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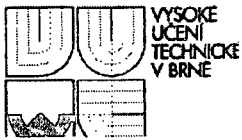
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**UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANISATION**



**INTERNATIONAL CENTRE FOR
SCIENCE AND HIGH TECHNOLOGY**



**BRNO UNIVERSITY OF TECHNOLOGY,
FACULTY OF CHEMISTRY**

FINAL REPORT

Workshop on

**“Technologies and Processes for Sustainable Development
and Pollution Reduction/Prevention”**

Brno, Czech Republic, 14-16 January 2002

**UNIDO PROJECT TF/GLO/00/105
CONTRACT No. : 2001/372**

OBJECTIVES

The main objectives of the proposed workshop were as follows:

- To survey the available technologies for the reduction/elimination of toxic wastes and pollutants, i.e. , heavy metal compounds, acidic and/or saline effluence of organic/inorganic co-products, with specific focus on PTS.
- To survey the available technologies for valorization of renewable resources (especially crop-derived chemical feed-stocks) .
- To survey the state of art in CEE transition – economy countries.
- To define the ICS – UNIDO follow-up actions relevant to the topic in selected transition – economy countries.
- To identify suitable institutions to be included in the ICS UNIDO Network and for the establishment of ICS UNIDO focal points.

ORGANIZATION

The workshop was organized jointly by the Faculty of Chemistry , Brno University of Technology , Czech Republic.

The local Organizing Committee consisted of Professor Milan Drdák, Associate Professor Ivan Mašek, Faculty Secretary Dipl. Eng. Renata Herrmannová, Dr. Gabriela Clemensová, Dr. Lenka Bucherová, Associated Professor Jaroslav Fiala.

DATES AND VENUE

The workshop was held on 14-16 January 2002 in Brno, Czech Republic at the Faculty of Chemistry of Brno University of Technology (BUT).

FUNDING

The expenditure sanctioned by UNIDO for this project was USD 20,000. The amount received from UNIDO on 31 December 2001 was USD 16,000 to cover the expenses towards the items listed in the budget. The hosting country (Czech Republic) contributed USD 4,000 towards various items. The Organizing Committee had covered travel tickets for all international and Czech participants . The arrangements for meals, student dormitory, etc., with reasonable costs and quality were made.

The actual expenditure for travel of international lecturers and participants was lower than the estimation, because much cheaper air tickets were found and some of the participants agreed to travel by car/train. Despite the lower expenditure the total number of participants was not lower than the estimation and the objectives of the workshop were fully achieved. The actual expenditures for accommodation and board didn't reach the sum expected because cheaper but good standard accommodation was arranged and , moreover, some participants stayed just for the part of the conference. The conference was held close to the accommodation venue, thus less money was spent on transport than supposed.

For further details on the expenditures, please refer to the budget table attached as Appendix 3

SCIENTIFIC PROGRAM

9 keynote twenty-minutes lectures, 20 oral 20-min presentations, and 28 posters in a special poster section and 5 country reports were presented during the workshop. The detailed workshop program is given in Appendix 1 and the list of posters is given as Appendix 1/a

The key topics covered during the workshop were:

- A. International initiatives in cleaner production and waste remediation
- B. Trends in clean technologies and processes for pollution
- C. Technologies for remediation and for destruction of pollutants
- D. Technologies for sustainable development
- E. State of the art in pollution reduction and prevention (country/institution reports)

PARTICIPATION

Several forms and invitation letters were disseminated among Central and East Europe academic institutions by the ICS UNIDO.

Table 1. Participants according to countries

No.	COUNTRY	NUMBER OF PARTICIPANTS
1	Austria	1
2	Bulgaria	1
3	Czech Republic	48
4	Hungary	1
5	France	1
6	Italy	7
7	Poland	1
8	Serbia	1
9	Slovak Republic	8
10	Slovenia	1

List of lecturers and speakers of 20-min oral presentations from different countries are given in Tables 2 and 3, respectively. The complete lists of participants and posters are attached (Appendix 2).

