained rather constant during the last years at about 1 million SKK. Except for 1998 (when international funding decreased) the share of domestic sources of funding never prevailed over the foreign ones and in 2000 and 2001 their share is less than 20%. This happens in spite of the fact that SCPC tries to generate income from companies participating in its projects. In many cases the companies had to pay one third of the costs themselves. Since 1997 there was a clause in the contract with some companies that all the costs have to be paid by the company if it drops from the project before it is completed. (In one case it actually happened and the company paid.) In three cases a contracting model was introduced where the SCPC was paid based on the savings incurred by the company as a result of the project.

High dependence on international resources represents a certain risk for the long term sustainability of the original function of SCPC but, at the same time, higher income per working hour generated in internationally funded projects allows for honorary work for domestic services to some extent.

Expenditures contain primarily remuneration for the employees and external consultants. The contracts exceed the staff salaries. (Also due to the fact that the Director herself operates on contractual bases.) From the expected amounts of more than 7 mill SKK in 2001 the engagement of 7 persons (employment and contracts) is ensured.

This staffing is adequate to meet the challenging work in the next future on public, national and company level as well but a more balanced distribution of the workload will be required. For that purpose an extension of the basis of expertise to include at least 3 permanent staff of the Centre seems recommendable.

Sustainability of SCPC can be supported by networking with some companies, as already practiced. Involvement of former clients leads to an information network among the companies for exchange of experience, which generally will strengthen their ability to find solutions to problems. Some of the companies should increasingly be used as regional focal points to disseminate information, serve as a first contact and penetrate better the region with CP ideas.

6. ANNEX

6.1 Persons Met and Interviewed

Monday 11 June 2001

The Slovak Cleaner Production Centre

Ms Viera Feckova, Director of CPC
 Ms. Jana Báležová, Deputy Director
 Ms. Marta Chovancova, consultant

Všeobecná úverová banka (VUB – bank)

Ms. Slivia Vidlárová, environmental loans

Association of Industrial Ecology in Slovakia (ASPEK)

Mr. Pavel Jech, General Director

UNIDO - Investment and Technology Promotion Office, Bratislava

Mr. Vladimír Wiedermann, Head of Office

Tuesday 12 June 2001

Ministry of the Environment of the Slovak Republic

Mr. Robert Brňák, Head of the Department
 Mr. Ivan Tirpák, Director, General Intersectional Relations and Informatics Division
 Mr. Ivan Mojčík, Director, Department of Air Protection

Ministry of Foreign Affairs

Ms. Zuzana Chudá, multilateral cooperation and environmental projects

Slovak University of Technology, Faculty of Chemical Technology

Mr. Prof. Vladimír Bálež, PhD., DSc., Dean

Wednesday 13 June 2001

VIPO a.s.

Mr. Ing. Leopold Duchovič, Csc., Managing Director
 Mr. Ing. Dagmar Jehlárová, Quality and EMS Manager
 Mr. Ing. Jurkovič, Head of Laboratory

Thursday 14 June 2001

CALENDULA, a.s.

Mr. Ján Valigulský, Managing Director
 Mr. Ing. Daniel Bucko, Vice Director
 Ms. Ing. Erika Baranová, Q+EMS Manager

Friday 15 June 2001

Municipality Office of Martin

Mr. Stanislav Bernát, Lord Mayor
 Mr. Ing. Stanislav Janiš, Office Manager

6.2 Visits in Companies

6.2.1 *Calendula*

Calendula produces semiproducts for pharmaceutical industry, mainly herb extracts and essential oils out of medical herbs, cultivated to the largest extent in the region. It was founded 16 years ago as an agricultural co-operative, owned by Slovakofarma. The current company started as a research project within Slovakofarma, but was during the transition process in SR intended to be shut down. Due to the dedication of the employees to that activity there was a buy-out of the area and the equipment leading to new establishment as independent company in 1998. The intended increase of the share of clients abroad led to the idea of implementing EMS (ISO 9000 and 14000).

