

PART 1

OUTLINE OF THE STUDY

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1. Study Background

Japan International Cooperation Agency decided to conduct the Study on “Master Plan for Hazardous Waste Management in Romania” in response to the request of the Government of Romania.

In 2001, JICA conducted a baseline study using Environmental Resources Management (ERM), a UK consulting firm. In November 2001, JICA and the Ministry of Waters and Environmental Protection (MWEP) of Romania have signed the Scope of Work and Minutes of Meeting for the Study.

In February 2002, JICA commenced the Study by forming a JICA Study Team comprising of two Japanese consulting firms.

In general, Romanian hazardous waste management is poor and backward. Main problems include:

- 1) Low level of awareness on the part of citizens and industry about possible impacts of hazardous waste on health and environment.
- 2) There are almost no treatment and disposal facilities dedicated for hazardous waste.
- 3) Low level of application of industrial pollution prevention, control (IPPC) and cleaner production (CP).
- 4) Low level of the government capacity for law enforcement and poor information system
- 5) Lack of steady and reliable implementation plan of EU directives in spite of vigorous transposition of the directives.
- 6) Difficulty for industrial enterprises to acquire funds for industrial and environmental upgrading.

2. Study Objective

The Study Objective is:

- To strengthen hazardous waste management system in Romania at both governmental and private sector levels.

Major focuses of the Study is:

- To strengthen the government organizations, as well as to strengthen the awareness of the private sectors that generates hazardous waste.

3. Counterpart Organisations

The main Romanian counterpart agency for the Study is the Ministry of Water and Environmental Protection. Members of the Steering Committees for the Study are representatives of:

- a. Ministry of Water and Environmental Protection
- b. Ministry of Industry and Resources
- c. Ministry of Health and Family

- d. Ministry of Agriculture
- e. Ministry of Public Works and Transport

The EU Romanian office has participated in the Steering Committees as observer. JICA Study Team has maintained a close relationship with “EU Phare 2001/German Twinning Program on solid waste management” as well as “EU Phare 2000 on technical assistance programme for strengthening the local EPIs and establishment of regional EPIs”

JICA Study Team has collaborated with the National Institute for Research and Development of Environmental Protection (ICIM) in some aspects of the Study including waste generation surveys and pilot projects.

Since completion of this Study, the Romanian Government has started a major reorganisation based on reducing the number of Ministries from 23 to 14. The MoWEP has now been subsumed by the Ministry of Agriculture with the formation of the Ministry of Agriculture, Forests, Waters & Environment (MAFWE). This re-organisation started with Parliament's Decision issued on this subject on 19 June 2003 which revoked the former Ministers in one article, and names the new Ministers under the re-organised Ministries. Following this Decision, an Emergency Governmental Ordinance No. 64/2003 has been issued (28 June) to legally support the process of re-organisation of the Government. It has one article for each Ministry, briefly mentioning the changes to be made. In regard to MoWEP, it only provides that it is to merge with the Ministry of Agriculture and Forests to form the new body. The National Environmental Guard, "a special body of the central public administration with legal personality" is subordinated to the National Authority for Control. This was followed by GD No. 739/2003 on organisation and functioning of the Ministry of Agriculture, Forests, Waters and Environment, published in the Official Journal No. 495 of 9 July 2003; this includes 5 annexes with tables and organisation charts. This legislation also precedes the revision of Law 135/1995 through EGO 91/2002 by renaming the county units as Agencies rather than Inspectorates.

4. Major Outputs and Activities of the Study

Major outputs of the Study are:

- National Strategy and Action Plan for Hazardous Waste Management
- Transfer of know-how and technologies concerning hazardous waste management and its planning
- Implementation of the following four (4) Pilot Projects:

Pilot Project 1: Promotion of heavy metal recycling using existing smelting facility

Pilot Project 2: Improvement of hazardous waste treatment in plating and surface treatment

Pilot Project 3: Promotion of voluntary actions and pro-active waste management within chemical and petro-chemical industries

Pilot Project 4: Strengthening an EPI Capacity in Hazardous Waste Management

As part of the Study, JICA Study Team has conducted the following surveys:

- Hazardous waste generation surveys, i.e., questionnaire survey for 600 enterprises, and visiting survey for 80 enterprises

- Waste management contractors and recyclers survey
- Contaminated site survey
- Questionnaire surveys for EPI

The Study period is 1.5 years from February 2002 till July 2003.

The Study area covers the whole of Romania.

5. Study Team

The Study Team has 12 members, i.e., 1) team leader/management plan, 2) policy and institutions, 3) 3Rs (Reduce, Reuse and Recycling), 4) treatment, 5) economic analysis/instruments, 6) environment impact evaluation 1, 7) environment impact evaluation 2, 8) generation source study, 9) organic chemical waste, 10) management, 11) expert for Pilot project, and 12) expert for Pilot project 2.

JICA Study Team is comprised of the two Japanese consulting firms, i.e., EX Corporation as leading firm, and Mitsui Mineral Development Engineering Co., Ltd. (MINDECO) as member firm. Environmental Resources Management (ERM) (UK) and E&E Solutions (Japan) participated in the Study as sub-consulting firms.

Certain activities have been contracted to capable Romanian organizations and enterprises.

6. Report Structure

The Study has or will produce the following reports:

- Inception report (March 2002)
- Progress report (July 2002)
- Interim report (September 2002)
- Draft final report (March 2003)
- Revised draft final report (June 2003)
- Final report (August 2003)

The Draft final report comprises of the following 5 volumes:

- Volume 1 Main Report: Strategy and Action Plan for Hazardous Waste Management in Romania
- Volume 2 Supporting Report 1: Supporting Information for the Strategy and Action Plan
- Volume 3 Supporting Report 2: Results of Surveys Conducted
- Volume 4 Supporting Report 3: Results of Pilot Projects Implemented
- Volume 5 Summary
- Volume 6 Pilot Project 1 Documents (Documents produced through PP 1)
- Volume 7 Pilot Project 2 Documents (Documents produced through PP 2)
- Volume 8 Pilot Project 3 Documents (Documents produced through PP 3)
- Volume 9 Pilot Project 4 Documents (Documents produced through PP 4)

PART 2

SUMMARY OF PROPOSED PRINCIPLES, STRATEGY & ACTION PLAN FOR HAZARDOUS WASTE MANAGEMENT IN ROMANIA

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Part 2A: Proposed Principles for Hazardous Waste Management in Romania

Part 2B: Strategy for Hazardous Waste Management in Romania

1. Hazardous waste generation and data management
2. Waste prevention and recycling
3. Collection and transport of hazardous waste
4. Treatment and disposal of hazardous waste
5. Management of contaminated sites
6. Administrative, legislative and institutional aspects
7. Economic aspects

Part 2C: Summary of Strategy and Action Plan

Part 2A Proposed Principles for Hazardous Waste Management in Romania

Proposed principles are summarised as follows:

- *HWM Responsibility*

Hazardous waste generators are responsible for HWM based on Polluter Pay Principle (PPP). The Romanian government assumes responsibility in case where responsible owners of waste is not existent or not identifiable.

- *HWM Objectives*

HWM objectives are:

- minimise impacts of hazardous waste on health and environment
- maximise effective use of resources

- *HWM Technology*

HWM technology should be economical, affordable, yet environmentally sound. Win-win technology should be applied wherever possible.

- *Implementation of EU Directives*

Schedule for implementation of EU directives should be steady and realistic. Romanian government should have a credible implementation plan.

- *Law Enforcement*

In reality, many Romanian enterprises are allowed not to apply even a minimal environmental standard. Such situation will keep enterprises' willingness to pay for pollution control at very low level. MWEP/EPIs should strengthen their enforcement in a gradual and steady manner. Under the above-mentioned situation,

- 1) enterprises (waste generators) have no or little incentive for hazardous waste prevention and recycling, and
- 2) hazardous waste management service market will not develop.

Higher willingness to pay on the part of waste generators will play a key role in advancing the waste disposal, prevention and recycling as well as for creation of hazardous waste management service market. The strong law enforcement is the most effective way to increase the willingness to pay.

- *Awareness Raising*

A government role is to strengthen:

- Awareness of hazardous waste generators about win-win opportunities
- Awareness of citizens and EPI staff about health risks associated with hazardous waste including illegally reused waste oil.

- *Provision of Funds for Industrial and Environmental Upgrading*

It is very difficult for Romanian enterprises to acquire funds for industrial and environmental upgrading as the financial market is not well developed. Under this situation, it would be justified that the Romanian government establish a funding mechanism to provide soft loans for those who are willing to invest for industrial and environmental upgrading using internal and/or external funds.

- *Policy Reform*

Efficient use of energy, water and raw materials is a base for a good industrial and environmental management including HWM. A key role of the government is to ensure that society has an incentive for efficient use of those resources. Energy and water price reform, privatisation of state owned enterprises, market liberalization, and awareness raisin are key instruments to enhance such incentives, particularly in a transition economy like Romania.

Part 2B Strategy for Hazardous Waste Management in Romania

1. Hazardous Waste Generation and Data Management

1) Hazardous Waste Generation

- It is estimated that hazardous waste generation quantity in Romania in 2002 is 1.2 million approximately. Waste oil shares about one half of the total quantity. The second largest is metal waste 30% approximately. Third is sludge (non-specified) 9 %.
- Hazardous waste is generated in all regions, share of each region in terms of generation quantity ranges between 9% – 16%. (Bucharest municipality and Ilfov are considered as one region.)
- Per capita hazardous waste generation rate is estimated to be 53 kg/capita in 2002. Corresponding rates were 252 kg/capita in 1995, and 103 kg/capita in 1999.

- Those rates are smaller than average hazardous waste generation rates in Central and Eastern European Countries (CEEC), i.e. Bulgaria, Czech republic, Estonia, Hungary, Lithuania, Poland, Romania, and Slovenia. CEEC's average rates were 283 kg/capita in 1995, and 183 kg/capita in 1999. (Source: Draft Waste Strategy; English draft May 2002, MWEP/ICIM)
- Major reason for the substantial decrease in the hazardous waste generation rates is considered to be the drop in industrial outputs over the period rather than improvement in production technology.

2) Hazardous Waste Data Collection and Management

- MWEP has a data collection system for waste including hazardous waste. However, there is a need to improve data quality and reliability.
- A basic problem is that waste generators (enterprises) do not know how to identify and classify hazardous waste with a reasonable accuracy.
- Changing Definition of Hazardous Waste: Romania intends to apply new EU Integrated Waste List soon. Unfortunately, it would add confusion to waste generators for some years to come.
- Recommendation: MWEP should deliver to all EPIs and waste generating enterprises "Guidance Note for Hazardous Waste Identification and Classification" that was drafted by JICA Study and ICIM through the Pilot Project 4.
- A manifest system should be established along the development of hazardous waste collection and transport system.