Table 2. List of lecturers of the workshop

No.	KEYNOTE LECTURER	INSTITUTION	COUNTRY
1	František Škoda	Ministry of Environment	Czech Republic

2	Laszlo Miklos	Ministry of Environment	Slovak Republic
3	Stanislav Miertus	ICS UNIDO	Italy
4	Martin Schamann	ICS UNIDO	Austria
5	Martin Krcma	CPC UNIDO	Czech Republic
6	Viera Feckova	CPC UNIDO	Slovak Republic
7	Ivan Holoubek	European Initiatives in PTS Assessment	Czech Republic
8	Vladimir Wiederman	ITPO UNIDO	Slovak Republic

Table 3. List of speakers of 20-min oral presentations

No.	SPEAKER	INSTITUTION	COUNTRY
1	V. Bales	Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava	Slovak Republic
2	F. Trifiro	University of Bologna	Italy
3	B. Gryzbowska	Polish Academy of Sciences, Krakow	Poland
5	L. Petrov	Institute of Catalysis, Bulgarian Academy of Sciences, Sofia	Bulgaria
6	M.G. Clerici	Enitecnologie, Milano	Italy
7	J. Brandstetr	Brno University of Technology, Brno	Czech Republic
8	P. Fornasiero	Universita degli Study di Trieste	Italy
9	M. Schamann	ICS UNIDO	Austria
10	A. Lodolo	ICS UNIDO	Italy
11	G. Centi	Universita degli Study , Messina	Italy
12	J. Derco	Slovak University of Technology, Bratislava	Slovak Republic
13.	M. Fišera	Brno University of Technology, Brno	Czech Republic
14.	L. Pistone	ICS UNIDO, Milano	Italy
15.	M. Murin	Eco-toxicological Centre , Bratislava	Slovak Republic
16.	G. Clemensova	Brno University of Technology, Brno	Czech Republic
17.	P. Gallezot	Institut de Recherche sur la Catalyse, Lyon	France
18.	I. Chodak	Slovak Academy of Sciences, Bratislava	Slovak Republic
19.	I.T. Horvath	Institute of Chemistry, Budapest	Hungary
20.	J. Jancar	Brno University of Technology, Brno	Czech Republic
21.	B. Druzina	Institute of Public Health, Ljubljana	Slovenia
22.	A. Vesic	Ministry of Health and Environmental Protection, Beograd	Yugoslavia

WORKSHOP MATERIALS

Each participant and lecturer was provided with a workshop bag containing the following:

Detailed workshop program
List of participants with their mailing addresses
Pen and notebook
Identification badge
Brno City and Brno University of Technology promotion booklets

OPENING CEREMONY

The Opening Ceremony of the workshop was organized at the Assembly Hall of Chemical Faculty of BUT. The session was chaired by Professor Stanislav Miertus, ICS UNIDO.

SOCIAL EVENTS

Full board was organized for all participants of the workshop. A welcome reception was given on the first evening of the workshop at the conference premises. Excursions to historical places of Prague and Brno were organized.

ASSESSMENT

Assessment of the workshop was performed by an optional questionnaire to all participants. A summary of this assessment is given in Table 4. According to results of this assessment the workshop was very successful and the organization was excellent, most evaluations have been from very good to excellent.

All participants would recommend others to attend a similar activity.

Table 4. Summary of the questionnaire (%) based on 11 participants

A. Organization – I am satisfied with the conference organization

	Very much	Quite	Not very much	I don't know	No answer
Percentage	54.5	45.5	-	-	-

B. The conference accommodation was:

	Very good	Good	Acceptable	Non-acceptable	I don't know
Percentage	54.5	36.4	-	-	9.1

C. The conference program was:

	Very good	Good	Acceptable	Non-acceptable	I don't know
Percentage	45.5	54.5	-	-	-

D. I appreciate:

Item	Total numbers
1. Involvement of organizers	4
2. The workshop scientific program	1

E. Recommendations, comments:

Item	Total numbers
1. Earlier information about the workshop	3
2. Wider participation of young scientists	1
3. Discussion after each lecture	1
4. More focused on topics	1

POSSIBLE FOLLOW-UP

In concluding session, a general discussion based on country reports was held. The following conclusions were drawn:

- Professor Petrov suggested to constitute a focal point (an institution tightly connected with the ICS-UNIDO database) to solve the lack of information in the field of environmental protection . The importance of information and networking is equal to that of financial sources.
- Chemical Faculty asked for participation in the following fields : fluidized bed coal combustion, environmental loads from uranium mining by sulfuric acid, soil remediation, waste and drinking water treatment, platinum group elements analyses and monitoring, state protected workshops for screen glass recycling (heavy metal elements remediation and reuse) and rape oil waste remediation.
- The list of traditional and newly originated pollutants is to be prepared and will be used as the base for common environmental projects.

- Each country was suggested to decide on its own environment treatment priorities.
- Concentration of key environmental studies into one institution for each country would make the monitoring of environmental problems easier.
- The expenses on water remediation will make it one of the core environmental problems.
- The electronic Internet based form of workshop contribution is being prepared .

