OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

20786

Distr.
RESTRICTED

ISED/R.4
2 February 1994

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

'EFFECTS OF WAR ON THE ENVIRONMENT'
(CENTRAL AND EAST-EUROPEAN REGION)

UC/CRO/92/164

REPUBLIC OF CROATIA

Technical report: Programme development - projects and concepts*

Prepared for the Government of the Republic of Croatia
by the United Nations Industrial Development Organization

Backstopping Officer: B. Sugavanam
Chemical Industries Branch

* This document has not been edited.

V.94 20558

PREFACE

From the very beginning of the young Croatian state, a wide range of intensive activities has been developed in order to get in touch and start to work with numerous international organizations, and particularly with the specialized agencies of the United Nations. War destructions by which the Republic of Croatia has been affected has made the need and significance of such co-operation more urgent.

The problems arising from war devastation due to environmental damage caused by the uncontrolled discharge of hazardous and toxic substances from the facilities of the chemical industry, power supply systems and their infrastructure have led the Ministry of Civil Engineering and Environmental Protection to request the UNIDO to send an expert mission to the war affected areas of the Republic of Croatia. The aim of the mission was to visit the facilities of the chemical industries, power supply systems and municipal infrastructure and to assess the devastation which has resulted in the uncontrolled discharged of considerable amounts of hazardous substances into the environment and thereby damaging public health and the ecological system. Owing to the expertise of the UNIDO, the mission was realized in January, 1993. Under the auspices of the Government of the Republic of Croatia, the International Conference on the Effects of War took place in Zagreb from 15-17 April 1993.

Based on the documents and data obtained by the mission and the Conference, as well as a special delegation from the Republic of Croatia to the UNIDO from 17-20 August 1993, the proposal of priority projects aiming at diminishing hazardous impacts of war devastation on the environment are included in the projects such as "Strengthening National Capability to Monitor Chemical Pollution Due to the War Damage".

I sincerely feel that the long-lasting technical co-operation and help of UNIDO will result in the realization of these programmes, the findings of solutions to these problems which face Croatia by means of the replacement of old and frequently polluting technologies in many industrial branches with new technologies more suitable from the ecologically sustainable industrial development point of view.

Dr. Viktor Simončić

Vice-Minister
Ministry of Civil Engineering
and Environmental Protection
REPUBLIC OF CROATIA

CONTENTS

1. Introduction

Today the world is witnessing the most dramatic turn of the century. The end of the cold war brought hope of the dawn of a new era of peace without the fear of a looming nuclear holocaust. However, man made disasters of the past and at present due to industrial pollution and undeclared civil wars in many continents led to a great tragedy that has never before been witnessed. In addition, natural disasters aggravated the situation both in the developed and developing countries. According to a UN estimate today there are more than 100 million refugees around the world , most of them from developing countries. They have been uprooted from their homes and villages, living in appalling conditions and bear the brunt of the consequences of man- made and natural disasters. Apart from the refugee problems, the world is also facing the slow process of deterioration of the environment due to global warming, ozone depletion, decertification, transboundary pollution, soil contamination, etc.

One typical example is the war on territory of Croatia and Bosnia and Herzegovina which has created hundreds of thousands of refugees in their own homeland with great hardship to innocent civilians, destruction of property and invaluable historical monuments built and preserved over the centuries by mankind. Above all chemical pollution due to destruction of chemical industries has caused long term effects in the region.

It is commendable that the Government of Croatia in collaboration with international organizations has taken steps for early identification of problems and is recommending short- medium- and long- term measures to local and international communities to alleviate the human suffering, prevent and eliminate chemical pollution in the region and sound management of municipal and hazardous wastes and industrial rehabilitation in accordance with the changing circumstances. Such anticipatory planning and preparing well ahead will speed up recovery of the countries now engaged in fighting a war. The deliberations and recommendations of experts at an international conference on 'The Effects of war on Environment' held in Zagreb during April 1993, brought to light the various problems the region is facing which need immediate attention and planning towards an integrated approach to find long- term solutions to human and environmental problems caused by man made disasters. UNIDO, along with other organizations, is pleased to associate itself with the above mentioned international conference and help to promote an international understanding to solve the human miseries being witnessed worldwide. Such meetings would provide the catalytic effect to plan well ahead in troubled spots all over the world and would speed up rehabilitation and mitigating effects of trans- boundary pollution.

2. Report on the International Conference on 'The effects of War on the Environment' held in Zagreb, 15-17, April 1993.

The Conference was held under the auspices of the Government of the Republic of Croatia, and organized by The University of Zagreb, The Ministry of Civil Engineering and Environmental Protection and the Ministry of Science.

The Conference was co.sponsored by UNIDO, The Toxicology Subject Group of the Royal Society of Chemistry, London and the Croatian Chemical Society. The Conference was attended by over 100 delegates from 10 countries.

After opening address from the rector of the University of Zagreb, Vice Ministers from the Ministry of Civil Engineering and Environmental Protection and the Ministry of Science, presentations were delivered giving an overview on the environmental destruction resulting from the ravages of war included:

* Forests, agriculture and water protection
* Economic aspects
* Cultural and national heritage
* Traffic and communications
* Energy and industry
* Health aspects
* Civil engineering and environmental protection

These presentations were followed by the plenary lecture delivered by UNIDO consultant Mr.Richardson entitled 'The Assessment of Hazards and Risks to the Environment Caused by War Damage to Industrial Installations in Croatia'.

This presentation and two discussion sessions on the 2nd and 3rd day provided a forum to discuss UNIDO report US/CRO/92/164 (IO/R.263) and the consultant's issue paper which was based on the report.

This was followed by a message from the Director, Industrial Operations Technology Division of UNIDO and read by the Backstopping officer for the project, and entitled 'Activities of the United Nations Industrial Development Organization (UNIDO) in the Area of Chemical Industry (See ANNEX I page 46).

The Vice-Minister to the Ministry of Civil Engineering and Environmental Protection of the Republic of Croatia responded to the UNIDO mission and in doing so, opened a discussion which led to the consultant's report and its recommendations being carried nem con.

Final comments in the session were delivered by His Excellency the British Ambassador Mr. Brian Sparrow.

The remainder of the conference dealt with a variety of supporting lectures on various topics covering war damages to property, industries, historical monuments etc.

Prior to and during the Conference, the consultant, with the backstopping officer in some cases, and with other participants, was able to hold meetings with ministers, ministerial representations, representatives from the University of Zagreb, the Croatian Chemical Society, Croatian Radwaste Management Agency, Astra, and the Croatian Chamber of Commerce.

During the meeting with the counterpart, Vice-minister, Dr. Viktor Simoncic, it was recommended that the Government of the Republic of Croatia should make urgent application to both UNIDO in Vienna and their UNDP office which is located in Vienna, for funds for continuation of the monitoring of the damage to environment due to war damages and make preparations to implement the recommendations in the UNIDO's report and the views expressed by those attending the Conference.

3. Report on the Follow-up Meeting Held in Vienna, August 17-20,1993.

Following the International Conference on 'the Effects of War on the Environment' a follow up meeting was convened in Vienna to assess various project ideas and the recommendations of the conference and prepare a consolidated programme for submission to potential donors. Detailed report of the meeting is attached as ANNEX II page 49.

4. Strengthening National Capability to Monitor Chemical Pollution due to the War Damage- Project Document.

UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of Croatia

PROJECT DOCUMENT

Title: **STRENGTHENING NATIONAL CAPABILITY TO MONITOR CHEMICAL POLLUTION DUE TO THE WAR DAMAGE**

Number: SM/CRO/93/.../A/42/37

Duration: 2 years initially

Project site: Zagreb
Sector (Govt. Class.):
Sub-sector (Govt. Class.):

UNDP (Class. and code): 05

Host Country Implementing Agency:
APO d.o.o (*) Savska 41/4
41000 Zagreb, Croatia

UNIDO and cost-sharing financing

IPF US$ 737,000
Other -

Executing Agency: The United Nations Industrial Development Organization (UNIDO)

Cost-sharing Govt. or third party US$

Estimated starting date: 1994

Government inputs: staff, office facilities, travel as specified.... (in kind)

Brief description:
This project will strengthen national capability to monitoring chemical pollution, to apply a risk assessments and risk management in prioritization of remedial actions; and also, in framing pragmatic environmental legislation. It will also complete previous preliminary inspections of environmental damages, caused by the Croatian chemical industry during the war, provide analytical and biological monitoring equipment to enable the hazards caused to the Croatian chemical industry sustained during the war to be assessed for risks, to manage these risks and to advise/embark on remedial work.

Signed: Date:
Name/title:_____
_____ on behalf of the Government
_____ on behalf of the Executing Agency

UN official exchange rate at date of last signature $1.00 =

(*) APO - Croatian Hazardous Waste Management Agency, authorized for the project implementation by Ministry of Civil Engineering and Environmental Protection of the Republic of Croatia.

Part A. Context

1. Croatia has an area of ca. 56 500 km² and a resident population of 4,740000 currently enhanced with ca. 1/2 million Bosnian refugees.

The chemical industry, with its associated infrastructure, eg, sewage treatment facilities, has suffered devastation during the recent war.

Its chemical industry covers detergents, cosmetics, leather, wood and furniture, oil refining, heavy engineering, cement, iron and steel, wine, mineral water, general chemicals, etc.

Additionally, damage was sustained to wheat silos, electrical power stations and transformers, sewage treatment works, water works etc.

The bombardment has inflicted severe damage to these facilities resulting in massive soil and water pollution which will have international consequences due to downstream pollution of the river Danube and the Mediterranean sea.

Soil contamination includes PCBs, various mineral oils, heavy metals and (unknown) organic chemicals from destruction of munition dumps, etc. Water contamination includes the Adriatic Sea, groundwater and surface waters, in particular the River Danube which is widely extracted for drinking water by downstream countries.

Whilst the host country has commenced reconstruction of housing and some factories, because the lack of financial resources, it is doing so without due regard for the environment. Building debris, broken glass, household garbage, industrial waste, etc., is being dumped indiscriminately by roadsides, former beauty spots, the Adriatic Sea, etc. This situation is exacerbated by poor landfill management or former disposal sites now being in occupied territory or other countries, eg, Bosnia, Serbia, etc.

Croatia is also facing enormous problems from refugees, in turn placing added loads on inadequate/damaged sewage treatment facilities, water supplies, electricity, waste disposal, etc. There is a real hazard of a mammoth outbreak of water-borne diseases in the future unless these sanitary shortfalls are more appropriately managed.

2. Host country strategy
To consult with UNIDO and the Chief Technical Adviser (CTA) to:

2.1 To equip an institute with selected analytical chemical equipment and fully trained staff.
2.2 Survey with CTA towns/installations damaged during the war and other towns such as Bjelovar, Djeletovci, Knin, Kutina, Nova Gradiska, Pula, Šibenik, Vukovar, Zadar, etc.
2.3 To take samples for analysis.
2.4 To make risk assessments and undertake risk reduction and management.
2.5 To prepare at least 30 reports for consideration by its Government and UNIDO.

2.6 To prepare pragmatic legislation for consideration by its Government to formulate new statutes.

Additionally, there is a requirement to develop new and clean technology industries. The recommendation, resulting from the UNIDO consultant's mission are summarized within his report. The Croatian Ministry of Civil Engineering and Environmental Protection is very keen to set up a central focal institute to undertake the overall monitoring of various pollutants emitted to soils and water. Such an institute in the future would become a centre of excellence, and will work in close collaboration with other local institutes.