2. Waste Prevention and Recycling

- Generally, the "Waste hierarchy concept" places emphasis on waste prevention and minimisation. In the case of Romania, however, establishment of a proper treatment and disposal system should be given priority. To achieve that, provision of proper physical facilities as well as a stronger legal enforcement and administrative system are required.
- Awareness of cleaner production methods is low. Both diffusion of information and awareness raising as well as measures to promote economic instruments are required. Implementation of the IPPC legislation is expected to improve this situation.
- According to the present HW generation structure, priority sectors for waste prevention and recycling are the chemical, oil and petrochemical, non-ferrous metal smelting, electroplating and surface treatment industries. Priority HWs to be recycled are waste oils, waste solvents and HW containing heavy metals.
- Since there are at present almost no facilities for off-site HW recycling except lead acid batteries, the utilization of existing facilities should be prioritised in terms of HW management. In this regard, the Romanian cement industry has an important role to play in the HW recycling and disposal business.
- Some sludge containing heavy metals can possibly be recycled and recovered at non-ferrous metal smelters. However, non-ferrous metal smelters are one of the largest HW generators. Consequently, HW minimisation and facility improvements at the

non-ferrous metal smelters are necessary.

3. Collection and Transport of Hazardous Waste

Romania does not have a developed network of waste contractors who arrange the collection and/or recovery / treatment / disposal of hazardous wastes other than for used waste oils, and acid batteries. With relatively little wastes being transported for off-site disposal, Romania currently lacks the necessary skills and infrastructure for safe transport of hazardous wastes. Also, given the almost complete absence of large-scale hazardous waste transport in Romania, it is an area where the Environmental Protection Inspectorates understandably lack regulatory experience and capacity. This combined with the lack of understanding of the identification and classification of hazardous wastes leads to four main issues for these activities in Romania:

- Probability that hazardous wastes are being disposed with other industrial wastes to landfill
- How such a service to industry for waste transport to authorised treatment and disposal facilities should best be developed; and,
- How such collection and transport activities should be regulated and controlled to ensure that hazardous wastes in transit are safe and arrive at an authorised 'recovery / treatment / disposal' facility.
- How over-regulation and duplicated regulation and control can be avoided.

Prior to development of hazardous waste collection and transport services, it is first necessary to create demand for appropriate treatment and disposal of hazardous waste.

4. Treatment and Disposal of Hazardous Waste

1) General Situation

Hazardous waste management is variable in Romania. In common with many countries with transitional economies, many of Romania's industries have old, out-dated, inefficient processes and equipment. This is particularly true of waste treatment and disposal systems where these exist. Implementation of the IPPC legislation is expected to improve this situation.

Many factories have in the past had physical/chemical treatment systems and incineration systems which, due to economic pressures, have been allowed to fall into disrepair and have become inoperative as a result. Similarly, due to the general decline some factories have opted not to use their existing treatment facilities and also discharge wastes untreated or are stockpiling the wastes. Whilst this is a fairly general problem there are some examples of good practice too.

To ensure environmentally sound hazardous waste management, these inappropriate or poor standard facilities need to be identified and the owners/operators are required to re-commission them (upgrading them as necessary), or replace them. Alternatively, the respective wastes need to be sent to third parties for environmentally sound treatment and / or disposal.

Many hazardous wastes are being "stored" pending later management. The term

“storage” implies a future intention to do something with the material stored, but in Romania the term storage is used interchangeably with the term “disposal”. Most “stores” are in reality waste dumps. Improper stores /dumps need to be identified and the wastes dealt with properly.

Further, it is not uncommon for enterprises to compensate for lack of adequate wastewater treatment to rely on massive dilution of hazardous wastes to meet discharge consent concentrations.

Some companies who have their own incinerators to manage hazardous wastes they generate accept waste from third parties for disposal. The majority of these incinerators do not meet current European standards and will require substantial upgrading to comply with such standards when these are introduced in Romania.

A country in transition like Romania generally does not have many hazardous waste contractors (companies which collect, transport, treat and/or dispose of hazardous wastes). There are a couple of merchant hazardous waste incineration facilities (both initially intended for clinical wastes), one of which also accepts organic hazardous wastes. Both of these facilities are small scale and not of great strategic importance. They do however indicate a slowly emerging realisation that hazardous waste management may become a viable business.

The cement industry in Romania is keen to be involved in hazardous waste management and one company has, in partnership with a waste management company, developed an organic waste blending facility at one of its cement kilns. Cement kiln incineration is of major strategic importance in Romania

No third party physical / chemical treatment facilities were identified, such facilities are certainly necessary to enable inorganic wastes to be managed in an environmentally sound manner.

2) Regulation and Control

Effective regulation and control is the major driver to improve hazardous waste management. As indicated elsewhere in this chapter, a basic institutional structure exists along with much of the necessary legislation. It is necessary to improve application of effective regulation and control by:

- Continuing to develop the legislative base for regulation and control of hazardous waste management.
- Provision of sufficient resources.
- Training regulation and control personnel to enable them to undertake their regulation and control activities most effectively.

3) Development of Necessary Infrastructure

As indicated, the necessary infrastructure for hazardous waste management is under-developed. Potential developers are experiencing difficulties due to a general lack of willingness on behalf of hazardous waste generators to pay for proper management of their wastes. The development of improved infrastructure needs to be accelerated.

All stakeholders (waste generators, waste management companies, regulators, the government and the public) have roles to play in encouraging and facilitating this development. The provision of economic incentives has been extremely successful in Europe and should be considered in Romania.

4) Measures for Certain Waste Types

Section 7 in Vol 2 describes the situation, the issues, and makes recommendations concerning the following waste types:

- PCBs (Section 7.2)
- Pesticides (Section 7.3)
- Organic chlorinated solvents (Section 7.4)
- Waste oils (Section 7.5)
- Medical waste (Section 7.6)

One of the issues we consider we need to emphasise concerns the issue of PCBs, and the main points are summarised below:

- Any PCB 'handling' (ie liquids transfer from transformers, decanting, transport, treatment etc) should only be done after a prior rigorous risk assessment of the proposed Operating Procedures and written Test Protocol to verify the proposed Operating Procedures.
- PCB 'solids' – JICA study team is of the opinion that there is no incineration facility currently in Romania (other than cement kilns which preclude PCB handling as a matter of policy) which has the capability of destroying PCB solids to the required destruction efficiency of 99.995%.
- PCB 'liquids' – JICA Study team is of the opinion that the only incinerator in Romania (other than cement kilns which preclude PCB handling as a matter of policy), which may have the capability of destroying PCB liquids (not solids) to current EU standards, is that of Oltchim (Rm Valcea).

See also Vol 1 Ch 5.5.3 section 3) which refers to PCBs and export for destruction. Action G5 (in Vol 1, Ch 9) also refers to this issue. In Vol 2, Ch 7 we specifically state 'a better strategy for Romania, "evaluate the option for final elimination by export to a proven facility". It is likely that the inventory is underestimated. EPIs need guideline for identification of PCBs like the Basel information notes. It is probable that a waste management contractor with hazardous waste high temperature incinerator in a proximate country (eg Austria) would be able to provide an estimate of costs for total service for secure removal, collection, transport and final elimination of PCBs.

5. Management of Contaminated Sites

- Soil and groundwater contamination by leakage of hazardous substances from hazardous waste deposits and storage sites raises the risk of chronic long term exposure through water consumption and land use, resulting in possible health and ecological damages. There is however an insufficient knowledge and awareness of the extent of contamination due to contaminated sites and their environmental impacts. Understanding the present conditions of environmental management of contaminated sites and the existing potential impacts of hazardous contaminants in Romania should be an important issue for the MWEF. There is a need to set up a policy of management of contaminated sites (objectives, procedures, jurisdictions) through new ministerial orders, technical guidelines, awareness raising, and institutional coordination.

- Several inventories of surface water pollution sources have been elaborated, indicating that there is a potential of soil contamination from present and past hazardous waste dumps. There is however no any national statement of the situation in terms of groundwater and soil quality impacts and past inactive dumps of hazardous waste. The government decision about waste landfilling is a key institutional tool for management of certain categories of contaminated sites. This decision does not concern historical hazardous waste dumps and cases of landfill sites with no accountable and liable party.
- Besides the lack of legal definition and rules concerning historical waste dumps, there are factors that have contributed to minimizing attention to the problem of soil and groundwater contamination from hazardous waste substances sources. These are: a) Environmental permitting system conditions before the adoption of a new system in 2003, with the possibility which was given to operators to renew their permit even in cases where objectives of the compliance program in previous permit could not be achieved; b) A limited attention was given to the protection of groundwater resources.
- There are many gaps in the management of contaminated sites like absence of legal requirements for remediation of historical hazardous waste dumps, lack of appropriate soil quality standards for taking measures about investigation and remediation of contaminated sites, and no technical guidelines available for the environmental officers about investigation and remediation approach.

6. Administrative, Legislative and Institutional Aspects

In this section about administrative, legislative and institutional aspects, the current issues and recommendations in the field of industrial and hazardous waste management are summarily described under three (3) headings:

- Strategic planning and implementation
- Legislation and EU harmonisation
- Administration and capacity building (including information and data management)

1) Strategic Planning and Implementation

Starting in the 1990s, this has been a developing process in Romania, culminating in the National Environmental Strategy (NES) and the National Environmental Action Plan (NEAP). Generally speaking these strategic planning processes are in line with international and in particular with EU processes. These strategic planning exercises are currently being extended to the entire country, including National and local/regional Waste (and Hazardous Waste) Management Strategies and Plans, Local Environmental (LEAPs and REAPs) and Sustainable Development Plans (Agenda 21).

Implementation continues to be most difficult issue and has been addressed in our Strategy and Action Plans. Inevitably, there is a high risk that this will not be a level playing field with profitable private sector companies (maybe in the Oil, Automotive, Pharmaceutical sectors) leading the way in environmental standards and taking the brunt of enforcement. If allowed to happen, this 'double standard' will in itself be an issue. In order to track progress of the implementation of the HWMP in Romania, and to do the 5-year review (as required by Law) it will be necessary to develop performance indicators. It is important within the implementation plan to identify such indicators and how they will be used. As reporting mechanisms get better, the quality of the data and usefulness of the indicators will correspondingly improve. This activity requires good co-ordination and

supervision to ensure effectiveness and involvement and participation of all organisations referred in the law on Waste.

2) Legislation and EU Harmonisation

Legislation in the environmental field is advancing at a good speed. In 1995, a strategic law (No 137/1995) was adopted to provide the necessary framework legislation regulating environmental management, and the most important secondary environmental management legislation linked with environmental impact assessment (EIA) and permitting was also put in force. However, the new legislation is extremely complex, and is not supported by Guidance Notes. Also, old legislation is rarely repealed when adopting new legislation. This creates a large bureaucratic burden on enterprises, local authorities, EPIs and NGOs. The Judiciary is inadequately trained to prosecute this legislation. A related problem is that the levels of charges, fines and penalties have generally been set very low, so that incentives for compliance are low.