The contact to the centre was established based on a personal relation to the director, the subsidiary of Ecolinks was an additional temptation. The procedure followed the pattern hereunder:

- introductory audit by SCPC staff + consultant;
- consultants visits on-site for the purposes;
 - * building up a team;
 - * establishing a list of relevant regulations;
 - * listing the requirements for legal compliance;
- training of the team together with a another company which had already ISO 9000 and served as an example;
- support by preparation of the documents;

Generally the support by the SCPC helped definitely the company to get established by gaining as fast as possible a sufficient operational status through:

- complying to the legal requirements in economic and administrative respect;
- up-grading the technical equipment to the state of the art;

As CP related measures could be identified:

- Waste separation so that the organic waste can be used for composting;
- Liquid waste from cleaning for fertilizer production;
- Health and safety improvements.

Although the CP relevance in this company was not very high, the situation required other first steps which have been completed successfully. The built up confidence can guarantee further pursuing of CP strategies and can now be used as a positive reference for the activity of the centre in the region.

6.2.2 *VIPO-Partizanske*

VIPO was founded in 1972 as research institute for leather and footwear industry. From these fields the working area was extended to cover also rubber processing, furniture and manufacture of carbon brushes.

There are now three main product lines:

- Chemicals, glue production
- Engineering, engines for rubber processing, tyres and floorings
- leather tanning technologies

The contact was established by the director of SCPC, having got the name from a list of attendees at a MoE workshop. The main motivation of the company to use the SCPC service was the implementation of ISO due to the request of customers, with a clear expectation of improving quality in the company. ISO 9000 has already been introduced, should now be extended to ISO 14000. The procedure followed the common pattern with a lot of on-site support. During the project following options could be identified:

Realised Options

- reduction of wastes by optimized punching of the shapes in shoe production – economic benefit
- hot melt production – economically beneficial
 - improved water recycling for new lines
 - reduction of cooling water
- use of a emulsion based on vegetable oils allowed a utilization of metal shapings

Further environmental improvement of the tanning process is under investigation

- reduction of S^{2-} in the waste water – economic benefit through saving of fines for exceeding emission limits expected
- Chromium recycling – emission reduction and material saving
- utilization of hairs and collagen – economic benefit due to sellable by-products

The even reduced leather wastes are up to now difficult to utilise due to their Chromium content. A modification of the process allows to recycle the Chromium bath and to make use of the residues to produce gelatine for food industry, glue and Keratine for cosmetics. If developed to technical level this process will represent one conspicuous example for Cleaner Production.

6.2.3 Municipality of Martin

The participation of the Major of Martin was in the context of the network on Healthy Cities, where the focus is on cleaning industrial and commercial activities. The contact to the city hall was established by SCPC director, as she got the list of participants and contacted them. After the consultations with the centre the targets are now the followings:

- companies – training in workshops for the main polluters in the city and the district;
- city hall – implementation of CP in the office;
- city related institutions and organisations – limited competency in many respects as many of the services as provided by external companies, but these companies are tried to get involved in the workshops.

The focal point of the movement is the Municipal Office. On one hand CP thinking is introduced in the office operation with the intention of finally getting an EMS implemented, but also for owned institutions (nurseries, schools,..) and permissions in the field of competency. Moreover it is tried to encourage at least the major polluters in the district to participate in the workshops by showing them the continuous implementation of EMS in the city government.

The efforts to extend the implementation of CP to more than the Municipal Office itself is restricted by limited competencies of the major in the district and due to national legislation. But the Municipality expect a fundamental change in that situation in the future, shift to many competencies from the national to the local level.

In the Municipal Office some CP options could be identified:

- Introduction of separated waste collection
- Reduction in paper consumption
- Management of fat and oil wastes
- NH₃-handling in the Skating Stadion
- Monitoring of water and energy started

At the moment no effects could be reported as the measures had been started only some month ago. There was also no information in the Municipal Office about achievements in companies at the moment.

There are efforts to multiply the CP principles also to other Municipalities in Associations and at meetings and to promote herewith the CPC services for other cities.