CLOSING CEREMONY

Professor Miertus and Associated professor Fiala appreciated organization of the workshop and high scientific level of all presentations and activity of all participants.

SUGGESTIONS, RECOMMENDATIONS

The participants would appreciate less general, but clearer and more to the point instructions sent before the workshop. Paper proceedings should be replaced by their electronic form including voice records.

APPENDIXES:

**Appendix 1:
Workshop Program**

**Appendix 2:
Complete List of Participants**

**Appendix 3:
List of Posters**

**Appendix 4:
A selection of key lectures (hands-out) presented in the workshop**

**Appendix 5:
Budget Table**

Appendix 1

14. 1. 2002



*United Nations Industrial Development Organization
International Center for Science and High Technology*



WORKSHOP

*“Technologies and Processes for
Sustainable Development and
Pollution Reduction/Prevention”*

14-16 January 2002

AGENDA

Brno, Czech Republic

CONFERENCE PROGRAM

Monday, 14th January

13.00-15.00	Registration of participants and guests
15.00-16.35	Opening session (Chairman: J. Fiala)
15.00-15.20	Welcome Addresses and Greetings (Ministers of Environment of Czech Republic and Slovak Republic, representatives of ICS-UNIDO, representatives Local and International Authorities)
15.20-15.40	Key Environmental Issues in Czech Republic (M. Kuřvart, Minister of Environment of Czech Republic)
15.40-16.00	Key Environmental Issues in Slovak Republic (L. Miklos, Minister of Environment of Slovak Republic)
16.00-16.20	ICS-UNIDO Programme and Activities for Sustainable Industrial Development (S. Miertus, ICS-UNIDO, Italy)
16.20-16.35	Discussion
16.35-16.50	Coffee Break
16.50-19.00	Session 1: International Initiatives (Chairman: S. Miertus)
16.50-17.10	CEE Forum of ICS-UNIDO for Remediation of Polluted Sites (M. Schamann, ICS-UNIDO Expert)
17.10-17.30	Programmes and Initiatives of Cleaner Production Centre of UNIDO in Czech Republic (M. Krcma, L. Novak, CPC Czech Republic)
17.30-17.50	Programmes and Initiatives of Cleaner Production Centre of UNIDO in Slovak Republic (V. Feckova, CPC Slovak Republic)
17.50-18.10	Programme ITPO-UNIDO in Slovak Republic (Representative of UNIDO-ITPO, Slovak Republic)
18.10-18.30	European Initiatives in PTS Assessment (I. Holoubek, Czech Republic)
18.30-19.00	Discussion
19.00-21.00	Conference Party

Tuesday, 15th January

7.00-8.00	Breakfast
8.00-14.15	Session 2: Trends in Clean Technologies and Processes for Pollution Prevention (Chairman: M.Clerici)
8.00-8.30	“Trends in Environmental Engineering” (V. Bales, Slovak Republic)
8.30-9.00	“Advanced Catalytic Processes for the Industry and the Environment” (F. Trifiro, Italy)
9.00-9.25	“Effect of additives to oxide catalysts on their physicochemical and catalysts properties in selective oxidation reactions”, (B. Grzybovska, Poland)
9.25-9.50	“Application of Gold Containing Catalysts for Environmental Protection” (L. Petrov, Bulgaria)
9.50-10.00	Coffee-break
10.00-11.30	(Chairmen: P.Gallezot – J. Brandstetr)
10.00-10.30	“Zeolites for Fine Chemical Protection” (M.G.Clerici, Italy)
10.30-10.50	“Secondary raw materials in mortars and Concrete for 21-st century” (J. Brandstetr – Havlica, J.)
10.50-11.10	“Catalytic Technologies for Prevention/Control of Air pollution from mobile Sources” (P. Fornasiero, Italy)
11.10-11.30	Discussion
11.30-14.15	Poster Section
12.30-13.30	Lunch
14.15-18.10	Session 3: Technologies for Remediation and for Destruction of Pollutants (Chairman: V. Bales)
14.15-14.45	“Polluted Sites: Risk Assessment and Management” (M. Schamann, Austria)
14.45-15.10	“Remediation Technologies: Survey and Decision Support Tools for Their Selection” (A. Lodolo, ICS-UNIDO, Italy)