Regarding waste management and industrial pollution control, and although very significant progress has been achieved over the last two (2) years, Romanian legislation is only partially meeting the *Acquis Communautaire*. Therefore, these continue to be a priority field in legislation. Government Emergency Ordinance No 78/2000 introduced framework legislation for waste management, including hazardous waste management, and transposed the requirements of the EC Waste Framework Directive 75/442/EEC and its daughter Directives into Romanian legislation. This Ordinance was approved by GD 426/2001 in late July 2002.

The requirement to adopt a more strategic approach to hazardous waste management has also been reinforced by the need to implement the Landfill Directive (GD 162/2002) and the IPPC Directive (EGO 34/2002 endorsed by GD 645/2002), as well as the specific measures to remove the most dangerous chemicals from the environment. Furthermore in December 1999, the 5th Conference of Parties to the Basle Convention (of which Romania is a member) made a high level declaration on the environmentally sound management of hazardous wastes.

Much of the most important EU waste legislation has been transposed. The biggest challenge for the new Waste and Hazardous Chemicals Department is to:

- Finalise the Chapter
- Prepare and co-ordinate the secondary legislation to fill the framework, and
- Implement all the requirements.

It was very clear with feedback from all stakeholders that the existing legislation is not supported by sufficient Regulations / Standards / Norms, and that guidance on practical application of the legislation is a very necessary requirement.

3) Administration and Capacity Building

This is probably the singular most important issue in this section; implementation and enforcement of the regulatory and control measures that are required to provide confidence and support to those considering investing in commercial hazardous waste management services. Much donor technical assistance has been focussed on capacity building within the authorities responsible for environmental policy and management in Romania

Administration and capacity building is the overriding factor to achieving change, and this is what is required. The MWEP and its subordinated EPI play a key role in implementation and enforcement of environmental policies and legislation. They have limited human resource (1,470 for EPI and 582 for NEG) and limited budget; in comparison Apele Romane have 9000 persons. In this situation, and recognising the financial limitations, our recommended strategy is based upon the role of the MWEP moving towards responsibility for policy frameworks, facilitating and co-ordinating. Decentralisation and de-concentration of tasks and responsibilities from national level to lower levels is one of the consequences and means.

7. Economic Aspects

- Pollution control in general, including hazardous waste management, has very low priority in public and private sector expenditure decisions in Romania.
- Relatively little use is made of economic instruments for pollution control and hazardous waste management.
- Rapid improvements in economic and financial policies related to pollution control and cleaner production in general, and hazardous waste management in particular, are hampered by various inefficiencies in the overall economic system, such as the continued existence of State Owned Enterprises, inadequate pricing policies for key resources such as energy and water; and inefficient capital markets.
- Improved information is required about the physical, social, and economic impacts of hazardous waste discharges, and therefore of the benefits of reductions due to cleaner production technologies and improved treatment and disposal methods.

Obvious priority investments for pollution control, cleaner production technology, and hazardous waste management, which are clearly justified in economic and environmental terms, are often not practicable due to an inadequately functioning financial system. Interim financing measures must therefore be developed. These may involve subsidies in some form, which, while not an ideal solution, may be the only way in which needed improvements can be achieved.

Part 2C Summary of Strategy and Action Plan

1. EU Principles

With respect to waste management, EU has the following principles:

- 1) Waste management hierarchy
- 2) (Waste prevention, reduction, recycling and appropriate treatment and disposal)
- 3) Producer responsibility and polluter pays
- 4) Precautionary principle (Prevention showed be first pursued.)
- 5) Proximity principle (Dispose waste at a place near to waste generation as much as possible.)
- 6) Self sufficiency (Dispose waste at own region, county as much as possible)
- 7) Best available techniques not entailing excessive cost (BATNEEC)

2. Strategic Objectives

In response to MoWEP's request, JICA Study team has elaborated the Strategic Objectives and Measures of Hazardous Waste Management in table form using the proforma adopted by the MoWEP within with EU German Twinning Group and JICA Study Team. MoWEP expressed that the elaborated hazardous waste management objectives and measures will be a part of National Waste Management Plan for Romania which has been formally accepted by the Romanian government as the government official plan. The Strategic Objectives and Measures of Hazardous Waste Management are expressed in two tables, i.e., Tables 2C-1 for general hazardous waste and 2C-2 for certain hazardous waste..

In the two tables, the measures proposed are those required to achieve the stated objectives. The proposed measures are further supported by Actions, which are coded like A1 ...J1. Therefore, it is considered that those actions have become a part of the National Waste Management Plan that have been formally approved by the Romanian government.

Table 2C-1 Objectives and Measures of Hazardous Waste Management

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
1. Policy and legislation	1.1 To establish a hazardous waste management system that is environmentally-sound and economically efficient, and socially fair (eg. realisation of Polluter Pay Principle).	1.1.1 To establish legal and administrative systems that are adequate to provide hazardous waste generators with incentives to comply with the legal requirement. 1.1.2 To implement EU Directives in steady and step by step manner.	1.1.a Authorize “Hazardous Waste Mangement Strategy and Action Plan” as part of the Waste Management Strategy and Action Plan of Romania (A1) 1.1.b Make legal, administrative and financial arrangements necessary for implementing the Action Plan included into JICA report on hazardous waste (A1, B1, C3, D5, D4, E4, H1, I2)) 1.1.c Develop and implement by economic sectors and Ministries involved of some `sectoral strategies and plans’ as mentioned into the legal provisions regarding the hazardous wastes 1.1.d Establish means to ensure monitoring and review of strategy and plans in accord with legislation (A3)
2. Institutional and organisational aspects	2.1 To strengthen the administrative capacity of governmental organizations	2.1.1 To strengthen the administrative capacity of governmental organisations at all levels (national, regional and county) having responsibilities in enforcing the law	2.1.a Strengthen national level administrative capacity in HW management by identifying roles and functions of all Actors (eg MoWEP, NEPA, REPIs, LEPIs, NEG) 2.1.b Introduce Regional level of waste management planning, including HW planning 2.1.c Strengthen county level EPAs and NEG capacity in inspection and monitoring of waste management conditions, including hazardous waste (D4, D6)
3. Human resources	3.1 To provide the necessary human resources as number and professional background, at all levels	3.1.1 To provide the necessary staff and well professional trained staff, at all level, both in public sector and in private sector: 3.1.2 Strengthening of the NEG & EPI staff capacity in law enforcement regarding the HW;. 3.1.3 To strengthen waste generators capacity in HW ecologically sound management.	3.1.a Establish and implement a two-weeks HW management training course for EPIs staff. (D4) 3.1.b Provide EPI staff with guidance notes for 1) identification/classification of HW, 2) waste management inspection, 3) assessing company hazardous waste management plan, 4) enforcing the existing legal network for the re-commissioning of existing HW treatment facilities, and 5) making contaminated sites’ inventory (B2, C3). 3.1.c Organise awareness-raising seminars for HW generators in order to increase the awareness level and disseminate information regarding the best available technologies for cleaner production, waste avoidance and minimization (C3, E1, E2).

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
<p>4. The prevention and minimization of waste generation.</p> <p>(has to be in accordance with the item 7 of the table "General strategic objectives for waste management")</p>	<p>4.1 To promote and apply the hw generation prevention principle and, if possible, the proximity principle</p> <p>4.2 To minimise impacts of hw on health and environment.</p> <p>4.3 To maximise effective use of resources.</p> <p>4.4 To increase productivity and save costs.</p>		<p>4.a Not allow illegal waste disposal. (Allowing such illegal activity will reduce waste generators' incentives for waste prevention and recycling.)</p> <p>4.b Implement some demonstration projects for awareness raising of HW generators (enterprises) about environmental and economic benefits of CP and IPPC techniques. (E1, E2)</p> <p>4.c Increase awareness of chemical sector industry concerning "Responsible Care".(E3)</p> <p>4.d Enforce IPPC directive.</p> <p>4.e Require enterprise in-company HW audit. (F1)</p> <p>4.1.a Prepare and enforce a law to phase out use of certain hazardous chemicals.</p>
<p>5. Waste collection and transport</p>	<p>5.1 To establish waste collection and transport services dedicated for HW.</p>	<p>5.1.1 To establish HW transport system that meets needs of hazardous waste generators</p> <p>5.1.2 To ensure that HW collection and transportation meets EU dangerous substances' requirements</p>	<p>5.1.1.a Create demand for HW collection and transport services through creating demand for HW treatment and disposal services. (I1, I2) (See Measure 6.1.1 below for measures to create demand for HW treatment and disposal.)</p> <p>5.1.2.a Ensure hazardous waste included in standards for hazardous goods transportation.</p> <p>5.1.2.b Develop and implement manifest system for tracking waste movements (I2).</p>

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
6. Waste treatment and disposal	6.1 To dispose of HW in environmentally sound and economically efficient and socially fair manner.	6.1.1. Encourage the HW treatment and disposal in view of: <ul style="list-style-type: none"> • Recovery (if possible); • Handling easiness; • Disposal enabling; • Minimisation of hazardous characteristics. 6.1.2 Ensure adequate provision of hazardous waste treatment and disposal facilities	6.1.1./6.1.2. a Create demand for hw treatment through the following activities: <ul style="list-style-type: none"> • Categorise existing landfills as “hazardous waste landfills” or “non-hazardous waste landfills” • Prevent acceptance of hw at landfill sites categorised as “non-hazardous waste landfills”. • Enforcing treatment and disposal standards for hw through 1) strengthening EPIs compliance enforcement capacity (D4), and 2) applying effective penalty (D5). • Raising awareness of hw generators through seminars and IPPC best available technology demonstration projects (E1, E2 & E3). • Raising awareness of hw wastes generators through seminaries and demonstrative projects regarding the best available technologies as per IPPC (E1,E2,E3) • Requiring owners of hw illegally stored or deposited, to legally dispose of such waste. 6.1.1.b Promote use of cement kilns for hw treatment (G1). 6.1.1.c Identify / encourage potential developers of hw management facilities (I1). 6.1.1.d Promote construction of dedicated treatment and landfill facilities for hw (G2, G3. G4).
		6.1.3 Ensure facilities designed, constructed and operated to EU standards	6.1.3.a Identification of illegal facilities / facilities not complying with EU standards (D1) 6.1.3.b Promote re-commissioning / upgrading of existing facilities (D2). 6.1.3.c Implement model voluntary agreements (D3).
		6.1.4 Facilitate appropriate export of certain hazardous wastes for environmentally-sound management	6.1.4.a Develop and maintain improved inventories of PCB wastes and pesticides 6.1.4.b Facilitate disposal of PCB waste and obsolete pesticide in the existing facilities (G5, G6)
7. Material recovery (recycling) and energy recovery	7.1 To maximise effective use of resources. 7.2 To minimise impacts of hw on health & environment. 7.3 To increase productivity and save costs.		7.a Promote use of smelting facilities for of-site recycling and recovery of heavy metals from wastes. 7.b Promote use of cement facilities for core facilities of recycling and disposal of wastes including HW. 7.c Same as 4.a, 4.b, 4.c, 4d and 4.e.