3. Related technical assistance activities

Apart from the initial mission January 1993, there are no known projects in hand.

The January 1993 mission enabled an international UNIDO expert to visit 18 damaged towns, inspect some 50 war damaged installations and have discussions with staff from ministries and academia in Zagreb and other locations. Details of the priorities for remediation extracted from the UNIDO report US/CRO/92/164 (IO/R.263 15 March 1993) are appended.

During the initial mission the expert made contact with more than 100 Croatian industrialists, officials and scientists.

The consequences of the war in Croatia resulting from destroyed chemical factories and other infrastructures, eg, electricity facilities, sewage,treatment works, etc., has incurred severe hazards to the soil and water environments. In the Northern area along the catchments of the rivers Drava and Sava and their tributaries, emissions have the potential to contaminate drinking water resources in the countries bordering the River Danube. Similar adverse effects are produced in inland regions and long term hazards to the Adriatic Sea is likely. Additionally, adverse public health effects, including congenital malformations, may be anticipated, together with short term water-borne diseases.

The report covers a complex panoramic situation in which many areas are so badly destroyed, that finding a solution cannot be based on previous experience but would entail a new type of approach suitable to the nature of the problems, many of which are acute.

While hazards could be assessed with respect to chemicals by their inherent toxicology and exposure levels, it is essential to limit or eliminate the hazards by taking the necessary steps.

The approach to strengthen local capability to cope with the existing solution on a medium/long term basis would be the first step so that the country can build up slowly the capacity through multilateral and bilateral assistance.

The problems in Croatia need to be approached by multi-disciplinary team

to provide inputs to assist the Government of the Republic of Croatia in problem solving in overcoming war damages and to move to a free market economy.

Requirements for training and joint venture opportunities were detailed.

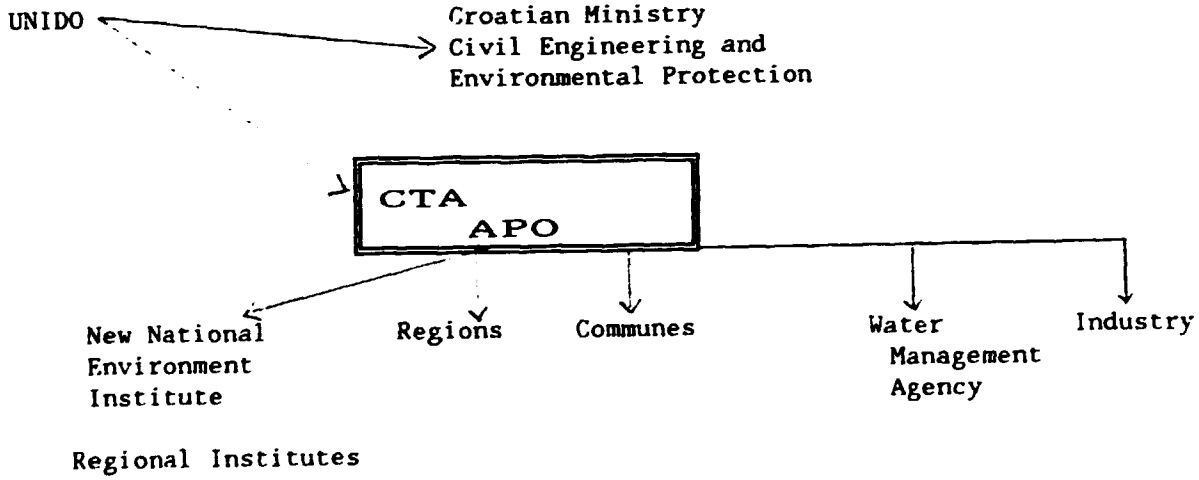
The Zagreb conference 15-17 April 1993 attracted an international audience of 130+ delegates. The conference recommended unanimously that the agreed and formulated recommendations from report US/CRO/92/164 should be implemented without delay. It further recommended that a meeting between UNIDO officials, the international experts and representatives of the Government of the Republic of Croatia should be convened without delay - this meeting took place on 19/20 August 1993. The conference generated significant but non-financial interest and proposed:

i) That a stable economy in Croatia was achievable only by means of a sustainable environment, and

ii) That to do nothing was the worse possible alternative.

4. Institutional framework

The project would be executed by APO with the full liaison with the Ministry of Civil Engineering and Environmental Protection in Zagreb, working in close cooperation with the institute who would lead and obtain cooperation from other and local institutes, communes and industry in the towns damaged by the war.



Part B. Project Justification

1. The problem to be addressed: the present situation

The hazards sustained to the environment through damage to its chemical and allied industries, infrastructure, etc, have been identified and summarized in the report of the consultant during his initial mission to Croatia in January 1993.

The adverse effects to the soil and water environments are very

considerable, and necessitate urgent and far more detailed assessment than this consultant could provide in his initial mission, which resulted in inspecting some 50 installations in 18 towns within 2 weeks (see Tables 1, 2 and 3, Annex 4 page 21).

Whilst the consultant identified a significant number of hazards, no risk assessments could be considered because of the total lack of monitoring information. Furthermore, an additional number of towns/installations need to be inspected.

The initial stage would be to strengthen APO and one focal institute which would initiate various activities to control long term pollution abatement measures and establish pragmatic legislative measures.

2. Expected end-of-project situation

The proposed project would enable risk assessments, indicating the real extent of the hazards to the environment identified during the consultant's initial assessment. This will entail a significant amount of analytical chemical and biological monitoring. Risk management procedures will also be placed in hand to enable remedial work to be initiated in the most pragmatic and cost beneficial manner. This in turn will lead to the commencement of reconstruction and development of industries embodying clean techniques coupled with sustainable environmental development.

At the end of the project APO and a well equipped, staffed and managed institute would provide advisory and technical assistance in the control of hazardous and toxic pollutants being released to soil and water systems.

Such an institute would additionally contribute to the control of pollutants emitted to the river Danube and its tributaries and to the Adriatic Sea.

3. Target beneficiaries

The direct beneficiaries will be APO and the institute reporting to the Ministry of Civil Engineering and Environmental Protection. This in turn will benefit the whole country and furthermore, all countries down stream of the River Danube, depending on transboundary water resources.

Remedial action such as prevention of ongoing pollution to the Rivers Drava and Sava, will also be beneficial to consumers of drinking water derived from the River Danube in all countries east to the Black Sea. A plan to prevent further damage to the environment from indiscriminate refuse dumping will be of value to everyone, not least the tourist industry.

4. Project Strategy

i) UNIDO would take the lead role in the organization of remedial measures working in close cooperation with the CTA, the Ministry of Civil

Engineering and Environmental Protection, who would be responsible for its executive operating agent, APO.

ii) The CTA and the APO would in turn be responsible for the institute, the officer in charge of which would be responsible fully and personally for sample reception, analysis and reporting whether this work was undertaken in his/her institute or another institute.

iii) The CTA and APO would engage external experts/consultants as indicated in the recommendations from the initial mission (January 1993).

iv) Towns/installations not inspected in January 1993 would be visited and recommendations formulated. Particular attention would be given to lateral thinking so, as far as is possible, to utilize waste from one damaged factory as raw material for another, or even as a fuel source, eg,for cement factories, or in power plants.

v) Training of Croatian scientists would be provided for sampling analysis and interpretation of the results in order to undertake the risk assessments.

5. Reasons for assistance from UNIDO

The target beneficiaries will be reached by the project by pollution reduction, sustainable environmental development, etc. These project lie within UNIDO mandate. UNIDO has initiated already a number of activities in this area and the necessary expertise and experience provide the necessary assistance to Croatia.

6 Special considerations

The position in Croatia is complex, in which urgent attention is necessary as so many areas are so badly destroyed and finding a solution will not be based on previous experience but will require new types of approaches suitable to remedy the nature of the problem. The project is related to the management of hazardous and toxic chemicals which have been discharged to soils and various river systems in the Danube basin, the Adriatic sea and vital groundwater reserves. There is in addition a need for a new waste management programme.

7. Coordination arrangements

Significant coordination will be required between the various UN agencies mentioned in the consultant's January 1993 report, in particular UNEP, WHO and FAO.

8. Counterpart support capacity

The Croatian Hazardous Waste Management Agency authorized by project implementation by the Ministry of Civil Engineering and Environmental Protection will provide the necessary support through the institute.

The officer in charge of the institute will have personal responsibility for his designated duties.

Part C. Development Objective

The situation in Croatia demands immediate assistance to prevent pollution of rivers in the Danube basin and the Adriatic sea. UNIDO has initiated already a number of activities in the area and the necessary expertise and experience to provide the necessary assistance to Croatia.

The main objective of this proposed project is to prevent further environmental damage, rectify that damage where possible, and to assess the risk from the hazards identified from the consultant's initial mission. Some of these hazards are in very urgent need of assessment and rectification to prevent further damage.

It is anticipated that some of the industries will recommence activities (some have already done so) and in may cases will be seeking joint venture partners, via Chambers of Commerce, etc.

The project should prevent further damage to the environment, enhance the restructuring and reconstruction of industry and in particular much needed infrastructures such as sewage treatment works, improvement to water treatment, maintenance of the quality of rivers, Adriatic Sea, etc.

Part D. Immediate Objective, Outputs, and Activities

1. Immediate objectives

To assist the institute's capability to monitor contamination of soils and water caused by damage to the chemical industry, water installation etc. Additionally, the institute will assist the development of pragmatic environmental legislation, with the view of Croatia reaching easy standards as soon as possible.

Full regard will be taken of current practices involving risk assessment, risk management, environmental impact assessment. The institute should attempt to achieve full good laboratory practice status within 2 years.

2. Outputs

2.1 Output 1

The Institute equipped fully with both relevant analytical equipment and have trained staff capable of undertaking necessary monitoring of environmental samples on a regular basis.

2.1. Output 2

Surveys and reports would be undertaken/reported on a region basis

including both the town/installation identified during the January 1993 mission and other towns such as Bjelovar, Djeletovci, Knin, Nova Gradiška, Pula, Šibenik, Vukovar, Zadar, etc.

2.3 Output 3

At least 30 reports will be issued for consideration by the Government and UNIDO. These reports will include hazard/risk assessments, risk reduction and risk management.

2.4 Output 4

Pragmatic environmental legislation will be prepared for consideration by the Government to form new statutes.

3 Activities	Responsibility
3.2.1 Activity for output 1	
In consultation with CTA and experts (see annex for job description) procure necessary analytical equipment and provide in-depth training for a total 14 scientists for a total period of 22 m/m, state of the art analytical techniques including sampling, and quality assurance schemes. Additionally 6 scientists to attend international meeting.	UNIDO/CTA/experts counterparts
3.2.2 Activity for Output 2 CTA to visit with counterparts not covered under project UC/CRO/92/164 and submit survey reports.	UNIDO/CTA/ Counterparts
3.2.3 Activity for Output 3 Counterpart staff will be prepared to undertake environmental impact assessment, risk assessment, risk reduction/management relevant to the problems in the Croatia caused by war damage.	UNIDO/CTA/expert Counterparts
3.2.4 Activity for Output 4 Under subcontract draft necessary pragmatic environmental law and regulatory aspects and assist in the implementation of new statutes, so as to be in line with EC requirements.	UNIDO/ CTA Subcontractor/ Counterparts

Part E. Inputs

1. Government inputs

Government inputs in cash and kind.
Government will provide focal institute with all infrastructural and utility resources and counterpart staff. Additionally, it will provide secretarial facilities for the CTA and international experts and arrange travel within Croatia. Furthermore, they will provide use of existing analytical equipment for use for the project.
Fellows' travelling expenses will be provided by the Government.