15.10-15.35	“Catalytic Technologies for Water Depollution” (G. Centi, Italy)
15.35-15.50	“Treatment of persistent organic pollutants by ozone” (J. Derco, A. Gulyasova , Slovak Republic)
15.50-16.20	“Microorganisms and their products as bio-sorbents for detoxication in environment” (M. Fisera, T. Gregor, T. Breierova, Czech Republic)
16.20-16.35	Coffee-Break
16.35-18.10	(Chairmen: G. Centi – J. Fiala)
16.35-17.00	“POP’s Destruction Technologies” (L. Pistone, Italy)
17.00-17.30	“Biological remedation of PCBs polluted soil - pilot plant test” (P. Innemanova, L. Vesela, Czech Republic)
17.30-18.00	“Negative impacts of armed forces activities on environment” (I. Masek, M. Drdak, G. Clemensova, Z. Nyvlt, Czech Republic)
18.00-18.15	Discussion
18.15-20.00	Supper

Wednesday, 16th January

7.00-9.00	Breakfast
9.00-11.20	Session 4: Technologies for Sustainable Development (Chairmen: F. Trifirò – J. Jancar)
9.00-9.30	“Catalytic Technologies for the Conversion of Renewables. Conversion of Carbohydrates into Fine Chemicals” (P. Gallezot, France)
9.30-10.00	“Perspectives of Environmentally Degradable Plastics in Environmental Assessment” (I. Chodak, Slovak Republic)
10.00-10.20	“Sustainable/Green Chemistry and Combinatorial Approaches” (I.T. Horvath, Hungary)
10.20-10.40	“The utilization of recycled materials in the production of polyurethanes” (J. Jancar, P. Cerny, Czech Republic)
10.40-10.55	“Persistent Toxic Substances: Key Problems in Slovakia and other Central European Countries” (M. Murin, Slovak Republic)
10.55-11.10	Discussion

11.10-11.30	Coffee-break
	Session 4:
11.30-13.30	State of the Art in Pollution Reduction and Prevention (Key Problems, Available Technologies, On-going and Planned Initiatives in Academia and Industry) Country Reports (Chairman: A. Lodolo)
11.30-11.50	Poland (B. Grzybowska-Swierkosz)
11.50-12.10	Hungary (I.T. Horvath)
12.10-12.30	Slovenia (B. Druzina)
12.30-12.50	Bulgaria (L. Petrov)
12.50-13.10	Yugoslavia (A. Vesic)
13.10-13.30	Discussion
13.30-14.30	Lunch
	Session 6:
14.30-15.30	General Discussion and Conclusions (Chairmen: S. Miertus, M. Schamann, J. Fiala, I. Masek)
14.30-15.30	Round Table Discussion on possible common follow-up initiative/projects proposal; Recommendations and Conclusions of the Workshop.

Appendix 2

List of Participants

Workshop on "Technologies and Processes for Sustainable Development and Pollution Reduction/Prevention"

Brno, Czech Republic, 14th – 16th January 2002

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Appendix 3

List of Posters

Workshop ICS Brno 14.-16. 1. 2002

Masek I., Bucherova L.	TV screens and PC monitors sources of quality by raw materials
Koci K., Ostra E., Syslova A., Simek Z.	Extraction and determination of polycyclic aromatic nitrogen heterocycles (PANH)
Kolar K., Ciganek M., Simek Z.	SPME a promising technique for sampling polycyclic aromatic hydrocarbons in air
Stepankova R., Hrdlicka A., Sommer L.	HPLC of chlorophenols on a narrow-bore column with previous off-line solid phase extraction for the determination in river waters
Smetkova V., Docekal B., Docekalova H.	Soil characterisation by diffusive gradient in thin-films technique
Prycek J., Ciganek M., Simek Z.	Isolation of nitro-PAH from solid samples – a comparison of extraction technique
Komendova-Vlasankova R., Sommer L.	Preconcentration of PGMs by Solid Phase Extraction for determination by ICP-OES
Vitova E., Drdak M., Mikulikova R.	Use of solid-phase microextraction for analysis of mould cheeses aroma
Vestpalcova M., Gregorova D., Zemanova J.	An attractive subject for the electrophoretic analysis
Slovak B., Koci R., Pokorna I., Marova I., Drdak M.	Effect of exogenous stress factors on production of carotenoids by microbial cells.
Polakova M., Hladikova R., Valasek P., Marova I., Drdak M.	Protective effect of food components against oxidative stress in humans
Vanek J., Prazak A., Vesela L.	In-situ remediation and catalytic combustion
Laichman L., Kramarova D., Brandstetr J.	Environmentally friendly binders of foundry sands based on polysaccharides
Hladikova R., Marova I., Drdak M., Pokorna Z.	Study of genotoxic effects of mycotoxins isolated from contaminated foods
Pospichal Z., Stejskal B.	Material cycle as a part of IPPC
Kuchar D., Vondruska M., Bednarik V.	Stabilization/solidification of wastewater treatment sludge utilizing fly ash
Koutny M., Mickova A.	Assessment of direct mutagenicity of the anionic asphalt emulsion using the Ames test
Sild M., Koutny M., Vondruska M.	Ecotoxicity of asphalt emulsions applied in environmental technologies
Omelkova J., Breirova E., Marova I.	The influence of oxidative and osmotic stress on the morphological features of the red yeasts
Matalova S., Omelkova J., Mravcakova E., Jancekova L.	Hodnoceni tvorby mikrobiálního plaku na dentální materialy
Ruzicka J., Muller J., Nemecek M.	The choice of the suitable bacterial culture for