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
<p>8. Soil-contaminated sites management</p>	<p>8.1 To secure public health, through preventing / minimising peoples' exposure to contaminated soil and water and contaminants themselves.</p> <p>8.2 To prevent creation of new soil-contaminated sites</p>	<p>8.1.1 To contribute to achieve the environmental quality objectives of surface water, and to achieve international obligations of the Romanian government in the field of biodiversity preservation and prevention of ecological accidents in the Danube river (Danube river protection convention framework).</p> <p>8.2.1 To make information on soil contamination publicly available</p>	<p>8.a Prepare and issue a new ministerial order about historical contaminated sites (H1) in order to:</p> <ul style="list-style-type: none"> • Clarify site owners' responsibilities for identification, reporting, inventory making, monitoring and taking measures for protection of health and environment • Clarify roles of EPIs • Clarify administrative procedure about activities related to soil contaminated sites • Regulate historical contaminated sites in the cadastre documents • Stipulate a funding mechanism to finance costs related to contaminated sites <p>8.b Strengthen MWEP and EPIs role in monitoring and enforcing compliance with respect to soil contaminated sites through (H1)</p> <ul style="list-style-type: none"> • (MWEP) Preparing and issuing a guidance notes for management and assessment of soil contaminated sites based on JICA Study Document (Volume 9 Section 7) • (MWEP) Providing training and awareness raising for EPIs • Creating a section within MWEP responsible for issue of soil contaminated sites • Establishing a national working group on contaminated sites • (MWEP/ICIM) creating a national data system based on EPIs data, and a list of prioritized contaminated sites • Monitoring implementation of the action program set up under Decision 118/2002 <p>8.c. Requiring EPIs to (H2)</p> <ul style="list-style-type: none"> • Prepare a preliminary inventory of soil contaminated sites, and include obtained information in the county environmental report. • Prepare and enforce restrictions on land use and water use to minimise exposures to contaminates sites <p>8.d Publicize information on soil contaminated sites by putting it in public documents (H2)</p> <p>8.e. Require enterprises to 1) comply and submit to EPIs all relevant data on soil contaminated sites including historical waste deposit sites, and 2) make a plan for monitoring, managing and taking measures for such sites. (H3)</p> <p>8.f Enforcing responsible bodies to take measures to minimise impacts on people' health. (H3)</p>

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
9. Finance of waste management system.	<p>9.1. To create and use economical-financial mechanisms for hw management in the conditions of complying with the general principles, specially the polluter pay principle.</p> <p>9.2. To improve access of industry to funding required for economically justified and efficient investments in environmental improvement, clean production technology, and plant modernization</p>	<p>9.1.1 Create and implement some economical-financial instruments assuring the creation and development of a sound market of industrial and hazardous wastes by applying the polluter pay principle.</p> <p>9.1.2 Develop capacity of commercial banks to appraise environment projects</p>	<p>9.a Facilitate at central/regional/county level of the dialog between various sectors/economic agents in view to support financial mechanisms for the creation and use of hw treatment/disposal capacities in ecological sound conditions (in case it is possible the co-incineration of hw into cement factories kilns will be preferred in view of energetic and/or material recovery.</p> <p>9.b. Conduct feasibility studies for creation of funding mechanisms using internal or external sources including intermediary loans. (J1)</p>
10. Information system for waste management.	10.1 To establish a reliable and useful hazardous waste information system to meet International, EU and national requirements.	10.1.1 To facilitate improved hazardous waste regulation and control	<p>10.1.1.a Increase capacity of both hw generators and EPIs in identifying and classifying hw through delivering and encouraging to use a guidance note for hw identification and classification as proposed by JICA Study Team (B2)</p> <p>10.1.1.b Implement improved data collection system (C1, C3)</p> <p>10.1.1.c EPIs to require enterprises to elaborate a company waste management plan, and to include the plan in application documents for environmental permit. (B2, C3)</p> <p>10.1.1.d Require EPIs to prepare contaminated sites inventory, and include it in county environmental management plan using inventory format proposed by JICA Study Team.(H2)</p>
		10.1.2 To provide information at Regional and National levels for hazardous waste management planning and strategy development	<p>10.1.2.a Modify national waste database, and Develop Waste Management Information System (WMIS) featuring Regional and National databases (C1, C2)</p> <p>10.1.2.b Commence data collection and data input into WMIS (C2)</p>
		10.1.3 To make waste management information publicly available.	<p>10.1.3.a Establish information dissemination roles and responsibilities</p> <p>10.1.3.b Integrate into WMIS information reporting requests to EU (C2)</p>

Domain / Activity	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
		10.2 To implement a waste management reporting system in accordance with EU requirements	10.2.1.a Establish reporting roles and responsibilities 10.2.1.b Integrate EU compliant reporting functionality into WMIS
11. Awareness Raising.	11.1 To raise citizens awareness about impacts of hw on health and environment.	11.1.1 Raise awareness of consequences of bad practices	11.1.1.a Include environmental education with focus on waste management in school education. 11.1.1.b Information dissemination via internet and NGOs (H3)
		11.1.2 Raise awareness of necessary good practices	11.1.2.a (As 11.1.1.a) 11.1.2.b (as 11.1.1.b) 11.1.2.c Establish a national Forum for advancing the technical, scientific and practical aspects of HWM (C4)
	11.2 To raise awareness about benefits of applying cleaner production practices and technologies	11.2.1 Raising awareness of cleaner production and IPPC in industry	11.2.1.a Implement some demonstration projects to for awareness raising of hw generators (enterprises) about environmental and economic benefits of CP and IPPC technologies (E1, E2)
		11.2.2 Raising awareness of cleaner production and IPPC in EPIs and government	11.2.2.a Dissemination of demonstration project results (E1, E2)
	11.3 To raise awareness about "Duty of Care" and "Polluter Pays Principle".	11.3.1 Improve industries "Responsible Care" performance	11.3.1.a Increase awareness of chemical sector industry concerning "Responsible Cares" (E3) 11.3.1.b Publicise bad responsible care performance (E3) 11.3.1.c Publicise / disseminate information on good responsible care performance (E3)

Source: JICA Study Team

Table 2C-2 Objectives and Measures for Management of Certain Hazardous Waste

Hazardous Waste Category	Sub-categories	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
1. Waste containing PCB/PCT	Waste oil containing PCB/PCT. Equipments containing PCB/PCT	1.1 Management according to national and international requirements.	1.1.1 Periodic verification of national inventory 1.1.2 Usage forbidden for oil and equipments containing PCB/PCT. 1.1.3 Storage in safe conditions for environment and local residents' health 1.1.4 Disposal of existing stocks in the best technical and economical conditions as soon as possible	1.1.1.a Establish and update inventories of PCBs and equipment containing PCBs including random field visits 1.1.2.a Prohibition of any recovery, treatment, or disposal until practical proving trials have been undertaken to confirm efficacy of handling and destruction. 1.1.3.a Inspection of existing major storage locations to include ambient PCB measurements 1.1.3.b Requiring holders of equipment containing PCBs to notify competent authority and ensuring equipment is labeled correctly in accord with law 1.1.3.c Establish a reporting system 1.1.4.a Evaluate options and establish programmes for the disposal/decontamination of equipment containing PCBs 1.1.4.b Prohibit the removal of PCBs from transformers and retro-filling of transformers with non-PCB alternatives 1.1.4.c Establish an effective inspection and enforcement system
2. Obsolete Pesticide	Obsolete pesticides which are subject to PHARE 2002 project of MWEP Other pesticides and pesticides packaging wastes which have been identified beside PHARE 2002 project	2.1 Management according to national and international requirements.	2.1.1 Periodic verification of national inventory and field visits 2.1.2 Storage in safe conditions for environment and local residents' health 2.1.3 Disposal of existing stocks in the best technical and economical conditions as soon as possible	2.1.2.a Monitor existing 'obsolete pesticide' storage sites for security and integrity of material containment. 2.1.3.a Implementation of MAFF EU Phare 2002 project proposal for disposal of obsolete pesticides. 2.1.3.b Evaluate options and establish programmes for the disposal/decontamination of remaining sites that hold obsolete pesticides 2.1.3.c Implement management programme for existing pesticide use to prevent recurrence of this type of problem.

Hazardous Waste Category	Sub-categories	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
3. Organic chlorinated solvent		3.1 To reduce the generation of waste 3.2 To reduce the emission to environment 3.3 To dispose the waste in proper manner	3.1.1 To reduce the consumption of the solvents and generation of waste. 3.2.1 To reduce the discharge of the solvents to air, water and soil. 3.3.1 To establish the proper management and disposal of the wastes.	3.a To introduce proper guidance for storage/handling/management for waste. 3.1.a To disseminate the result of the pilot project PP3 to reduce the consumption in industry. 3.2.a To introduce effective enforcement in air emission, effluent discharge and soil contamination. 3.3.a To provide proper incineration for waste disposal.
4. Waste oil		4.1 To increase the collected amount of waste oil from users /population 4.2 To reduce environmental and health impact by improving waste oil management 4.3 Use waste oil as fuel in environmentally sound manner.	4.1.1 To eliminate illegal market of waste oil of which use generates adverse impacts on health and environment. 4.2.1 Encourage use of waste oil in environmentally sound manner at cement kilns 4.3.1 To encourage the waste oil regeneration	4.a Monitor illegal market, and strengthen the enforcement 4.b Development of a programme of public education and information concerning the ecologically sound manner of waste oil disposal. 4.b Legally require waste oil lagoon owners to reduce waste oil stock quantity by disposing of it at environmentally sound manner through co-incineration at cement kilns. 4.c Provide legal and administrative support to encourage the disposal of waste oils by co-incineration, with energy recovery at cement kilns and steel making furnaces in environmentally sound manner 4.d Provide legal discouragement to the landfilling of acid tar and other oil residues.
5. Wastes resulted from medical activity and generated by research institutes	Infectious wastes (codes from health and research units) Hazardous wastes, other than infectious wastes	5.1 Separate collection of infectious wastes, hazardous wastes (except the infectious ones) and non-hazardous 5.2 To dispose of medical waste safely without affecting health of waste handling workers and citizens	5.1.1 Encourage hospitals to apply good in-hospital waste management 5.2.1 Encourage of disposal of medical waste environmentally-sound, and economically-efficient manner. 5.2.2 Prohibition of hazardous waste disposal without pre-treatment; in case of infectious wastes incineration should be the compulsory pre-treatment method.	5.1.a Strengthen awareness raising of hospitals about in-hospital waste management 5.2.a Identify a potential contractor for development of medical waste incineration facility 5.2.b Negotiate and make a contractual arrangement with interested contractor for development of incinerators and collection, transport and treatment services. (Government must assure a contractor that it can receive medical waste of planned quantity for some period of years.)