2. UNIDO Inputs

Experts *

		Start date	(US$)
11.01	Chief Technical Adviser 12 m/m	1994	150,000
11.02	Analytical Chemist 6 m/m	1994	75,000
11.03	Expert in disposal of PCB 1 m/m	1994	15,000
13.00	Bilingual secretary, Driver, (Administrative support)	1994	15,000
15.00	Project travel		5,000
16.00	UNIDO mission		8,000
17.01	Toxicology Expert 10 m/m		20,000
17.50	National short-term consultant 2 m/m		4,000
21.00	Subcontract (see annex 2, page 19)		65,000
31.00	Fellowships		110,000
	i) New analytical chemical techniques;		
	ii) Toxicology/ecotoxicology;		
	iii) Hazard assessment, risk assessment and risk management.		
32.00	Study tour attending conferences		10,000
41.00	Expendable Equipment and Supplies:		25,000
42.00	Non-Expendable equipment (see annex 3 page 20)		225,000
43.00	Premises		5,000
51.00	Sundries		5,000
99.99	Project total		737,000

* For job description see annex 1 page 16

Part F. Risks

The major risks would be a further outbreak of hostilities or being unable to reach lasting peace between warring factions.

Part G. Prior Obligations and Prerequisites

1. Prior obligations

An institutional framework, including the recruitment of national staff and the CTA, office location, and laboratory requirements will be

necessary.The Government of Croatia will need to demonstrate its clear will to undertake the remedial actions outlined in the report from the January 1993 mission.

The Project Document will be signed by UNIDO, and UNIDO's assistance to the project will only be provided if the prior obligations stipulated above have been met to UNIDO's satisfaction.

Time during the January 1993 mission did not permit for an assessment of the staff and equipment available. However, based on discussions with chemical professionals, it would appear that little of the necessary equipment is available in Croatia, but there are staff of the required levels. All institute staff (see organogram) would require to be chemistry or biology graduates. There are few toxicologists/ecotoxicologist of the required standard within Croatia and specialist training using specialist subcontractors, fellowships etc, would be necessary.

NEW NATIONAL ENVIRONMENT INSTITUTE

Officer in Charge

Principal Analytical Chemist to have an overall responsibility for Microtox, GC, HPLC,AAS.

Bilingual secretary (CTA's to be used for first 6 months)

Administrator

---

(4) laboratory assistants for sample preparation etc (all above to be trained in use of Microtox)

Senior chemist(s)

Principal in charge of Risk Assessment/Management
National Toxicologist

Senior Hazard Assessor
Risk assessment/management including information retrieval
Library

Total national staff - 14

Sufficient space and facilities will need to be made available at the Institute. It is unlikely that any funds outside those indicated above could be made available locally.

2. Prerequisites (not covered above). None

Part H. Project Reviews, Reporting, and Evaluation

1. The project will be subject to tripartite review (joint review by representatives of the Government, executing agency and UNIDO), at least once every 12 months. The first review will be needed within the first 9 months because of the complexity of the project and the additional data which will be generated by the surveys within the first few months of the project. The national project coordinator (ie, the Chief Technical Adviser) and/or senior project officers of the United Nations executing agency shall prepare and submit to the UNIDO least 3 months before each tripartite review, a Project Performance Evaluation Report (PPER). Additionally, PPERs may be requested as necessary during the project.

2. Project terminal report

A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft, sufficiently in advance to allow review and technical clearance by the executing agency at least 4 months prior to the terminal tripartite review.

3. The project shall be subject to evaluation 6-9 months after the commencement of full implementation as noted above. The organization, terms of reference, and timing, will be decided after consultation between the parties involved in the project.

Part I. Legal Context

The Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement likely to be signed soon between the Government of the Republic of Croatia and the United Nations Industrial Development Organization, signed by the parties on ..... (date).

It is noted that UNDP currently has no office in Croatia.

Part J. Budgets

will be attached later

Annex 1: Job Description

1. Chief Technical Adviser

He/she should be a graduate chemist or chemical engineer having in addition a background in biological/medical/environmental sciences, and a thorough knowledge of the toxicology, both environmental and mammalian, of the chemicals being synthesized, used, formulated, transported, and disposed of within Croatia.
He/she should have had demonstrable expertise in liaising with officials from national governments, international agencies, top level executives from industry and academia on an international level.

He/she should be able to demonstrate previous experience in chemical information retrieval, hazard and risk assessment, risk management, etc., of chemicals and other substances likely to invoke adverse effects to the environment. Knowledge of problems of discharges from factories and their effects on sewage treatment processes, rivers and drinking waters are a requirement.

He/she should have travelled widely (in Europe) and have a wide personal knowledge of experts/ consultants who are in a position to advise in specialty sectors of industry for short term missions within the project.

He/she is expected to have skills in training and conference organization, be an excellent communicator both the spoken and written, and have publishing experience.

A detailed knowledge of the geography of Croatia would be an asset.

2. Analytical chemist

He/she should be graduate chemist, in addition having a background in environmental sciences. He/she should be familiar with sampling techniques for environmental samples in particular water and soils. He/she should be familiar with modern, physio-chemical techniques including atomic absorption spectrophotometry, gas chromatography, mass spectrometry, Microtox etc. Relevant experience in training of staff from less developed countries is essential.

He/she should be able to advise on the setting up of the necessary laboratory techniques and institute a good laboratory practice code of operation.

3. Expert on Disposal of PCB's

He/she should be a graduate biologist or chemist having proved expertise in remedial action/decontamination of soils and water contaminated with PCB's.

He/she must be able to prove by case studies, details of previous successful work, especially so in difficult geographic terriers. A full

knowledge of modern methods of PCB analysis is desirable.
The overriding requirement is a clear understanding of pragmatic techniques for PCB decontamination/remedial -action by a variety of techniques.

JOB DESCRIPTIONS - NATIONAL STAFF

4. Bilingual secretary

The bilingual secretary will be fluent in both Croatian and English, and will also act as personal assistant to the Chief Technical Adviser.

He/she will have proven expertise in both normal commercial secretarial skills eg. typing letters, reports, maintenance of diaries, making appointments, travel arrangements, together with previous experiencing in liaising with senior government and UN officials, senior industrialists and academics located in Croatia and other countries.

Additionally, familiarity with a wide range of complex scientific and technical phraseology is vital as many of the reports etc., will be complex in nature.

Accurate and fast keyboarding skills, coupled with experience in scientific word processing, eg. Word Perfect 5.1. is required.
He /she will also have typing skills, shorthand would be an asset but not a necessity.

He/she should have a pleasant and efficient manner, be sociable, be prepared to work hard with flexible working hours, be prepared to travel nationally, interpreting when required, and ideally should be a car driver.

5. Officer in Charge of new National Environment Institute

As it is not envisaged that this appointment would be made within the first 6 months of the CTA commencing his/her duties within Croatia, a preliminary job description is given. It is envisaged that either the principal analytical chemist or the principal in charge of risk assessments, eg. the Croatian Toxicologist (Ecotoxicologist) would be considered as candidates for this vital post whoever is appointed to this post would need to demonstrate very clearly his/her ability to lead the institute as a centre of excellence of international repute to lead Croatia in environmental monitoring, risk assessment, risk management requirements, after remedial work had been achieved at the conclusion of the CTA's advice period.

He/she must have a primary degree in chemistry, biochemistry, biology, medical or veterinary science, ideally be of post doctorate status.

He/she must hold evidence by scientific publications of research in the above disciplines.

The ideal candidate would have some knowledge in both analytical sciences and toxicology with interest in risk assessment/risk management.

Additionally, proven general management skills are essential with an ability to communicate with senior personnel from government, international agencies, industry, and academia.

An appreciation of accountancy or economics would be of value but not essential.

A proven command of both oral and written English is essential and an appreciation of computers would be an asset.

He/she should have travelled abroad and participated actively in international conferences. Some editing experience (in English) would be of advantage.

It is an overriding prerequisite for this post that the officer-in-charge undertakes clearly that he/she has personal responsibility for all work undertaken by the institute itself and work sub-contracted to other laboratories.

6. National Toxicologist (Ecotoxicologist)

He/she must be at least of graduate status having a first degree in chemistry, biology or a medical science. The appointee will need to acquire the necessary skills in both, mammalism, toxicology, genotoxicology etc. and also ecotoxicology e.g. fish, invertebrate and other non-target species toxicology. Such additional skills will be provided by the CTA, visiting short-term international consultants and by short-term visits to toxicology/ecotoxicology in Western European centres of excellence.

The appointee would need to demonstrate a clear ability in the use of oral and written English, and general ability in the use and undertaking of the relevant scientific literature.

A good record of publications is essential, which would illustrate an ability in a multi-disciplinary thinking and appreciation of the scientific principles involved.

Annex 2: Sub-Contractors

Subcontracts will be let to specialists for short term missions for:

i) Specialist training in:
   Sampling
   Analytical chemical techniques
   Information retrieval, validation and interpretation
   Hazard assessment
   Risk assessment
   Risk management
   Remediation

ii) Specialist legal/regulatory advisors to review and advise the current Croatian environmental law with the view of advising the Government on a set of revised legislation which will reflect current Western European practice.

iii) Subcontractors will be let for specialist analytical analysis, treatment techniques, for example, treatment of oil spills by enzymic/bacterial systems on a trial basis.

Job description

i) These specialists will need to demonstrate clear experience in their relevant specialism, eg.:
   a) Statistics
   b) Information technology
   c) Hazard/risk assessment/management

Statistics

A degree in mathematics with specialism in statistic will be required.

Information technology

Recognized diploma/member of professional institute in information science.

Hazard/risk assessment/management

Degree in chemistry, biology, toxicology, with a demonstrable experience in ecotoxicology and hazard/risk assessment/management.
An understanding of transboundary effects will be needed where appropriate.

ii) An environmental scientist and/or lawyer with demonstrable knowledge of one or more western European environmental laws/regulations, plus a working knowledge of relevant EC Directives, Regulations, etc.

A knowledge of the UNEP/IRPTC legal file would be of advantage for (i) b,c, and (ii).

The exact periods and numbers will need to be specified by the CTA in collaboration with UNIDO, the other international experts, the government, CHWMA, and the officer-in-charge of the institute.

iii) This can only be specified on a need basis but working within close budgetary constraints.

In view of the novel nature of the problems in Croatia, it is proposed that one or more international conferences will be organized, ideally, but not necessarily in Croatia. For this purpose it may be necessary to engage an experienced international conference organizer. Whilst any funds for this would be covered under the budget headings, it is envisaged that such conference(s) would be at the least financially self-supporting.

Annex 3.