Vit D., Hutecka V., Hoffmann J.,	trichloroethylene biodegradation
Dvorackova M., Rienerova M., Prostrednikova M., Kupec J.	Contribution to deproteination of residual chrome sludge after enzymatic hydrolysis of shavings with additional removal of magnesium
Volcik V., Hoffmann J., Ruzicka J.	Cometabolic biodegradation of trichloroethylene (TCE) under aerobic conditions
Kramarova D., Laichman L., Brandstetr J.	Waste products as binders for foundry sand
Rusnik I., Hlavinek P.	Sewage treatment in biological ponds
Gregor T., Fiserá M.	The ICP-OES method for determination of iodine in foods and medicaments
Blahak R., Klucakova M., Kucerik J., Omelka L., Pekar M.	Low-rank coal as a valuable non-energetical raw material
Vesely M., Bezdekova K., Svamberkova H.	The photocatalytic processes for water treatment

Workshop on Technologies and Processes for Sustainable Development and Pollution Reduction /Prevention
 Brno, 14-16 January 2002
 Catalysis and Sustainable Chemistry 1.1

Rate of Exchange: 36,17 local currency/dollar

BUDGET UNIDO

TOTAL FUNDS FROM ICS-UNIDO US dollars 20 000

TOTAL FUNDS FROM UNIDO

DESCRIPTION	Budget in US\$	Budget local curr.	Disbursement US\$	Disbursement l.c.	Difference US\$	Difference l.c.
Travels to the Czech Republic						
International lecturers:fare to CR and back						
1 - Feckova V.			34.00	1 229,78		
2 - Horvath I.			64.00	2 314,88		
3 - Grzybowska B.			51.00	1 844,67		
4 - Trifiro F.			296.00	10 706,32		
5 - Schamann M.			31.00	1 121,27		
6 - Vesic A.			190.00	6 872,30		
7 - Druzina B.			52.00	1 880,84		
8 - Centi G.			338.00	12 225,46		
9 - Clerici M.			305.00	11 031,85		
10 - Pistone L.			305.00	11 031,85		
11 - Gallezot P.			332.00	12 008,44		
12 - Lodolo A.			243.00	8 789,31		
13 - Chodak I.			34.00	1 229,78		
14 - Bales V.			7.00	261,00		
15 - Cik G.			7.00	261,00		
16 - Derco J.			9.00	325,00		
17 - Derco J. - train supplementary charge			2.00	74,00		
18 - Fornasiero P.			377.00	13 624,00		
19 - Petrov L.			384.00	13 900,00		
20 - Cik G. - back fare			6.00	225,00		
21 - Bales V. - back fare			6.00	225,00		
International lecturers:fare in CR						
22 - Schamann M.			2.00	80,00		
23 - Petrov L.			23.00	830,00		
24 - Vesic A.			23.00	830,00		
25 - Gallezot P.			4.00	140,00		
	10 200	368 934,00	3125.00	113 061,75	7 075.00	255902,75
26 - Accommodation			3807.00	137 700,00		
26 - Board			1991.00	72 000,00		
Total Board and Accommodation	7 200	260 424	5798.00	209 700,00	1402.00	50710,34
27 - 30 Transport	600	21 702	481.00	17 400,00	119.00	4304,23
31 Transport	2 000	72 340	2000.00	72 340,00	-	-
TOTAL TOTAL	20 000	11 404.00		412 501,75	8 596	310917,32
TOTAL BUDGET FROM UNIDO	20 000					
ALREADY RECEIVED	16 000					
AMOUNT TO BE RECEIVED					4596	166237,32