Hazardous Waste Category	Sub-categories	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
6. Waste batteries and accumulators	Batteries and accumulators	6.1 Batteries and accumulators management in accordance with the specific legal provisions, both national and European	<p>6.1.1 Separate collection and disposal for the waste batteries and accumulators</p> <p>6.1.2 To prevent the entrance on the market of the batteries and accumulators containing toxic compounds in higher amounts than the limits allowed by the European and Romanian laws, and promotion of marketing of batteries and accumulators containing smaller quantities of dangerous substances and/or less polluting substances</p> <p>6.1.3 Recovery of valuable materials contained in batteries and accumulators.</p> <p>6.1.4 Reduction of the heavy metal content of batteries and accumulators</p>	<p>6.a Establish a system in order to prevent the entrance on the market of the batteris which are against to the European Directives.</p> <p>6.b Establish a collection system for waste batteries and accumulator.</p> <p>6.c Develop a group to provide people information about sound disposal measures of waste batteries, obligations for collection, significance of written and symbols on batteries, toxicity and hazardous degree of the contained materials.</p>
7. Asbestos	<p>Construction and demolition waste</p> <p>Manufacturing and asbestos containing products</p>	7.1 Prevention and reduction of environmental pollution by asbestos in accord with EU Directive 87/217	<p>7.1.1 Prevention of products coming onto the market containing asbestos</p> <p>7.1.2 Safe handling and separate collection of securely packaged and labelled asbestos waste</p> <p>7.1.3 Safe disposal in accord with current best practice</p>	<p>7.a Introduction of product-related legislative measures</p> <p>7.b Awareness raising and guidance notes for construction and demolition contractors for safe handling, storage and disposal procedures.</p> <p>7.c Ensure separate collection and handling of securely packaged and labelled waste</p> <p>7.d Establish 'best practice' for disposal of asbestos wastes ensuring use of approved sites only and record keeping to ensure identification of asbestos disposal areas.</p>

Hazardous Waste Category	Sub-categories	Main Objectives	Subsidiary Objectives	Measures to Achieve the Objectives
8. Waste Electric and Electronic Equipment (WEEE)		8.1 Transposition and implementation of the WEEE Directive (2002/96)	8.1.1 Collection of pollutants from electric and electronic equipment and components and use of low-pollutant, recoverable materials 8.1.2 Prevention of waste by ease of repair and dismantling and re-use of old equipment 8.1.3 Maximisation of the recovery of valuable materials 8.1.4 Recovery of the energy contained in residual material that cannot be recycled under economically reasonable conditions 8.1.5 Preventing the disposal of untreated WEEE	8.a Ensuring the separate collection of WEEE 8.b Ensuring the proper environmentally sound recovery and treatment of WEEE

Source: JICA Study Team

3. Action Plan

The following is a list of actions that are required to achieve the stated objectives of hazardous waste management, and are referred to in the previous two tables. Table 2C-3 shows description of each Action.

Actions Plan Supporting the Measures and Objective Achievement

A. HW Management Strategy and Plan

- A1. Authorize the Strategy and Plan
- A2. Implement the Plan
- A3. Develop and implement `sectoral strategies and plans' listed in Waste Laws
- A4. Review these National level Waste Strategies and Plans

B. Information System Legislation & EU Harmonisation

- B1. Secondary legislation
- B2. Prepare technical guidance notes to support the legislation

C. Administration & Capacity Building Environmental Authorization and Permit

- C1. Establish national hazardous waste data management system
- C2. Develop National Waste Management Information System (WMIS)
- C3. Modify requirement on information to be submitted by enterprises for authorization to include waste management plan
- C4. Establish a forum (Federation) for advancing the scientific, technical and practical aspects of wastes management.

D. Environmental Compliance

- D1. Check legal/illegal status of existing industrial waste storage/deposit sites
- D2. Re-commission the existing on-site waste treatment facilities within factories
- D3. Model Voluntary Agreements to be entered into between Government and selected industrial plants
- D4. Strengthen waste inspection capacity at EPIs
- D5. Review policy and penalty rates for enforcing non-compliance
- D6. Review EPI waste management staff requirements and performance indicators (linked with D7)
- D7. Modify ROF and Ministerial Order 541/2000 concerning waste inspection activities (linked with D6)

E. Prevention

- E1. Diffuse waste minimization and improved treatment practice in metal finishing industries
- E2. Establish a bottom up and practical approach for diffusion of IPPC
- E3. Diffuse “Responsible Care” and “Voluntary Environmental Management” to chemical industry and petro-chemical industry
- E4. Phase out/ban certain hazardous chemicals

F. Recycling

- F1. Promote introduction of hazardous waste audit
- F2. Promote off-site recycling using existing smelter

G. Treatment and Disposal

- G1. Promote treatment/thermal recycling of hazardous waste at cement kilns
- G2. Promoted Development of necessary dedicated treatment facilities to include physical/chemical treatment and stabilisation of predominantly inorganic wastes
- G3. Develop landfill sites for hazardous waste
- G4. Develop medical waste incineration
- G5. Evaluation of options for PCB destruction and support to implementation of GD 173/2000
- G6. Dispose of obsolete pesticide

H. Historical Waste and Hazardous Waste Storage Sites

- H1. Legislative and institutional actions to prepare a policy of management of historical hazardous waste contaminated sites in Romania
- H2. Actions for constitution of a database, diffusion of data, preparation of technical guidelines, and awareness raising
- H3. Actions for the development of remediation measures and planning of cleanup projects

I. Development of Hazardous Waste Management Business

- I1. Promote hazardous waste management business (linked with I2)
- I2. Assure systems and procedures for hazardous waste (linked with I1) transfer and/or transport

J. Feasibility Study for Funding for Industrial Upgrading

- J1. Conduct a feasibility study for funding for industrial upgrading

The following table shows details of each action.

**Table 2C-3 Actions Required for Achieving the Objectives of the Strategy
for Hazardous Waste Management in Romania**

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
A. HW Management Strategy and Plan					
A11. Authorize the Strategy and Plan & Implement the Plan	<ul style="list-style-type: none"> Complete and adopt the output of this Study Project the National Hazardous Waste Strategy and Plan Acquire the budget and foreign donor assistance for the implementation of the Plan shown here Implement the Plan. Authorize the strategy and plan for hazardous waste management. 	MWEP Other Ministries & Gov't	✓	✓	2003 2004 to 2008
A2. Develop and implement 'sectoral strategies and plans' listed in Waste Laws	<ul style="list-style-type: none"> Develop and implement 'sectoral strategies and plans' listed in Law 426/2001 to support NEAP and National Waste Management strategies and plans 	MWEP & other Ministries	✓		2004 to 2007
A3. Review these National level Waste Strategies and Plans	<ul style="list-style-type: none"> Establish Steering Committee [SC]and Working Group(s) [WG] including national, regional and local representatives, based on organisations with responsibilities under Law 426/2001 with responsibility for implementation, monitoring and review of Strategy and Plans Establish Hazardous Waste Working Group Review and report to SC Actions and Measures taken, and Performance Indicators Monitor EU proposals regarding hazardous wastes for implications on industrial and hazardous waste management strategy and plans. Review and issue revised Hazardous Waste Management Strategy and Plan Review and issue revised Hazardous Waste Management Strategy and Plan 	MWEP			2003 to 2007
B. Information System Legislation & EU Harmonisation					
B1. Secondary legislation	<ul style="list-style-type: none"> Complete and approve all secondary legislation, regulations, Standards / Norms on hazardous waste management according to the requirements of the Waste legislation. 	MWEP	✓		2004 and permanently
B2. Prepare technical guidance notes to support the legislation	<p>Prepare technical guidance notes to support the legislation including:</p> <ul style="list-style-type: none"> Licensing, inspection and enforcement procedures Correct identification and classification and reporting of hazardous wastes Environmentally sound waste minimisation, recovery and re-use Environmentally sound disposal Waste generator hazardous waste management plans County and regional level hazardous waste management plans 	MWEP	✓		2004 to 2005

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
C. Administration & Capacity Building & Environmental Authorization and Permit					
C1. Improve quality of data input to national hazardous waste data management system	<ul style="list-style-type: none"> Issue a guidance note on waste identification and classification based on JICA PROJECT recommendation. Modify company data format sheet to make a clearer distinction between waste flow and stock, between hazardous and non-hazardous, and between outgoing waste and those internally managed. Disseminate the above guidance note and new data format to EPIs and enterprises through regional seminars. 	MWEP			2003 to 2004
C2. Develop National Waste Management Information System (WMIS)C1. Modify requirement on information to be submitted by enterprises for authorization (Drewett)	<ul style="list-style-type: none"> Development of concept and ToR for WMIS development Preparation of Detailed Design for WMIS. Application development. Hardware and system software procurement. System testing and completion. Installation and Training. Initial data input reporting. Prepare guidance for Specify format of company waste management plan based on JICA recommended guide, and provide EPIs with the guidance recommendation. . Require enterprises to submit a waste management plan. A material input/output flow diagram should be required for manufacturing and energy industries. 	MWEP EPIs	✓	✓	2003 to 2007
C3. Modify requirement on information to be submitted by enterprises for authorization to include waste management plan	<ul style="list-style-type: none"> Prepare guidance for company waste management plan based on JICA PROJECT recommended guide, and provide EPIs with the guidance. Require enterprises to submit a waste management plan. 	MWEP EPIs Industry	✓		2003 to 2004
C4. Investigation of possibilities for establish a forum (Federation) for advancing the scientific, technical and practical aspects of wastes management.	<ul style="list-style-type: none"> Develop and publicise Waste Strategy & Plans, and hazardous waste specific, stakeholder awareness reference literature (web site) Develop and implement workshops and training materials for hazardous waste management 	MWEP			Not determined but 2004 advised
D. Environmental Compliance					
D1. Check legal/illegal status of existing industrial waste storage/deposit sites	<ul style="list-style-type: none"> Prepare a practical guidance note for EPIs for identifying legal/illegal status of the existing storage/deposit sites. Establishment of programme for site identification, integrated with normal inspection activities. EPIs will check legal/illegal status, and establish legal status. Inspection of sites to check legal/illegal status, and establish legal status. Establishment of programme for upgrading operational sites in order to bring under them proper control. 	MWEP			2003 to 2005