Laboratory equipment list

Items	Estimated cost (US$)
Microtox	40,000
HPLC	35,000
Gas Chromatography	35,000
Atomic Absorption Spectrophotometer	80,000
Vehicle (4-wheel drive)	15,000
Computers (3+ printers)	6,000
Laboratory information management system	4,000
General laboratory equipment	10,000
	225,000

All of the above are expected to a life exceeding five years.

Annex 4. Places to be looked at damaged by the War.

Table 1

Short term recommendations (timescale < 1 year.)

Location/ Installation/ industry	Chemical / hazard	Proposed Action
Osijek Saponia	Sodium hydroxide Detergent residues Pesticides	Now reused. Re-use or via cement kiln - great care necessary re phosphate levels. Cement kilns.
Thermoelectric power plant	Heavy fuel oils PCBs	Treat microbially. qv. Project
Slavonka leather factory	Chromium salts, dyestuffs, biocides	Analysis and trade effluent treatment.
Vinkovci wheat silo	Wheat Heavy fuel oil	Now partially ploughed in Seal pipe.
INA oil refinery	Spent engine oil	Burn in thermoelectric power plant
Cibalia leather factory	Chromium salts, dyestuffs etc. Contaminated water in cellar	Prevent discharge to R. Bosut. Rebuild effluent treatment plant. Analyze and seek expert advice.
Pakrac Wood factory Sewage treatment works	Wood dust Fungicides	Install dust extractor. Investigate alternatives and improve techniques. Monitor river (Microtox). Provide/reconstruct
Lipik Glass works	Chimney	Demolish or repair
Slavonski Brod Duro Daković	PCBs from transformers, heat transfer system and hydraulic oils Lead paint Trade effluent	Chemical analysis and assess magnitude problem. Soil analysis initially Consider mobile peroxidative plant
Hladnjača Vino-Voće Bjelič (cold store)	Ammonia	Refrigeration engineer to prevent further ammonia losses and to assess damage.
Sisak Power plant and transformer station Thermoelectric power plant	Heavy fuel oil and PCBs ion-exchange chemicals	Analysis and microbial treatment/incineration. Examination of fish from Rivers Sava, Kupa, Lonja for PCBs and genetic abnormalities. Obtain specifications and means of discharge of spent chemicals.

Delnice Hydroelectric scheme lakes Transformers	- PCBs	Protection of resources by detailed catchment study including wood industry pesticides and bark residues. Analysis of soil on hillside
Karlovac Mill factory (Reported February 1993 to be destroyed totally)	-	Improvement to cleaning. Ammonia- advice from refrigeration engineer.
Ogulin Munitions dump	Cadmium Mercury Thallium	Further analytical surveys, including sub-surface soil samples groundwater etc. for metals and Microtox testing for other toxins. Consider treatment of ground with sulfur or sulfides to immobilize cadmium/mercury.
Lešće Hydroelectric power station	-	Investigate, identify, and prevent causes of contamination.
Otočac Cosmochemica	Organic solvents	Remove from underground tanks and inspect tanks for damage.
Gospić Sewage treatment R. Lipa Excavator in river Trees Battery factory Vehicle repair depot Refuse collection and disposal	- PCBs Unknown Manganese, zinc Spent engine oil -	Very urgent need for repair ca. 4 MDEM Remove or at least recover PCB hydraulic fluids Survey to be undertaken by local school children. Metal analysis and organics by Microtox testing required in soil samples. Oil analyses, toxins by Microtox required. Replacement garbage collection vehicles and better control of landfill site.
Zadar Drinking water supplies	-	Need for detailed chemical (and bacteriological) analyses plus frequent assessment by Microtox.
Šibenik Transformer	PCBs	Analysis required
Dubrovnik Former chlor-alkali works (Malanica bay) Marine Biological Institute Drinking water supplies Sewage treatment (Mali Ston) Refuse disposal Graphite (cooper) factories Limestone Wine cellar	 Mercury alkyl mercury Aquarium fish - Carbon monoxide PAHs	 Analysis of sea water, fish and mussels in particular. Examination of fish for genetic change, generally malformation, sores, and in particular for signs of hermaphroditism. Improvement to laboratory. More testing, eg. by Microtox. Reconnection to sea outfalls and repair to pumping station. Thorough survey of alternatives. Develop management plan. Analysis. Incinerate toxic, waste at cement works at Split. Provide dust extraction equipment. Blank off undamaged wooden vats and fill with water. Remove and re-use unbroken glass bottles.

General Refuse	Building debris, broken glass, household garbage, industrial waste.	Develop overall management plan. Recycle wherever possible. Provide recycling plants at eg. Kutin, Split.
Broken glass	-	Very urgent provision.
Microtox	-	Use of in situ electro-generation of chlorine for hotels, municipalities, etc.
Chlorination of drinking and bathing waters.	-	

Table 2
Medium Term Priorities, 1 - 2 years.

Location/ Installation/ industry	Chemical/ hazard	Proposed action
Vinkovci Wheat silo	Dust extraction Pesticides	Replace
Pesticide storage area		Monitor soil for residues (Microtox).
Đakovo Pesticides storage area	Pesticides	Monitor soil around replacement store for residues (Microtox).
Lipik Glass works	-	Consider float glass plant.
Slavonski Brod Oriolik- Oriofleke	Furniture chemicals	Analyze for phosphates, chromate, bromide and tin. Urethane residues.
Sisak INA oil refinery	Burnt oil and oil residues	Treat soil microbiologically. Improve monitoring, eg. by Microtox, also at Rijeka, Zagreb (Ivanić Grad), etc.
Delnice Munition Dump	Cadmium, Mercury, Thallium, etc.	Detailed chemical analyses for metals and for organic pollutants, by Microtox.
Karlovac Municipal rubbish dump	-	New site required, compaction, and improvements to management.
Ogulin (Plaški) Sulfur cellulose factory		Survey required.
Šibenik Aluminium smelter Vegetable oil and wine/alcohol factory	- Genotoxins produced by combustion.	Great care to be exercised in restoration, especially transformers. Fish monitoring for genetic damage.
Potable water resources	-	Need to undertake detailed catchment surveys.
Metković (Neretva Delta) Agrochemical usage	-	Expert needed to assess requirements for modern pesticides, fertilizers, etc.
Dubrovnik Drinking water supplies	-	Survey of catchment required, eg. Bileća, Trebinje, etc (Bosnia).
Incinerator	-	Remove mines from Locrum. Complete and commission incinerator.
Chicken/egg farm	- Phosphate	Treat decomposing animal tissue and prevent spread of pathological organisms. Analysis required
Graphite factory	Copper PAHs Carbon monoxide	Analyses required. Installation of fume extraction equipment. This factory should be relocated away from Dubrovnik.
Vineyard	-	Expert assessment required.

Table 3
Long term Recommendations (time scale > 2 years).

Location/ Installation/ industry	Chemical/ hazards	Proposed action
Osijek Drava safety measure products IPK LIO	Not known ditto ditto	Survey required. ditto ditto
Dakovo Meteor plant	Detergents, etc.	Apply BPEO, BATNEEC, to reduce discharges. Install trade effluent treatment.
Sisak Thermoelectric power plant	Ion-exchange resins.	Recover if possible.
Karlovac Milk factory INA oil distribution	- Diesel oil residues	Refurbishment of laboratory and air filters on chimney. Soil monitoring by Microtox testing. Survey of trees by school children.
Ogulin Winter hotel facilities	-	Provision of sewage treatment and improvements to all aspects of water disposal.
Otočac Sewage works	-	Necessary to provide full facilities.
Split Sewage works Former chloralkali works	- Mercury, alkyl mercury compounds.	Necessary to provide at least primary treatment. Analysis.
Dubrovnik (Gruž) Coal fuel power station	-	Renew dust extraction equipment.

5. **UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION**

Project Document

Number: SI/CRO/93/.../. Country: Croatia

Title: **Environmental Remediation Programme For Osijek Damaged by the War**

Total UNIDO budget
(excl. support costs): US$ 135,000 (Including cost sharing.)

Estimated starting: Early '94. Planned duration: 2 months

Project site: Osijek (Power Station and Saponia (Nemetin) Factory)

Government Implementing Agency:

Croatian Hazardous Waste Management Agency authorized for project implementation by the Ministry of Civil Engineering and Environmental Protection of the Republic of Croatia.

Host Government/Agency:-
(if applicable in case of inter-country, interregional and global projects

Date of official request:

Brief description:

This urgent troubleshooting project will survey the unforeseeable war damages sustained to the chemical industry and infrastructures such as power plants in the Osijek region. As generic and other monitoring programmes will be initiated; risk assessments, reductions, and managements undertaken, together with recommendations for remedial work. It is anticipated that this project will form the basis for foreign investment, joint venture opportunities, etc., to assist Croatia in economic recovery.

Signed: Date:

Name/Title:_____

I. BACKGROUND AND JUSTIFICATION

The town of Osijek, at the east of the Slavonia region of Croatia has suffered considerable and unforeseeable damage to its chemical industry and vital infrastructures as a result of the war.

Much of this damage was reported in the initial UNIDO expert's report US/CRO/92/164 (IO/R.263) dated 15 March 1993 and its supplement dated April 1993, resulting from the January 1993 UNIDO mission to Croatia and the Zagreb conference 15-17 April 1993. This proposed urgent and troubleshooting project would be for one international expert to undertake the following basic tasks:

(a) To survey/report on damaged installations not inspected in January 1993;

(b) To equip University of Osijek (or other appropriate institutions) with Microtox rapid generic monitoring equipment and train local staff in its operation;

(c) To survey, monitor and prepare risk assessments and plans for remedial action for the oil pollution at the Osijek thermal electric power station. (The oil spillage covers 15 acres, has blocked drains and has polluted a local canal up to 37,000 ppm oil; and,

(d) To survey , monitor, prepare risk assessments and plans for remedial action at the Saponia (Nemetin) factory. The chemicals include pesticides, detergents, plastics, etc.

The partially burnt surfactants would be used to assist in the oil dispersion and the perforate in washing powders used to oxidize some of the pesticides and other hazardous chemicals.

Whenever appropriate, toxicological monitoring and risk assessments will be used to support (a), (c), and (d) above. The preferred technique is that based on the effect to *Photobacterium phosphoreum* NRRL B-11177 (The Microtox® test, which is reviewed in *Ecotoxicology Monitoring*, Richardson, M.L. (ed.), VCH Publishers, Weinheim, 1993, pp. 384).

Such remedial troubleshooting work is very urgent because of the unforeseeable leaching of the pesticides, oils and other chemicals to the River Drava and hence to the River Danube, which is used as a source of drinking water for many peoples in other countries from Nova Sad to the Black sea.

Secondly, there is a very urgent need to reconstruct the power station as the Osijek region (12,000 km^2, total population ca. 1,000,000) is currently only receiving an unreliable electricity supply.

The return of a reliable electricity supply, the capital works for which is the subject of an EBRD loan will assist humanitarian rehabilitation of destroyed households and industry.

The damage of the Saponia site would enable a joint venture for the rebuilding of the detergent and allied industries, assuming this is valid

from international marketing viewpoint. It should be noted that whilst Osijek is some 350 km east of Zagreb, there are good lines of communication to Hungary, Pécs being only 100 km distant, and after total cessation of hostilities, goods can be transported on the River Danube.

There is urgent need for troubleshooting and international advice as indicated above.