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
D2. Re-commission the existing on-site waste treatment facilities within factories	<ul style="list-style-type: none"> • Prepare a guidance note for EPIs for enforcing the re-commissioning of on-site treatment facilities. • Establishment of programme for site identification, integrated with normal inspection activities. EPIs will put the “re-commissioning” as a condition of Environmental authorization/permit. • Inspection of sites to identify non-compliant plant and equipment necessary for environmentally sound waste management. • Development of “Compliance Programme” type agreements necessary to reactivate, refurbish, upgrade or replace treatment plant and equipment. 	MWEP, MIR, Industry			Permanent
D3. Model Voluntary Agreements to be entered into between Government and selected industrial plants	<ul style="list-style-type: none"> • Identify potential model industrial plants • Draw up legal agreements between local or national government and selected companies • Agreements should cover environmental performance targets, monitoring and penalties for non-compliance, and potential role of the pollution control manager • Publicize commercial benefits, replicate, and extend principle to pollution control in general 	MWEP, MIR, Industry		✓	2003 to 2004
D4. Strengthen waste inspection capacity at EPIs and Modify ROF and Ministerial Order 541/2000 concerning waste inspection activities	<ul style="list-style-type: none"> • Review the tasks and responsibilities of the EPI to consider how waste inspection activity can be strengthened at that level • Modify the Inspection Report format and content (shown in Ministerial Order 541/2000) in accord with JICA project recommendation Volume 2 Annexe 4, so that the Inspection Report will contain a more substantial description and analysis with respect to company management of waste – especially hazardous waste. • Modify Ministerial Order and ROF in accord with above • Undertake updated train EPI staff with respect to inspection techniques and assessment of company application documenting needs assessment. • Development of inspection handbook / manual and associated training materials. Establish a two-weeks training course for all EPI inspectors? • Establish a two-week training course for all EPI inspectors. • Provision of ongoing training using materials developed and capability built. 	MWEP	✓	✓	2003 to 2007
D5. Review policy and penalty rates for enforcing non-compliance	<ul style="list-style-type: none"> • Develop ToR for technical assistance • Tender, procure consultants, and implement project and approve outputs • Revise and adopt legislation • The ToR needs to take into account previous projects in this subject, other EU experience, and the principles of cost recovery, inflation indexing and costs of damage remediation. Institutional changes will be required to support the need for a stronger enforcement policy. 	MWEP	✓	✓	2004 to 2005

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
D6. Review EPI waste management staff requirements and performance indicators	<ul style="list-style-type: none"> Legislative analysis of tasks and responsibilities Review of activities to establish priority needs and performance indicators Evaluation of time required for implementation of all activities and staffing requirements Budget application, recruitment and training of new staff to strengthen waste inspection (give an inspection right to waste section) 	MWEP	✓	✓	2003 to 2004
E. Prevention					
E1. Diffuse waste minimization and improved treatment practice in specific industries	<ul style="list-style-type: none"> Identify all companies with metal finishing process (use chemical suppliers' marketing information for identification) Implement demonstration projects at metal finishing industry in each region. Organize workshops in each region for diffusion of good practice. 	MIR, Industry		✓	2004 to 2006
E2. Establish a bottom up and practical approach for diffusion of IPPC	<ul style="list-style-type: none"> Implement IPPC demonstration projects at selected enterprises. Work with enterprises to identify their environmental effects and utilise and develop their existing production management systems to address environmental effects and to demonstrate their efficient use of resources as required by IPPC Identify drivers and barriers and ways to overcome them based on E1 and E2 demonstration project. Formulate a practical strategy for diffusion of IPPC across other industry sectors. 	MIR, Industry		✓	2004 to 2006
E3. Diffuse "Responsible Care" and "Voluntary Environmental Management" to chemical industry and petro-chemical industry	<ul style="list-style-type: none"> Identify all major chemical and petro-chemical companies (use FEPACHIM for identification) Implement demonstration projects in each region. Organize workshops in each region for diffusion. 	MIR, Industry		✓	2003 to 2005
E4. Phase out/ban certain hazardous chemicals	<ul style="list-style-type: none"> Implement a study using FEPACHIM. Make legislation. 	MWEP	✓	✓	2003 to 2004
F. Recycling					
F1. Promote introduction of hazardous waste audit	<ul style="list-style-type: none"> Prepare practical manual for hazardous waste audit by generators Establish programme for planning, implementation and reporting system Organise information seminar, workshops and training for priority HW generators Implement hazardous waste audit Organise workshops of good practise of hazardous waste audit to other HW generators Disseminate hazardous waste audit to other generators 	MWEP /MIR EPIs Generators			2003 to 2005
F2. Promote off-site recycling using existing smelter	<ul style="list-style-type: none"> Develop ToR for TA activities Select TA contractor Development of project concepts Development of package of support measures to assist potential recyclers Conduct of feasibility study and conceptual designs Facility detail design and development 	MIR, non-ferrous metal smelters (Potential recyclers),			2003 to 2005

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
		Consultants			
G. Treatment and Disposal					
G1. Promote treatment/thermal recycling of hazardous waste at cement kilns	<ul style="list-style-type: none"> Organise seminars for hazardous waste generators awareness raising (to create/increase demand for waste treatment services) Make TV/other media advertisements for stopping illegal use/treatment of waste oil, acid tar and other hazardous waste. Implementing programme aimed at identifying improper use of waste oils and other organic wastes. Conduct a feasibility study for treatment service in collaboration with the cement industry. Development of cement kiln incineration guidelines with waste derived fuel (WDF) protocol. Integrate awareness raising with normal EPI inspection activities (one element of training in D3). Agreement of amended compliance programmes (as necessary) for major oily waste generators. Development of cement kiln facilities for accepting hazardous waste: <ul style="list-style-type: none"> Conduct detailed generation survey focus on cement plant utilization Examine facility improvement plan for hazardous waste acceptance Facility detail design and development 	MIR MWEP Industry	✓		2004
G2. Promote development of necessary dedicated treatment facilities to include physical/chemical treatment and stabilisation of predominantly inorganic wastes	<ul style="list-style-type: none"> Identification of potential facility developers (among existing WM contractors). Organise seminars for hazardous waste generators awareness raising jointly with G1. Organise seminars for waste management companies - awareness raising jointly with G1. Development of package of support measures to assist potential developers (including economic instruments). Conduct a feasibility study jointly with G1. Development of project concepts / feasibility reports and conceptual designs for two regional facilities. Facility detailed design and development, EIAs, licensing / permitting. Facility commissioning. 	MIR, Industry		✓	2003 to 2005
G3. Develop landfill sites for hazardous waste	<ul style="list-style-type: none"> Development of Terms of Reference for Feasibility Study. Organise seminars for hazardous waste generators awareness raising jointly with G1 and G2. Conduct a feasibility study and organise seminars jointly with G1 and G2. Site selection for Landfill (or existing landfills for dedicated hazardous waste cells). Commence development of landfill (or dedicated cells on existing sites) 	MWEP, MIR, Industry (see note 1)		✓	2004 to 2007
G4. Develop medical waste incineration	<ul style="list-style-type: none"> Complete the feasibility study currently being undertaken by ICIM. Implement the recommendations of the feasibility study. Commission medical waste management facilities. 	MoHF, ICIM, Developers (see note 1)	✓	✓	2003 to 2007

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
G5. Evaluation of options for PCB destruction and support to implementation of GD 173/2000	<ul style="list-style-type: none"> Develop ToR for technical assistance Include selective verification of PCB register by site visits, and sampling and measurement of ambient PCB levels PCBs present a very significant environmental and health risk. There are significant quantities in Romania. The issue needs better definition to quantify the risk and technical assistance would be beneficial because of the specialist nature of this subject similar to the 'obsolete' pesticides in G6. 	MWEP	✓	✓	2004 to 2005
G6. Dispose of obsolete pesticide	<ul style="list-style-type: none"> Implementation of EU Phare 2002 application for disposal of obsolete pesticides 	MAFF, MWEP		✓	2003 to 2006
H. Historical Waste and Hazardous Waste Storage Sites					
H1. Legislative and institutional actions to prepare a policy of management of historical hazardous waste contaminated sites in Romania	<ul style="list-style-type: none"> Prepare and issue a new ministerial order about historical contaminated sites (where a large amount of historical waste is stored or deposited.) Nominate one person in charge of contaminated sites in MWEP Establish national working group on contaminated sites Establish responsibilities of local government authorities Register historical contaminated sites in the cadastre documents should be regulated Establish a system of approval of plans of investigation and rehabilitation Make a statement of implementation of the action program set up under Decision 118/2002 Carry out a study of funding system for financing remediation and cleanup of orphan sites 	MWEP County Councils	✓		2003 to 2007
H2. Actions for constitution of a database, diffusion of data, preparation of technical guidelines, and awareness raising	<ul style="list-style-type: none"> EPIs will prepare preliminary inventory of contaminated sites. MWEP/ICIM will prepare a national inventory of contaminated sites. MWEP will carry out an awareness heightening program for EPI staff. EPIs will include contaminated sites inventory in the environmental statement white books and waste management plans. Make data available to the public through internet web site Prepare national technical guidelines for inventory of contaminated sites Prepare national technical guidelines for assessment and remediation measures 	MWEP EPI			2003 to 2007
H3. Actions for the development of remediation measures and planning of cleanup projects	<ul style="list-style-type: none"> Require companies to include information on historical hazardous waste dumps or deposits of the company in their waste management plans. Require contaminated site owners to monitor impacts of contaminants on soil and groundwater. EPIs will inspect historical hazardous waste deposit sites as part of their inspection activity. EPIs will require local governments to carry out surveys and take appropriate control measures for prioritized sites. Measures may include restriction of land use and water use. 	MWEP EPI			2003 to 2004

Objectives	Actions Required	Actors	Need for Legislative Actions	Need for Technical Assistance	Period
	<ul style="list-style-type: none"> MWEP will prepare preliminary list of national high priority contaminated sites. MWEP will prepare remediation or cleanup plans and feasibility studies for the high risk priority sites 				
I. Development of Hazardous Waste Management Business					
I1. Promote hazardous waste management business (linked with I2)	<ul style="list-style-type: none"> Identify potential developers of hazardous waste management (transport, storage, treatment, recovery, landfill) business. Use proposed seminars for G1, G2 and G3 for awareness raising of hazardous waste generators (to create and increase demand for the hazardous waste management services) Use proposed seminars for G1, G2 and G3 for identification of barriers to development of this business Remove barriers to facilitate start-up of these services 	MIR	✓	✓	2004 and ongoing
I2. Assure systems and procedures for hazardous waste (linked with I1) transfer and/or transport	<ul style="list-style-type: none"> Draft, adopt and implement all legislation, standards, norms and guidance notes for enabling collection and transport of wastes with particular reference to the below issues: Temporary storage and reception areas for accumulation of hazardous wastes awaiting collection Duty of Care on transfer of wastes Manifest system for supervising, monitoring, recording and reporting of waste transfers Vehicle specifications and vehicle operations 	MWEP and MoT	✓	✓	2003 to 2004
J. Feasibility Study for funding for industrial upgrading					
J1. Conduct a feasibility study for funding for industrial upgrading	<ul style="list-style-type: none"> Survey financial requirements for industrial investment in hazardous waste management Review existing financing mechanisms and need for new institutional arrangements Study and make recommendations for creation of new financial intermediary or intermediaries Identify financial, institutional and technical requirements for project effectiveness 	MIR MPF MWEP		✓	2003 to 2004

MWEP: Ministry of Waters and Environmental Protection

MIR: Ministry of Industry and Resources

MoHF: Ministry of Health and Family

MAFF: Ministry of Agriculture, Food and Forestry

MPF: Ministry of Public Finance

Note 1:

Actors noted are those with main responsibility for making decision to enable Actions to be done; Ministries generally have responsibility for these policy and strategic decisions but activities would be done by others

PART 3

PILOT PROJECTS

PART 3 PILOT PROJECTS

1. Introduction

We have carried out the following 4 pilot projects:

- Pilot Project 1: Promotion of heavy metal recycling using existing smelting facility
- Pilot Project 2: Improvement of hazardous waste treatment in metal plating and surface treatment
- Pilot Project 3: Promotion of voluntary actions and pro-active waste management within chemical and petro-chemical industries & Organic solvent reduction
- Pilot Project 4: Strengthening hazardous waste management capacity

Pilot Projects 1, 2 and 3 focused on practical application of best available technology in hazardous waste management at factory level. A component of Pilot Project 3 aimed at awareness raising for “Responsible Care” in the chemical and petro-chemical industry.

Pilot Project 4 focused on introduction of improved hazardous waste information and inspection system by working with major stakeholders and developing and diffusing the following guidance note and formats:

- 1) Guidance note for identification and classification of hazardous waste
- 2) Guidance note and format for company waste management plan
- 3) Format for inventory of contaminated sites, and suggested method for prioritisation of contaminated sites
- 4) Guidance note for waste inspection by EPA / NEG

Generally, target people who apply some technology must be convinced of usefulness and effectiveness of the technology. Considering this point, the Study Team has carried out the pilot projects with the following activities and procedures:

- a) Identification of opportunities and technology and relevant fields where effective improvements can be expected in connection with hazardous waste management. The following criteria were used for identification and selection of opportunities and technologies:
 - Useful for Romania
 - Effective for improvement of hazardous waste management, and bringing about economic benefits
 - Low implementation / operational costs
 - High applicability and replicability
- b) Designing, manufacturing, installation, operation, monitoring and evaluation of the pilot projects

- c) Awareness-raising and dissemination of the pilot projects to Romania through seminars.

We have designed the pilot projects in such a way that the pilot projects activities will be largely carried out by Romanian consultants and engineers so that pilot projects themselves could be replicated by Romanian people in future. The Study Team believes that the Team has achieved a substantial technology transfer to the Romanian consultants and engineers and participating companies through the pilot projects.

The JICA Study Team organised a series of seminars with full presentation materials (both hard copy and electronic format), prepared posters leaflets and videos, and presented and disseminated results of the pilot projects and Hazardous Waste Management Strategy and Action Plan to nearly 500 Romanian seminar participants including representatives of the majority of the 42 EPAs. See Appendix for the seminar programmes.

Number of Seminar Participants (excluding seminar presentators)

	TOTAL	EPIs	Enterprises	Other
Seminar 1 (6/24)	56	15	32	9
Seminar 2 (6/25)	89	-	38	51
Seminar 3 (6/26)	86	5	53	28
Seminar 4&5 (6/28)	167	55	63	49
Seminar 6 (7/1)	40	6	28	6
Seminar 7 (7/1)	48	1	16	31
TOTAL	486	67	230	174

However, it remains to be seen how Romanian people will actually replicate the technology and good practices disseminated through these seminars, leaflets and posters.

The following table summarises the objectives, participants, facilities installed in connection with the pilot projects described in this report.

Description of the Pilot Projects, Objectives, Technology Transferred, Participants and Equipment Installed

Project Name/ Objective	Participants (Signer of Agreement)	Other Participants	Facilities Provided	Facility cost (US\$)
1) Promotion of heavy metal recycling using existing smelting facility	a. Sometra S.A. b. Romplum c. Phoenix	d. Copsa Mica municipality e. EPI Sibiu f. EPI Baia Mare	Briquette machine installed at Sometra	60,000
2) Improvement of hazardous waste treatment in metal plating and surface treatment	a. Direct Auto b. Timpuri Noi SA	c. EPI Arges d. EPI Bucharest	Zinc plating lines of cleaner production type	72,000
3) Promotion of voluntary actions and pro-active	a. FEPACHI M b. FEA S.A.	5 FEPACHIM Member Firms which participate in making "Company	Closed solvent degreasing	76,000

Project Name/ Objective	Participants (Signer of Agreement)	Other Participants	Facilities Provided	Facility cost (US\$)
waste management within chemical and petro-chemical industries	c. AMCO d. Koyo	Voluntary Environment Management Plan?: e. Petromidia S.A. (refinery) f. SC Uzinele Sodice g. Govora S.A (soda, ammonia) h. Azo-Mures (fertilizer) i. Sicomed S.A. (pharmaceutical) j. PoliColor	and recovery systems (Recipients are b, c & d)	
4) Strengthening an EPI Capacity in Hazardous Waste Management	a. EPI Arges	Companies which participate in making enterprise waste management plan: b. Dacia (automobile manufacturer) c. Arpechim (refinery) d. Presate Dacia (car spare parts manufacturer) e. Ana Imep (electric motors) f. Direct Auto Rom (car spare parts)	Analytical equipment for hazardous waste for Arges EPI	38,000
				246,000

Source: JICA Study Team

1. Pilot Project 1 – Waste Minimisation in the Non-Ferrous Metals’ Sector

1.1 Introduction and Scope

The objectives of this pilot project are:

- Support to three Romanian non-ferrous smelters in terms of internal HW management and minimisation, and
- Indicate ways in which the three Romanian non-ferrous smelters can accept hazardous waste from external sources and recover valuable heavy metals from that waste.

1.2 Results and Technologies Transferred

1.2.1 Minimisation of Internal Hazardous Wastes Generated by the Non-Ferrous Metal Smelters

A highly experienced Japanese non-ferrous smelting engineer with support of local consultants carried out this component of the pilot project. Recommended measures to minimize internal waste are as follows:

- SC.ROMPLUMB S.A. - slag management and utilization
- RBG PHOENIX S.A. - improvement of management method of historical sludge generated from flue gas washing process of sulfuric acid plant
- SOMETRA S.A. - technical study of sulfuric acid production (Improvement of flue gas from ISP Furnace); reduction of Zinc-Lead dross; reduction of blue powder (Blue powder is generated in the zinc condenser exhaust gas cleaning process. It is the largest waste in quantity in SOMETRA S.A.); reduction of Cu-Pb dross; improvement of handling of powder materials (Reduction of dust); ISP slag management and utilization

Planned outputs of this component are:

- Technical recommendations for three smelters which are summarized in Table 3.1, and
- Introduction of the following items
 - Japanese elution test
 - Roasting arsenic containing sludge test
 - Hot briquette plant (See Table 3.2)

Report Volume 6 contains comprehensive documents produced through Pilot Project 1.

1.2.2 Market and Waste Collection Study

Utilising the ISP smelter as a model case, the amount and composition of external wastes were investigated and samples taken. Based on these data and operating data of the smelter, the possibility and direction of external HW recycling by using non-ferrous metal smelting facilities were studied.

Planned outputs of this component are:

- Report regarding evaluation and possibility of external waste recycling by using non-ferrous smelting facilities. (See Report Volume 6 for detail.)

1.2.3 Provision of Briquette Machine for Preparation of HW Recycling in the Non-Ferrous Metal Smelting Process

In order to promote external waste recycling, mixing and briquetting of wastes would be necessary. The component of this project is to provide the briquette machine for testing waste samples in terms of suitability for recovering non-ferrous metals.

Planned outputs of this component are (see Report Volume 6 for more detail):

- Test scale briquette machine
- Report of briquette test of external waste samples.

1.2.4 Participants in Project

In addition to the JICA Study team the participants in this pilot project were:

- S.C. SOMETRA S.A.
- S.C. LOMPLUMB S.A.
- RBG PHOENIX S.A.
- Institute for Nonferrous and Rare metals (IMNR S.A.)

1.3 Dissemination of Results

In order to report the result of pilot project and disseminate the minimisation technology of hazardous wastes, the team has conducted the seminar on July 1st, 2003. Total number of participants was 52 including non-ferrous metal generators, smelters, recyclers and researchers. According to evaluation of the participants, it was said that the seminar provided useful information.

1.4 Application and Replicability of PP1 in Romania

SOMETRA has conducted briquette test under normal temperature condition called “Cold Briquette Test”. Produced briquette shows quite good hardness for ISP furnace. SOMETRA together with IMNR continue to conduct “Hot Briquette Test” which is more suitable for wastes recycling. The progress and result of above test may refer to the other smelters.

Follow up actions required for development of the pilot project

1) Low-Grade Wastes Recycling System

Technically, some kind of low-grade non-ferrous metal wastes can be recycled by blending them with raw materials, internal wastes and/or external wastes in the non-ferrous

metal smelters. However, following items should be examined to promote the recycling of low-grade non-ferrous metal wastes.

- Reverse logistics system
- Awareness raising of generators
- Incentives of wastes recycling for non-ferrous smelters
- Fostering of mediator, blender or collector
- Intermediate storage

2) Potential Recyclable Non-Ferrous Metal Wastes

Following table shows an example of electric arc furnace dust analysis in Japan. Electric arc furnace is commonly used in the waste iron recycling. Because steel materials are galvanised electroplated in many cases, the dust from waste iron recycling process contains more than 20 % of zinc. Since composition of electric arc furnace is not so complex and amount of this dust is large, this dust is one of the big sources for secondary zinc. As mentioned before, this dust may be not captured and scattered in Romania at this moment. It is desirable that market study of these potential recyclable wastes should be carried out.

An Example of Electric Arc Furnace Dust Analysis in Japan

Element	Content (%)	Element	Content (%)
Zn	22.5	Fe	32.0
C	3.6	Cr	0.36
Cu	0.2	Pb	2.2
Ca	2.6	Cl	3.1
Cd	0.02	F	0.25
Si	1.6	O	24.9

3) Sustainability of Non-Ferrous Smelting Industry

Without primary source (concentrates), non-ferrous metal smelter cannot continue the operation. This means they cannot recycle external wastes in the smelter. In order to promote HM containing wastes by using existing non-ferrous smelting facilities, their sustainability is important. In this sense, promotion and revitalization of non-ferrous metal industry in Romania is also necessary.