The true magnitude of the problem was unforeseen under the expert's very brief visit in January 1993, nor were the problems stressed adequately during the Zagreb conference 15-17 April 1993 as delegates from Osijek experienced travelling problems.

The damage to the power plant, the Saponia factory, and a further 6 locations mentioned in the UNIDO expert's report (January 1993) are having a major impact on the economy of the region, the need to reconstruct the power plant and factories in turn effecting the enterprise opportunities, and above all are polluting the river Drava and hence the river Danube.

III. THE PROJECT

To undertake with urgency, troubleshooting work on the unforeseeable consequences of the war damage to the chemical industry and the oil leakage Osijek.

(a) Project Objectives

(i) To provide advice from an international expert;
(ii) To provide monitoring facilities and training;
(iii) To prevent further pollution to the Rivers Drava and Danube from pesticides, oils, and other chemicals;
(iv) To enhance the reconstruction of the Osijek thermal electric power station.
(v) To undertake risk assessments of the consequences of the pollution caused by the war.
(vi) To clear contaminated sites, which in turn will encourage international joint ventures and return of much needed enterprises.

(b) Outputs

Output 1
To survey/report on the damaged installations not covered during January 1993.

Output 2
To install Microtox® equipment at the University of Osijek (or other appropriate institution), train local staff in its use.

Output 3
To survey in detail the oil contamination from the thermal electric power station, taking into account soil pollution, blocked drains, and water pollution in the local canals, especially the Paličić canal (which on 4 February 1993 contained 36,853 mg l^{-1} oil).

To analyze samples by the Microtox® technique, and making full use of other local facilities, and to prepare risk assessments and to advise on remedial work, especially the use of bacterial/enzymes systems for soil remediation.

Output 4
To survey in depth the war damaged chemicals at the Saponia (Nemetin) factory, undertake analysis (Microtox and other locally available techniques), to produce risk assessments. It is envisaged that the damaged surfactants/perforate would be invaluable for emulsifying the oil spillages, and for detoxifying some of the pesticides, and other hazardous chemicals.

(c) Activities*

	Responsibility
Output 1 UNIDO expert to visit with counterparts war damaged locations not covered under project UC/CRO/92/164 and submit survey reports	UNIDO/technical adviser counterparts
Output 2 UNIDO expert to procure and install Microtox at University of Osijek (or other institution), train local staff.	UNIDO/technical adviser/counter-parts
Output 3 Counterpart staff will be trained to undertake monitoring and remedial work connected with the oil spillage.	UNIDO/technical adviser/counter-parts.
Output 4 Counterpart staff will be trained in monitoring, risk assessment and remedial work. Particular attention will be stressed on the use of certain contaminated substances to detoxify other damaged substances.	UNIDO/technical adviser/counter-parts.

* A proposed work plan is included in annex 1 page 31.

(d) Inputs

(i) Government Inputs

Input 1
50% share in cost of one Microtox®, viz US$ 20,000.

Input 2
Provision of counterpart staff, space at the University of Osijek (or other institution) for the Microtox, office and support, including all internal travelling within Croatia, secretarial, telephone, etc, for the UNIDO technical expert.

Input 3
Other analytical chemistry as required locally, Zagreb, or elsewhere within Croatia, as necessary.

Input 4
Full cooperation and resources as necessary from staff from the thermal electric power plant, Saponia, and other locations as indicated in output 1.

ii) UNIDO inputs

11.01	Expert on Microtox and related field (2m/m) (for job description see annex 1, page31)	$ 25,000
11.50	Short term consultants (2m/m)	$ 30,000
15.00	Project Travel	$ 5,000
21.00	Sub.contract for chemical analysis	$ 10,000
32.00	Study tour for 2 (3 weeks each)	$ 12,000
41.00	Expendable equipment	$ 5,000
*42.00	Non.expendable equipment	$ 45,000
51.00	Miscellaneous	$ 3,000
99.00	Total	$ 133,000

* The Government will provide $20,000 as cost sharing element.

II REPORTING AND EVALUATION REQUIREMENTS, EXPECTED FOLLOW-UP

The project will be evaluated in accordance with the UNDP/UNIDO policies and procedures. Based on the outcome of the project there will be opportunities for investments and joint ventures.

The proposed work plan is attached as annex 2, page32.

BUDGET

Budget sheets will be attached later.

Annex 1 JOB DESCRIPTION

Technical Adviser

He/she should be a graduate chemist or chemical engineer ideally a Chemist, having in addition a background in biological/medical/environmental sciences and a thorough knowledge of the toxicology, both environmental and mammalian, of the chemicals being synthesized, used, formulated, transported, and disposed of within Croatia.

He/she should have had demonstrable expertise in liaising with officials from national governments, international agencies, top level executives from industry and academia on an international level.

He/she should be able to demonstrate previous experience in chemical information retrieval, hazard and risk assessment, risk management, etc., of chemicals and other substances likely to invoke adverse effects to the environment. Knowledge of problems of discharge from factories and their effects on sewage treatment processes, rivers and drinking waters are a requirement. He/she must be able to advise on remedial action maximizing on the use of local resources.

He/she should have good experience of the region and have a wide knowledge of experts/consultants who are in a position to advise in specialty sectors of industry.

He/she is expected to have skills in training, be an excellent communicator both the spoken and written, and have publishing experience.

A detailed knowledge of the geography of Croatia and downstream countries would be an asset.

Annex 2 WORK PLAN

Workdays	
1-2	Visit to Microtox Ltd. with National Project Director for discussions .
3	Travel to Zagreb direct taking Microtox as excess baggage.
4	Meetings with counterparts in Zagreb.
5	Travel to Osijek
6	Discussion with local counterparts.
7/8	Outputs/activities 1 and 2.
9-15	Outputs/Activities 3 and 4 plus follow on of Output 1.
16/17	Prepare interim report
18	Return to Zagreb. Meeting with Ministry officials and others and then travel to UNIDO.
19/20	Meetings UNIDO
20/35	Return to Osijek via Zagreb and continue outputs/activities
36	Return to Zagreb for debriefing
37/38	Debriefing UNIDO
39 to end	Return to GBR, writing report, etc.

6. List of Concepts Identified.

Concept i

Title:

Managing and Processing of Building Debris for Reconstruction and Shelter

Problem Area:

Due to extensive war damage of houses, an estimated 10 million tons of building debris need to be disposed of.

Introduction:

Two hundred to two hundred and fifty thousand housing units in Croatia have been destroyed or damaged and the debris are posing a major environmental problem. At the same time the very high need for building materials to be used in the reconstruction of housing, commercial and public buildings focuses the attention on the choice of raw materials. If appropriately sorted and processed part of the debris could be recycled into new building materials especially in the form of crushed and graded aggregate. However, due to the low degree of segregation in the material, particular care must be taken in the recycling of even the highest quality segment.

Immediate Objective:

To analyze the scope for economic recycling of part of the available rubble material and advise on the most cost effective disposal of the remainder.

Special Advantage:

If successful, the project would allow expediting provision shelter to thousands of replaced victims of war and could be a model for the whole Balkan Region affected by the war.

Output:

A feasibility study comparing the various technological options for rubble recycling among each other as well as with building material technologies using natural aggregates.

Activities:

1. Sampling, quantification and analysis of representative categories of rubble and definition of optimum technological options for reuse.
2. Specification of alternative types of processing plants, mobile and stationary and calculation of their financial viability compared with plants using natural material for aggregate production.
3. Study of alternative uses of rubble material for road construction or various filling applications.
4. Study of positive and negative environmental impacts of various alternatives.
5. Advise on an overall action plan including supportive policy measures such as incentives, standards and regulations.

Approximate Budget:

21.00 Sub.Contract for feasibility and analysis studies:	$45,000
51.00 Miscellaneous	$ 3,000
99.00 Total	$48,000

Concept ii

Title **Action plan for decontamination of soils and waters from PCBs.**

Problem Area

Numerous of locations have been contaminated with PCBs from electrical condensers and transformers, and also from hydraulic systems from damaged vehicles largely military, resulting from the war in Croatia.

Introduction

Water, and in particular soil, has been contaminated with PCBs from the above mentioned sources. As PCBs are subjected to significant bio-accumulation which can affect aquatic species, crops and ingress into food chains, it needs immediate attention to contain leaching into international waters.

Immediate Objective

To take necessary measures based survey already in hand by the Croatian Hazardous Waste Management Agency, to prevent the detrimental side effects due to PCB contamination.

Output

Areas contaminated with PCBs identified and assessed level of contamination. Remedial measures initiated to be taken.

Activities

1. Assign experts to assess the magnitude of the problem and which methods could be initiated to eliminate the PCB contamination, taking into account economic aspects.
2. Prepare a detailed project proposal for necessary action to be taken with outputs and budgets.
3. Prepare an action plan and models of implementation and carry out trial experiment with known methods which are economically feasible.
4. Based on the level of PCBs in water and soil initiate or/and take remedial measures for treatment by environmentally friendly methods.
5. Isolation and management of contaminated locations seems to be the most appropriate remediation method in anticipation of extra financial resources.

Approximate Cost

Part of this concept will be carried out with the scope of the main project entitled 'Industrial Chemical Pollution Control' and also will be linked with the EBRD's proposal assistance for the reconstruction of Croatian electricity installations.

Expert 2 m/m on PCB decontamination	US $ 20.000
Laboratory studies for decontamination	US $ 30.000
Total	US $ 50.000

Concept iii

Title: **Remediation of Central Zagreb Municipal Waste Dump Site**

Problem Area:

The Zagreb municipal; waste dump site at Jakusevec is currently causing pollution problems and threatening the safety of the drinking water supply for Zagreb.

Introduction:

The jakusevec dump site is situated on a 80ha of land in the inner city. belt has been in use currently for 23 years and accommodates 5 million tons of waste and new waste is still being deposited. The dump site has never been properly designed as a sanitary landfill and is causing air, water and soil pollution. The leachate is directly filtering from the site into soil. The danger of infection is increased because hospital and industrial wastes have also been dumped there.

The leachate is threatening the drinking water supply for Zagreb and the health of the population and requires urgent attention.

Special Consideration:

The proper control of the waste dump site would prevent trans-boundary pollution of the region in the long run.

Immediate Objective:

To protect the drinking water sources of Zagreb from pollution.

Output:

Recommendations as to the best strategy for the city of Zagreb to protect its drinking water from leachate from the municipal waste dump site and also take necessary steps to properly manage the site to prevent long term effects in the area.

Activities:

1. Review the present situation regarding pollution from the Jakusevic dump site and make recommendations non the best approach to deal with the problem of drinking water contamination and other consequences due to pollution.

Approximate Cost:

International expert, landfill sites	1.5m/m	$21,000
International expert, Leachate treatment	1.0m/m	$14,000
International expert, gas recovery from landfill sites	1.0.m/m	$14,000
Miscellaneous		$ 500
Total		$49,500

Note; This project may be suitable for SIS funding because of the very urgent nature of the problem which needs to be addressed.

Concept iv

Title **Spent Oils Recovery and Recycling.**

Problem Area

Croatia has no means of disposal of waste crankcase and other waste oils generated during vehicle maintenance, engineering operations, etc.

Introduction

Prior to the conflict, Croatia had no effective means of disposal/recovery of such waste oils, which leads to unnecessary local air, soil or water pollution. In order to stimulate sustainable environmental development, advanced techniques are needed to rectify a growing nationwide problem.

Immediate Objectives

To assess the current position, to minimize environmental contamination and to improve sustainability.

Outputs

1. To assess the current position.
2. To recommend the setting up of regional or area-wise collection points.
3. To investigate pragmatic, environmentally sustainable and economic techniques for recovery and ultimate disposal taking into account fully best practical environmental options.

Activities

1. To provide international experts to advise on:
   a) Collection; and,
   b) Techniques for disposal.
2. To prepare report.
3. To advise on costs for setting up of regional (area) collection depots, special vehicle requirements, static tanks, etc.
4. To advise on treatment facilities.

Approximate Cost For Initial Surveys

One international expert to advise on a collection system, need for special vehicle, tankerage, etc	1.5 m/m	US$ 22,500
One international expert to advise on treatment/disposal.	1 m/m	US$ 15,000

Notes

It needs to be appreciated that different waste oils need different treatments.

1. Waste crankcase oils can be acid washed and subsequently recycled or distilled to yield diesel and other fuels. However, this leads to the production of a sulfuric acid tar, the disposal of which can lead to significant environmental problems.

2. Engineering cutting oils can be 'cut' often at the engineering factory, and subsequently treated and recycled.

3. Some oils can be redistilled but this needs dedicated plant as such feedstock cannot be introduced into normal refinery feedstock.

4. Some waste oils after treatment can be burnt in suitable furnaces.

Concept v

Title **Pre-feasibility studies for the selection of sites for reconstruction and development of Croatian Chemical Industries in the light of national and international market situations.**

Problem Area

The Croatian Chemical Industry is significantly devastated by the war and the remaining industry is highly polluting to the environment.

Introduction

The recent survey carried out by UNIDO expert under the project US/CRO/92/164 has identified a number of chemical and related industries badly damaged by the war or highly pollution the surrounding areas and needing extensive measures for rebuilding taking into account the national and the international market situation. Prior to taking any major investment decision it is desirable to carry out full market surveys and feasibility studies using systems such as UNIDO's COMFAR (Computer Model for Feasibility Analysis and Reporting) programme.

Immediate objective

To assist the Government of Croatia and the Croatian Chemical Industry to make major investment decision for reconstruction of the war damaged and existing installations.

Output

A feasibility study report covering national and international market situation, investment opportunities, joint venture opportunities and loans from development banks and giving investment costs, discounted cash flows and taking into account cleaner technologies and sustainable industrial development.

Activities

1. Assign a team of experts consisting of market specialists, chemical engineers, environmentalists, investment and COMFAR specialists, and assess the future and realistic opportunities or reconstruction of chemical industries in accordance with the European standards with special emphasis to high value specialty chemicals (see annex 1 page 38) for suggested chemicals and towns that need reconstruction).

2. Such a project would involve the Feasibility Studies Branch, the Chemical Industries Branch, and the Industrial Development Division.

Approximate Budget

The initial techno-economic feasibility studies would cost approximately:

Market specialist (team leader)	4 m/m	$ 50,000
Chemical Engineer (two)	2 m/m	$ 60,000
COMFAR specialist	1 m/m	$ 12,000
National experts:		
Chemical Engineer (two)	2 m/m each	$ 12,000
Other Experts	4 m/m	$ 12,000
Miscellaneous		$ 2,000
Total:		$ 148,000

Notes

1. The January 1993 mission identified severe(S) to total(T) devastation to the chemical industry in the following towns:

   Osijek(T); Vinkovci(S); Djakovo(some), Našice(a little); Pakrac(T); Lipik(T); Slavonski Brod(S); Sisak(some but with much reconstruction in hand); Delnice(some); Karlovac(S); Ogulin(some); Otočec(S); Gospić(T); Zadar(S); Šibenik(S to T); Split(minor); Metković(minor); Dubrovnik(S); Zagreb(minor).

2. Many towns are known to cause air pollution (see Annex 2, page 40 for additional information)

Annex 1
Specialty chemicals

It is proposed that specialty chemicals will have to be decided based on the world market and supply, cost of local production. Some selected chemicals are listed below should be considered for production as high value products.

1,2-dibromo-1,4-dicyanobutane;
b-bromo-b-nitrostyrene;
1-bromo-3-chloro-5,5-dimethylhydantoin;
2,2-dibromo-nitrilopropionamide;
2-bromo-1-(4-hydroxyphenyl)-ethanone;
2-chloro-N-(hydroxymethyl)-acetamide;
2-chloro-6-methyl-4-benzylphenol;
5-chloro-4-isothiazoline-3-one;
trichloro-S-triazenethione;
quaternary ammonium and phosphorium compounds;
methyl bis (thiocyanate);
polymeric imino compounds;
3,5-dimethyl-1,3,5-(2H)-tetrahydrothiaxiazine-2-thione;
glutaraldehyde;
2-n-octyl-4-isothiazon-3-one;
o-phenylphenol;
2-(thiocyanomethylthio)-benzothiozole; and,
peroxyacetic acid.

Industrial towns which could be considered for reconstruction and development of chemical and related industries include:

Osijek	Gospić	Vukovar
Vinkovci	Zadar	Djeletovci
Djakovo	Šibenik	Nova Gradiška
Delnice	Split	Pula
Našice	Zagreb	Trogir
Pakrac*	Kutina	Knin
Lipik	Ivanić-Grad	Drniš
Slavonski Brod	Rijeka	Sinj
Sisak	Trogir	Karlobag
Delnice*	Dugi Rat	Senj
Karlovac	Koprivnica	Omiš
Ogulin	Bjelovar	

*Wood industry only

Annex 2
Towns known to cause air pollution

During discussion with scientists in Zagreb the question of atmospheric pollution was discussed. Even prior to the war many towns caused severe atmosphere pollution, and this was confirmed by observation, both during the surface travel and the return air journey from Dubrovnik.

Inland Towns	Coastal Towns
Zagreb	Rijeka
Slavonski Brod	Pula
Kutina	Zadar
Ivanić-Grad	Šibenik
Sisak	Split
Karlovac	Trogir
	Dugi Rat

The inland towns are also known to pollute rivers; and, the coastal towns, the sea to the extent that many neighbouring bays are highly polluted.

Equally at these towns, workers suffer from respiratory complaints and other adverse health effects.

When considering remedial policies, it is vital that due consideration is given to an integrated risk assessment so that all adverse effects of chemicals are investigated.

Many sites/towns have industries totally inconsistent with the overall nature of the towns. Such industries produce materials under very highly polluting circumstances, eg. the
factory at Dubrovnik producing silicon carbide and electric motor copper brushes. Because of their strategic significance, these should be relocated to industrial towns
such as Dugi Rat, Kutina, etc.

At Dubrovnik, because of its cultural heritage significance, industry needs to be restricted to light clean engineering such as assembly of electric/electronic devices, eg. TVs, food processing, etc.

Similar remarks apply to Otočac which, because of its environmentally sensitive location, should only consider clean technologies.

Croatia would be advised to consider the synthesis of low-volume-high-volume specialty chemicals, such as those listed in Annex 17 of the January 1993 mission report. Annex is reproduced below.

Concept vi

Title: **Site Selection for Hazardous Waste Storage/Disposal Facilities in the Republic of Croatia.**

Problem Area:

The disposal of hazardous wastes in Croatia is currently not being properly managed.

Introduction

Croatia is currently in the early stages of developing an integrated waste management policy which will allow it to properly deal with hazardous and other industrial wastes. Development of this will require the selection of hazardous waste storage/disposal sites. This is seen as a critical part of the overall waste policy development, because of the need to overcome the expected reluctance of inhabitants to having such facilities located near them. The most suitable sites, once selected,will also be incorporated into the Regional Plan of Croatia. For this to occur, a set of regional planning documents will be prepared for the selected sites. These sites will be chosen based on a screening of the entire territory of Croatia, and the application of a number of appropriate criteria.

Immediate Objective:

To select the most suitable sites in Croatia for locating hazardous waste storage/disposal facilities, and to integrate these into the national plan for waste management.

Output:

A report consisting of a critical review of the proposed criteria and methodology for selecting hazardous waste storage/disposal sites in Croatia, and the integration of these into the national waste management policy, and recommendations for the improvement of this.

Activities:

1) Review, by an international expert, of the overall national waste policy, and the criteria to be used for selecting hazardous waste storage/disposal sites.

2) Based on the above, recommendations on the best approach to be taken for site selection, and preparation of a report on how this can be achieved.

Approximate Budget:

International expert - national waste management policy development (2.0 m/m)	US$ 28,000
International expert - hazardous waste storage and treatment facilities (2.0 m/m)	28,000
Miscellaneous	2,000
	58,000

Note: Concepts iii and vi could be combined into one project if necessary

Concept vii

Title

In situ chlorination of drinking water supplies.

Problem Area

Pure and wholesome potable water supplies are unavailable.

Introduction

Due to war damage which was inflicted on water purification plants, shortages of chlorine, water supplies to schools, hospitals, refugee centres, old people homes, etc. have no access to disinfected water supplies. These emergency situations should be remediated immediately and thus alleviate the sufferings of innocent civilians as a result of the war.

Immediate Objective

To provide relief to thousands of innocent people who are in immediate need of pure and wholesome water.

Special Advantages

The project would eliminate the need to transport hazardous chlorine gas or hypochlorite solutions.

Output

In situ chlorine generating units installed at various establishments, eg. schools, hospitals, refugee centres, etc., or indeed for complete communities up to population equivalent of 10,000.

Activities

1. On a model case select one or two communes with high concentration of schools, hospitals, refugee centres, etc., and make necessary preparations for installation of in situ chlorination units.

2. Ensure required facilities, such as sodium chloride of acceptable purity and reliable electricity supply, are made available.

3. Procure required number of in situ chlorination units of appropriate capacity and install them and set them in operation.

Approximate Budget

The cost of this experiment project would depend on the number of units needed for one commune based on the circumstances such as the size of the commune, etc.

The cost is expected to be in the region of about US $ 50,000

Range of cities' water supply in Croatia

Number of citizens	
- 10.000	- small towns
- 10.000-50.000	- middle towns
- 50.000-200.000	- regional towns (Osijek, Rijeka, Split)
- 1.000.000	- Zagreb, capital city

Concept viii

Title

Establishment of municipal waste-water treatment plants.

Problem Area

Rivers, groundwater and the Adriatic Sea are becoming polluted increasingly with sewage and industrial wastewaters. On the coast the position is particularly acute near high density tourist areas, especially so marinas.

Introduction

Many Croatian towns, villages, etc., even prior to the conflict, were without municipal or industrial wastewater facilities. This has the increased effects of contamination, both biological and chemical of fish, cattle, meat/milk products, cereals, vegetables, etc. Water rates are currently a very small percentage of GDP and as Croatia moves to a market economy, a greater proportion of GDP, in common with Western countries, will need to be expended on wastewater treatment, sludge disposal, recycling in particular on site treatment of industrial wastewater, etc., in accordance with best practical environmental options, and best available techniques not entailing excessive costs.

Immediate Objective

To survey major towns and villages to assess the nationwide requirements, and at critical locations, eg. Gospić, undertake remedial works on partially destroyed sewage treatment works.

Output

1. Nationwide survey of wastewater treatment requirements including industrial effluent.

2. Monitoring of receiving waters.

Activities

1. Survey country to list towns/village with
   a) Adequate facilities;
   b) Facilities which in mid 1990 terms are inadequate;
   c) War damaged facilities
      - totally
      - partially
   d) No facilities.

2. Assign two experts to assess the magnitude of the problem and the types of treatment most suitable for the geology and geography of the regions.

3. Select minimum 3 sites for monitoring of receiving waters.

4. Prepare a detailed project proposal for necessary action to be taken with budgets and outputs. This would include preliminary discussions with investment banks.

5. Select one location, eg., Gospić for immediate remedial action.

Approximate Cost

Two experts(2 m/m) for survey work		$ 60.000
One expert for monitoring work 2 m/m		$ 30.000
Monitoring equipment reagents etc.		$ 10.000
Remedial/reconstruction Gospić sewage treatment plant	$	2.500.000
Costs of Croatian Environmental Institute (CEI) to be decided.		
Total	US $	2.600.000

Note

1. The remedial construction work at Gospić should be considered on a loan basis, and be subject to total cessation of hostilities in the area.

2. It is assumed that the necessary monitoring equipment and national staff would be available at the new Croatian Environmental Institute.

Concept ix

Title **Analysis and risk assessment/risk management of river and potable water samples.**

Problem Area Currently there is significant inappropriate utilization of scarce resources in the monitoring of river and potable water samples.

Introduction

Croatia has inherited regulations (Water Classification Act) which encourages an inappropriate sampling and monitoring regime. Discussions at the Zagreb conference 15-17 April 1993, and reported in Supplementary Report to the January 1993 mission report US/CRO/92/164 (IO/R.263) showed that samples were analyzed for some 40 parameters in many cases at too many locations. Whilst data was being accumulated in ledgers or computers, no risk assessments were being undertaken on these data. In the case of spillages or other pollution incidents, remedial action was very slow to enact.

Immediate Objective

To initiate risk assessments on existing data to assess most vulnerable locations, reducing sampling, etc.

Outputs

River systems and potable water resources to be assessed for regular contamination, seasonal and other variations in analytical parameters. Consider analysis by online remote monitoring.

Activities

1. Assign two experts to review existing analytical data, parameters monitored, risk assessment of existing data.
2. Undertake risk management on existing data.
3. Propose more pragmatic sampling and monitoring regimes.
4. Prepare detailed proposals and for online remote monitoring stations with data being telecommunicated to central control centre, with outputs and budgets.
5. Prepare detailed project proposals for emergency response, with outputs and budgets.

Approximate Cost

Two experts for 3 m/m each US $ 90,000
Host country cost to be covered by the Croatian Society for Risk Analysis

Note

The people of the Republic of Croatia should be advised that in order to enjoy pure and wholesome potable water supplies and good aquatic amenities, that a realistic proportion of GDP will need to be expended on water charges as is now common in most western countries. Failure to do so will in all likelihood result in a 'water shock' not unlike the 'oil shock' of the early 1970s, when prices tripled overnight.
Water is a vital commodity which must not be abused continually, especially so to one's neighbours. It should anticipated that funds for the equipment, training, etc., resulting from the experts' reports would be forthcoming from investment banks, or as joint venture projects from Western privatized water undertakers.

ANNEX I

Speech Delivered at the International Conference
"Effects of War on the Environment"
Zagreb, 15-17 April 1993

ACTIVITIES OF UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO) IN THE AREA OF CHEMICAL INDUSTRY

by

Ms. A. Tcheknavorian-Asenbauer
United Nations Industrial Development Organization
Vienna, Austria,

On behalf of the newly elected Director General of UNIDO,Mr.Mauricio de Maria y Campos and on my own behalf, I want to welcome you all to this very important conference to discuss the effects of war on the environment. We are indeed very happy to support this international conference which will set the scene for action to be taken by your new born republic through local efforts and by bilateral and multilateral assistance. Countries such as Kuwait and Croatia, have gone through a traumatic experience of war with displacement of people from their own towns and cities and faced the consequences of a long term damage to the ecological system. Now your country is left to cope with the war damages to property, industry and above all to the cultural heritage which is very difficult to replace.. However, Mr.Chairman history has shown that mankind is resilient and despite great sufferings they do survive linking themselves to cultural and religious ties. Today, Croatia is going through the same process as shown in this conference. Many delegates having links to Croatia, are here to give both moral and technical support to build the country from the ruins of war.

International organizations such as UNIDO, UNEP, could play an important role in providing the badly needed assistance to Croatia and the Balkan Region in tackling the ecological damage. UNIDO's primary mandate is to assist promotion and acceleration of industrial development in developing countries and specifically to assist in the formulation of development, scientific and technological programmes and plans for industrialization in the public, cooperative and private sectors. In this special attention is given by UNIDC to:

- human resource development
- development and transfer of technology
- industrial rehabilitation
- small and medium scale industries
- environment, energy and economics
- mobilization of financial resources for industrial development
- promotion of the cooperation between developing countries
- industrial safety, waste management
- cleaner technology

- use of renewable resources

- reduction/elimination of CFCs and other ozone depletion compounds.

Today, we all know that industries play a vital role in determining the standards of living of mankind but at the same time, they are directly or indirectly contribute to the pollution of soil, water, air, and to the ever growing consumption of non-renewable resources. It is obvious that this part of the world, the Mediterranean region depicts the differences that exist between North and South and they are of extreme contrasts. They are evident especially among the eighteen countries that embrace the common coastline of the Mediterranean Sea. They affect all spheres such as economy, religion, politics, level of industrialization, rate of population growth, literacy rates, infant mortality and so on. The population of the region, especially of the Mediterranean countries, will reach around four hundred million by the turn of the century. Every year around a hundred million tourists pass through this region and all this will put enormous pressure on the Mediterranean countries, especially on the coastal areas and the fresh water resources in the south which are becoming very scarce.

The problems facing the region are clearly stated in the Bergen Ministerial Declaration of May 1990 of the United Nations Economic Commission for Europe. It specifies that destruction of the biosphere and its ecosystems, environmental degradation, population pressures, depletion of resources and extinction of species threaten the quality of human life as well as human health and many of the earth's biological systems.

Since the Bergen declaration, the Mediterranean has been changing fast with some countries moving from centralized economy to free market economy and above all,the world went through the Gulf war and today we are witnessing civil unrest threatening the Balkan states. In other words, this region is going through an unpredictable consequences on the life of the people and the environment.

UNIDO has been getting requests from countries in Eastern Europe and also from the Mediterranean countries to assist in privatizing their ineffective public enterprises, cleaning up of the environment and introducing cleaner technologies.

Exactly one year ago UNIDO actively participated in Athens Conference on Environment Protection and Recycling of Waste. Many recommendations were made and one of which was that UNIDO should promote in this region technologies that generate minimum or no waste. This is in accordance with UNIDO's concept of Ecologically Sustainable Industrial Development (ESID) which defines industrialization so as to

- maximize industrial output from a given level of resource ensuring appropriate use of human, renewable and non-renewable resources.

- make certain that industrial pollution does not exceed a critical load beyond which it adversely affects human beings and nature thus ensuring the quality of human life and proper management of natural assets.

In the Athens Conference I mentioned before, UNIDO reported on the sustainable management of industrial, domestic and agricultural waste. UNIDO is now more and more getting involved in waste minimization, waste recycling and proper disposal of waste. Energy conservation is a primary concern of UNIDO. In this we strive for low pollution in generating energy especially in coal and petroleum fuel utilization and in reducing energy consumption per unit production of industrial goods which are all of vital importance for ESID.

Another area UNIDO is giving importance is to air and water pollution control because they have consequences beyond national boundaries. The acid rain, ozone depletion, global warming, river pollution, eutrophication are all directly related to localized pollution generation having global consequence.

Finally industrial safety is vital for any plan to develop industries in developing countries. This cannot be emphasized more in chemical and allied industries where safety related to plant, workers' health and environment (SHE) aspects are given low priority in many countries. This is reflected in various accidents and ill health caused during handling, storage and transport and use of chemicals. In this UNIDO has developed Integrated International Safety Guidelines for Pesticide Formulation in Developing Countries. We are also conducting regular workshops on normal and preventive maintenance of petrochemical complexes. Recently we are giving assistance to Pakistan and Kuwait in dealing with eco-toxicological aspects related to chemical contamination. We are also providing assistance to Poland in clean coal technology and cleaner pesticide production.

In the chemical industries sub,sector our technical assistance programme covers the basic necessities of developing countries <u>viz</u>

Health, Hygiene, Nutrition, Food security, Shelter,
Clothing and Energy /Environment.

At the end of 1992 UNIDO in all industrial sub.sectors had 715 operational projects and 413 pipeline projects.

In conclusion, Mr.Chairman, this region needs the assistance similar to the Marshall plan to Europe after the world war, to put the region on the road to recovery from war damages. UNIDO along with other organizations would give all the necessary advisory and technical assistance to put your sufferings behind and start rebuilding the country especially in the industry sector. I sincerely hope that this conference would put Croatia on the road to recovery from the ruins of the war experience of which should be extended to the rest of the region. We are indeed very pleased to actively participate in this conference and along with the number of experts, UNIDO in collaboration with other organizations would be able to provide the necessary advice for controlling and rehabilitation of the chemical and allied industries damaged due to war. I wish you all a very successful deliberations and a pleasant stay in Croatia.

ANNEX II

Report on the Visit of Croatian Delegation
to UNIDO to Discuss Future Technical Assistance
August 17-20,1993.

I. **Introduction:**

Based on the request from the Ministry of Civil Engineering and Environmental Protection dt.March,1992, The United Nations Industrial Development Organization (UNIDO) under the project US/CRO/92/164 actively participated in an International Conference on 'the Effects War on the Environment' which was held in Zagreb during April 1993. The Conference was held under the auspices of the Government of Croatia and was organized by the University of Zagreb, The Ministry of Civil Engineering and EnvironmentaL Protection and the Ministry of Science of the Republic of Croatia. The Conference was co.sponsored by UNIDO, the Toxicology Subject Group of the Royal Society of Chemistry, London and the Croatian Chemical Society, Zagreb, Croatia.

The report (IO/R/263) prepared by UNIDO expert **Mr. Richardson** after visiting a number of war damaged areas in Croatia during Jan.1993 formed the basic document in the conference and was discussed in detail by the participants. Based on the recommendations of the conference, UNIDO and the Ministry of Civil Engineering and Environmental Protection in collaboration with other authorities identified a number of projects and concepts for further consideration. In order to facilitate discussions, a ***follow-up meeting*** was organized in Vienna during Aug. 19-20, 1993.

Prior to the meeting UNIDO expert **Mr. Richardson** came to Vienna to assess various project ideas and prepare projects and concepts for discussion in the meeting. The Croatian delegates also came to Vienna prior to the meeting and held discussions with Messrs. **Oxley, Bysyuk, Puerto Ferre, Biering, Ramsay, Mueller** (Policies) and **Muzio** (Res.Rep. Croatia).

II. **Report on the Meeting:**

The meeting was chaired by Mr. **Sugavanam** (for agenda and list of participants see pages 54,55). The visitors were welcomed by Mr. **Youssef**, O-i-C, Chemical Industries Branch. In his welcome speech he mentioned about the impact of the international conference held in Zagreb and how UNIDO's report has attracted the attention of other UN Agencies, member country missions and development banks. He referred to the fact that the soil and water pollution caused by damage to chemical and allied industries, sewage works, electrical installations and the consequent pollution of ground water, of the rivers feeding into the Danube river and the Adriatic Sea will be of great concern not only to Croatia but also to the countries of the Danube basin and the Mediterranean region. With the economy and environment playing a major role in decision making, he said that UNIDO is directing its efforts to integrate plant safety, workers safety and environment safety in its technical cooperation programmes. He also mentioned that in any industrial development,chemical industries play a major role and UNIDO will be pleased to offer the expertise to provide assistance for Croatian reconstruction plans. He stressed that projects or concepts identified at an early stage would speed up remedial action in the future. He wanted Croatia

in the meantime to take advantage of UNIDO's global and regional projects so that Croatia can benefit from the technical assistance programmes and aim to reflect the requirements of European standards during the reconstruction process.

The Vice Minister **Dr. Viktor Simoncic** in his reply thanked UNIDO for assisting the international conference on 'the Effects of War on the Environment' which according to him has already helped his country to present the problems to an international audience and to identify a number of projects. He expressed that his country being newly formed needed extensive outside contact and assistance from UN organizations specially UNIDO in industrial reconstruction and waste management. He said that many problems identified by UNIDO expert **Mr. Richardson** cannot be solved by his country without assistance from organizations such as UNIDO.

Following this the Croatian delegates were given a broad view of UNIDO's activities. **Mr. Donocik** (Area Office) gave an account of the changing situation in Eastern Europe and mentioned about challenging opportunities that exist in the region especially in the area of environment and reconstruction of industry and other sectors damaged during the war.

Ms. **Akiko Suzaki** and **Mr. Heaman-Dunn** of Industrial Promotion Service (IPS) section gave a brief description of the IPS set up and its activities in many developed countries promoting investment in developing countries. **Mr. Heaman-Dunn** said that in 1992 about 1000 investment projects were identified and around 190 projects were concluded. **Ms. Akiko Suzaki** emphasized that a focal agency in Croatia as a contact point would facilitate UNIDO IPS activities. They also expressed their desire to make a visit to Croatia to meet potential contact agencies and also visit a few sites that needed reconstruction and take necessary action to formulate project documents according to UNIDO format for future investment plans and send it to various IPS offices.

Mr. R. Williams (ENV) informed the meeting about UNIDO giving importance to Ecologically Sustainable Industrial Development (ESID) and the advisory services available within UNIDO. He recommended that Croatia should institute an environmental inspectorate. He referred to UNIDO's commitment to Basel Convention and Montreal Protocol and said that Croatia should make use of Montreal Convention if they are signatories of the Convention. The Vice Minister replied that they are members of **Montreal Protocol** and also has links with **International Programme on Chemical Safety** (IPCS).

Mr. C. Muzio, Resident Representative for Croatia mentioned that UNDP played a major role in the former Yugoslavia and now they are in the process of preparing programme for humanitarian and reconstruction assistance. He also mentioned about Norway's and Italy's contribution for Croatia. He said that the Croatian country programme should be an unified effort to utilize the available resources. According to him Croatian IPF (indicative planning figure) is around $700,000 and in the programme for Croatia and other countries of former Yugoslavia UNIDO will be an important partner for UNDP.

Mr. M. Platzer (ODG/UNOV) mentioned about the project they are involved with in Croatia and stressed the fact that Croatia has plentiful supply of skilled personnel and should be fully utilized in the reconstruction and

humanitarian activities. He mentioned about a project for 100 miles of Dubrovnik coast to promote tourism.

Ms. D. Magliani informed the meeting about donors' interest in Croatia especially that of Italy. She mentioned about the new arrangement which implicates that all requests for Croatia should be cleared by UNHCR and UNIDO's contact person should be informed of any such proposals. She also informed that this was a new arrangement but still Croatia could be directly considered from UNIDO funds for any seed money to start projects.

Mr. B. Samimi, Executive Managing Director of International Consulting Centre for Environmental Technology and Nutrition Industry (ICCI), Zurich, who attended the meeting for a short time, expressed the interest of many donors in funding projects for Croatia in areas related to energy, clean technology, and technology transfer. He referred to grants and mixed credit arrangements available for Croatia running into hundreds of millions Swiss Francs. All project considerations have been placed on hold until mid Sept. 1993. He appreciated very much UNIDO's initiative to assist Croatia in identifying projects so that when the right time comes the projects and concepts would be handy for submission to potential interested parties.

III. **Project identification:**

Following the presentations extensive discussion took place on various projet concept and ideas. One draft project document entitled' Chemical Pollution Monitoring' was suitably modified and the Croatian delegation gave the name of the focal institute to be strengthened as the Institute for Medical Research, Zagreb and the Hazardous Waste Management Agency will be the counterpart agency. Based on the suggestion of **Mr. Donocik** the project document was modified. **Mr.Donocik** mentioned that the project deals with an important topic and would attract donors attention. **Mr. Richardson** informed that from his contacts the EBRD (European Bank for Reconstruction and development) would also provide some support to the project. More than ten project concepts were prepared and prioritized for consideration for future funding. These are given below under two groups of priorities with action to be taken

IV. **High Priority Projects**

Group 1	Action
Chemical Pollution Monitoring ($ 737,000) or Strengthening National Capability to monitor Chemical Pollution due to the war damage.	**Mr.Richardson** to modify the project document
Recycling of debris from damaged buildings -Preparatory assistance	**Mr.Biering** to prepare concept
Osijek-remediation work for Saponic Factory and Thermal Power Plant Damaged by the war	**Mr.Richardson** to prepare concept and put $20000 under cost sharing for SIS

PCB Remediation	**Mr.Richardson** to amend concept & add $50,000 for preparatory assistance
Remediation of Central Municipal Waste Dump Zagreb	**Mr. Ramsay** to prepare concept
Spent oil recovery and recycling	**Mr.Richardson** to prepare concept and **Mr. Puerto Ferre** to put additional inputs.
Pre.Feasibility Studies for Reconstruction and Development of selected Croatian Chemical Industries	**Mr.Richardson** and Croatian authorities to modify concept
Group 2	
Site selection for Hazard Waste Management	**Mr.Ramsay** to prepare concept
In situ chlorination plants for drinking water	
Establishment of municipal waste water treatment plants	**Mr.Richardson** to prepare concept
Analysis and Risk Assessment of river and potable water samples.	**Mr.Richardson** to prepare concept
Assistance to INA oil refinery	To be taken under cost sharing by INA.

The Croatian delegation agreed to officially make a request to UNIDO to support the projects identified and copy to the Res.Rep.,Croatia.

V. Meeting with the Director General

The Croatian delegation paid a courtesy call on the **Director General, Mr. Mauricio de Maria y Campos**. The **DG** talked about the importance of having close relations with the neighbouring countries. He specially referred to the Italian assistance to Croatia and UNIDO's readiness to assist Croatia and other newly independent countries in humanitarian and reconstruction programmes. He wanted the Croatian delegation to discuss with IDF section regarding position of Croatia vis-à-vis the donors. The Vice Minister in his reply expressed his gratitude and appreciation for UNIDO's effective assistance to Croatia conference on the effects of war on environment which had a great impact and looking forward to future collaboration. He extended an invitation to the **DG** to visit Croatia. The **DG** accepted his invitation and would consider it in early 1994 after the Board meeting.

VI. **Miscellaneous:**

Mr. Ivan Brnelic, Croatian Ambassador to Austria paid a short visit to the meeting and mentioned about the importance of the *follow-up meeting* and thanked UNIDO for giving all possible assistance to identify projects.

The question of nodal agency in Croatia for UNIDO's contact was discussed. **Mr. Donocik** mentioned about a letter dt.May, 1992 from Croatia appointing The Ministry of Science as the nodal agency for UNIDO and he wanted to know whether or not this was still valid. The delegation suggested that they will inform any changes in this arrangement. The chairman in his closing remarks mentioned about the interest shown by various departments in UNIDO and other Agencies and said that the meeting achieved much more than what was originally anticipated. He hoped that the meeting will pave the way for future cooperation between Croatia and UNIDO. The Vice Minister in his remarks expressed his great appreciation for the level of interest shown by UNIDO staff in giving substantive contribution to various proposals. He said that the time spent by Croatian mission has been very fruitful.

Distribution:

All participants
Mr. Mauricio de Maria y Campos
Ms. A. Tcheknavorian-Asenbauer
Mr. R. Mueller
Mr. N. Biering
Mr. V. Bysyuk
Mr. J. Oxley
Mr. J. Buljan

Programme for the meeting with the Croatian delegation in D1518 - UNIDO, Vienna (Follow-up of International Conference on 'Effects of War on the Environment' held in Zagreb, Croatia, April 14-17, 1993

August 19, 1993

09.00 - 10.00 hrs	-	Welcoming remarks	Mr. Youssef, O-i-C, Chemical Ind. Branch
		Introduction to UNIDO	B. Sugavanam
		Technical assistance to Croatia - Nature of assistance - Funding possibilities - Present and future outlook for getting funds	Mr. Donocik
		- IPS activities	Mr. Heaman-Dunn Ms. A. Suzaki
		- Environmental Coordination	Mr. Williams
		- UNDP assistance	Mr. C. Muzio
		- Statement from UNOV	Mr. M. Platzer
10.00 - 11.00 hrs	-	Report on the conference 'Effects of war on environment' held in Croatia during April 93 and activities taken up since the conference.	UNIDO/Croatian Delegation
11.00 - 12.30 hrs	-	Projects identified for consideration	"
14.30 - 16.00 hrs	-	Continuation	"

August 20, 1993

09.00 - 10.30 hrs	-	Selection of projects and prioratization	"
	-	IDF contribution	Ms. Magliani
	-	Statement from ICCI (Zurich)	Mr. Samimi
11.00 - 12.30 hrs	-	Recommendations Concluding remarks	

List of participants

United Nations Office in Vienna	
Mr. M. Platzer	Special Assistant in ODG
United Nations Development Programme	
Mr. C. Muzio	Coordinator/UNDP
United Nations Industrial Development Organization	
Mr. M. Youssef	IO/T/CHEM
Mr. B. Sugavanam	IO/T/CHEM
Mr. M. Richardson	UNIDO consultant
Mr. R. Williams	PPD/SMA/ENV
Ms. A. Suzaki	IPCT/II/IIP/AEM
Mr. S. Heaman-Dunn	IPCT/II/IIP/AEM
Mr. G. Donocik	PPD/AREA/EMGI
Ms. D. Magliani	PPD/ICFM/IDF
Mr. G. Anestis	IO/T/ENG
Mr. G. Ramsay	IO/T/CHEM
Mr. J. Oxley	IO/DDG/ADV
Croatian delegation	
Mr. Ivan Brnelic	Ambassador to Austria
Mr. Viktor Simončić, Vice Minister	Min. of Civil Eng & Environ. Protection
Mr. Josip Čiček, Senior Advisor	" "
Mr. Damir Subašić, Director	Hazardous Waste Management Agency
Mr. F. Mišak	Min. of Economy Sector Industry
Outside UN	
Mr. B. Samimi	International Consulting Center for Environmental Technology & Nutrition Industry Zurich, Switzerland