Table 3.1 Recommendation of 3 R in the Non-Ferrous Metal Smelters

Companies	Issues	Recommendation	Cost (Million US\$)	Remarks
S.C. ROMPLUMB S.A.	Slag management & utilization	Slag management Check the elution in compliance with EU standards Slag utilization Raw material for steel and cement Substitute material for sand blasting Construction material Filling of caisson	—	Amount of generation in 2001; Approximately 30,000 ton Slag is inert glass substance. There are several utilization applications shown in left column. However social barrier and cost competitiveness exists for utilization. If official organization cooperates with non-ferrous metal smelters for technology deve
RBG PHOENIX S.A.	Wastewater treatment sludge storage management	Check the elution in compliance with EU standards Improvement of storage facility Reduction of sludge generation in case of re-start of the smelting process Introduction of heavy metals fixing by roasting the sludge	—	It is not generated yet. (Historical wastes), Storage quantity; Approximately 4,000 ton Roof, wall and pit of storage pond 1st stage neutralization pH;3 (1st stage; Gypsum, 2nd stage; Sludge) Roasting condition;>900°C,>10 min
S.C. SOMETRA S.A.	Reduction of Zn-Pb dross	Improvement of ISF operation Check below items Cokes strength Charging height of ISF Proper size of sinter lump	—	Amount of generation in 2001; 12,200 ton
	Reduction of blue powder	Proper rotor immersion depth Flow gas modification	0.4	Amount of generation in 2001; 11,343 ton
	Reduction of Pb-Cu dross	Shortening the de-copperization time Elemental sulphur copperization Treatment of speiss	0.1	Amount of generation in 2000; 6,100 ton
	Improvement of powder product handling	Mixing of dxry and wet powder Moisture content adjustment improvement	1.5	

Companies	Issues	Recommendation	Cost (Million US\$)	Remarks
S.C. SOMETRA S.A.	Slag management & utilization	See S.C.ROMPLUMB S.A.	—	
	SO ₂ emission improvement (Sulphric acid production)	Cosntruction of sulphuric acid plant	32	Rough estimation of initial cost; 32 Mill. US\$ Modification of sintering machine; 1.5 Dry electric precipitator; 3.5 Sulphuric acid plant; 24 Cooling facility; 1 Waste acid treatment; 2

Source: JICA Study Team

Table 3.2 Provision of Briquette Machine

1. Type of technology	Description of type of technology: Making briquette for the preparation of waste recycling		
	Purpose for supply: Conduct applicability test for waste recycling in the non-ferrous smelters		
	Results to be expected (generic): Promotion of waste recycling in the non-ferrous smelters		
2. Specification (Detailed list and specification of equipment supplied)	Item	Specification	Application
	Briquette machine	<ul style="list-style-type: none"> • Three row cylindrical rolls with dimples • Power; 1.8 kW • Revolution, 1,385 rot/min • Pressing force, 250 kg/cm² • Expected capacity, 1 ton/hour 	<ul style="list-style-type: none"> • Making briquette and preparation for waste feed of furnace to recycle HW
3. Overall cost (Euros)	JICA funding support for briquette machine was \$48,000 The SOMETRA smelter installed peripheral equipment and facilities like feeding conveyer, mixer and so on. Also the enterprise .		
4. Delivery date	December 2002		
5. Beneficiary (ies)	Name of organisation: SOMETRA S.A. Address: Str. Fabricilor Nr.1 3158 Copsa Mica, Jud. Sibiu, Romania Contact person(s): Mr. Leonidas Koudoumogiannakis Mr. Bela Balazs		Type of organisation: Non-ferrous(Pb,Zn) smelter Public/private sector: Private NACE code
6. Project duration	Start: October 2002		Finish: March 2003
7. Results achieved	Results achieved:		JICA Study Report reference: Final Report Volume 6
8. Dissemination of results	Date: 1/7/2003	Method: Dissemination Seminar / Workshop Bucharest Dissemination Video (Briquette machine and briquette test)	

Source: JICA Study Team

2. Pilot Project 2 – An Integrated Approach to Waste Management in Metal Plating Sector

2.1 Introduction and Scope

The MWEP, EPI and JICA study hazardous waste survey identified the metal plating industry waste as a priority sector. Stockpiling of hazardous acid wastes, cyanide wastes and “galvanic” waste (sludges from the treatment of plating wastes and wastewater) is common practice at Romanian plating enterprises because of low awareness and availability of appropriate sludge treatment and disposal methods. In addition, many metal finishing enterprises have no wastewater treatment plant or plant that has been allowed to fall into disrepair. The objective of Pilot Project 2 was to promote and demonstrate effective hazardous waste management in the Romanian metal plating industry.

2.2 Results and Technologies Transferred

Best practice was developed and implemented for two metal plating enterprises using an Integrated Pollution Prevention and Control (IPPC) approach. Sustainability of PP2 was ensured by involving all stakeholders, with a role to play in promoting and disseminating best waste management practice within the metal plating industry, in developing best practice work programmes at the enterprises. This involvement raised awareness of Best Available Techniques (BAT), the approach taken to identify BAT and of the issues affecting the implementation of BAT in Romania. Organisations currently offering technology advice to enterprises on plating processes, wastewater treatment and sludge treatment technologies were actively involved and were recognised as an excellent route for the dissemination of PP2 results

In line with the IPPC approach the scope of PP2 examined, developed and implemented best practice for the whole enterprise plating installation including plating processes, wastewater treatment, sludge treatment and sludge disposal. The approach required by IPPC legislation and the PP2 work programme where designed to replace hazardous raw materials with less hazardous raw materials, minimise process inputs and waste at source, reuse / recycle waste where possible, reduce the amount of waste to be treated, reduce the size of treatment facilities, reduce chemicals and energy used for treatment, improve the performance of waste treatment facilities, and ensure a safe disposal route for treated wastes to suit Romanian waste disposal circumstances.

Identifying issues associated with implementing best waste management practice at pilot enterprises supported the development and implementation of the Strategy and Action Plan for Hazardous Waste Management in Romania.

A Best Practice Guidance note with case study examples and results was produced to support the dissemination and implementation of best practice.

2.3 Dissemination of Results

In order to disseminate results two seminars were held, one in Cluji-Napoca and one in Bucharest. The table (Table 5.1) below shows the number of participants at each seminar.

Participants at PP2 Seminar

	Cluji-Napoca 24/6/2003	Bucharest 26/7/2003
Ministry / EPI	15	5
Enterprise representatives	32	53
Others	9	28
TOTAL	56	86

The seminar content was largely presented by the Romanian team members and the participating enterprises. The objectives, activities and results were presented in some detail. The presentations were supplemented by two video presentations, one for each pilot enterprise. Following each seminar time was allocated for participants to discuss the seminar results and their needs in informal session with the pilot project team.

Feedback from participants was very encouraging indicating that the content was highly relevant to them, that they were impressed with the results and keen to obtain the same benefits. The project team was approached during the seminars by several companies wishing to undertake similar activities at their enterprises. Following the seminars visits were made to two enterprises to discuss issues and opportunities for undertaking similar activities.

Several participants commented particularly on the relevance to their activities, specifically mentioning the minimisation of wastewater, the improved treatment systems and the need to solve problems related to the disposal of treatment plant sludges. The latter is known to be a major issue in Romania with many enterprises stockpiling such wastes. Enterprises very much appreciated the integrated focus with attention to technological efficiency.

In order to assist with on-going dissemination of results a poster and leaflet were prepared for distribution via County EPIs.

2.4 Application and Replicability of PP2 in Romania

Accurate and detailed information on the number and operating conditions of Romanian enterprise plating lines and wastewater treatment facilities was not readily available from official sources. An assessment of the number and operating conditions of Romanian plating lines was made by the PP2 team through; a limited number of visits to plating enterprises, discussions with EPIs in the pilot regions, discussions with Romanian plating process and wastewater treatment equipment suppliers, discussions with plating process chemical suppliers and discussions with plating enterprises and EPI's from outside the pilot regions attending JICA seminars.

The findings from these discussions are that:

- There are over 500 plating enterprises in Romania.
- The majority of the plating lines and wastewater treatment facilities are in poor condition, are operated inefficiently and are in need of replacement.
- Many plating companies do not have a satisfactory route for the disposal of their wastewater and sludge.
- The scope of work undertaken and technology transferred within PP2 is necessary at the majority of Romanian plating enterprises
- The level of awareness of the techniques and technologies implemented in PP2 is low.

The conclusion drawn and confirmed during the JICA dissemination seminars, by discussion with participating companies, is that the replication potential of PP2 is vast with hundreds of enterprises in directly analogous situations. Indeed, the team were approached by a number of companies with similar problems expressing desire to participate in any further programmes. In addition, the integrated approach demonstrated can be applied to **any** type of process in **any** industrial sector. The scope for replication to other polluting activities is tremendous.

Capacity for replication has been increased in ICIM and with some suppliers; nevertheless, the JICA foreign consultants believe that further programmes with the assistance of foreign consultants are necessary to complete the capacity building and to demonstrate applicability of similar techniques to other industrial sectors and other polluting activities / processes.

The pilot projects have resulted in large reductions in waste/wastewater requiring off-site disposal, indeed, the volumes of ongoing sludge generation are greatly reduced. The stabilisation recipes developed should allow the final disposal of such wastes as NON-hazardous residues for simple landfill. It is important that the application of these stabilisation and disposal techniques is encouraged. The Strategy and Action Plan developed by the JICA project recommends the development of small, regional facilities for physical/chemical treatment and stabilisation, the latter being an important part of replication of the results of this pilot project activity.

Follow up actions required for development of the pilot project

1) Continued Integrated Waste Management Pilot Project Programme

Objective(s): To continue developing capabilities within Romania to implement improved waste management in enterprises by adopting an integrated approach focussing on the complete waste management hierarchy.

Activities:

- (a) Improving waste management in metal finishing processes - this would be aimed at replication of PP2 activities to additional similar enterprises (more than 500

such enterprises in Romania. This would leverage the "local" capabilities already partially built during PP2. It is recommended that the programme includes a further 5 enterprises with galvanic processes.

- (b) To apply the same methodologies and techniques (avoidance and minimisation, process efficiency, improved waste recovery, treatment and disposal) to other processes and other industrial sectors. It is recommended that a further 10 to 15 enterprises participate in these activities.

Results:

- (a) Improved waste avoidance and minimisation and waste management in selected enterprises.
- (b) Improved environmental performance within the selected enterprises.
- (c) Improved process efficiency and use of resources in selected enterprises.
- (d) Consolidate capability within Romania for provision of such support to industry.

2) Feasibility Study for Regional Harardous Waste Treatment and Disposal Facility

Objective(s): To undertake a feasibility study for development of a regional hazardous waste treatment and disposal facility to promote the "fast-track" development of such facilities within Romania.

Activities:

- (a) Selection of a pilot region(s) for facility development.
- (b) Selection of Romanian waste management company to participate
- (c) To prepare an indicative waste inventory for the region (both stockpiled waste and ongoing waste generation) and identify potential market for provision of merchant waste treatment and disposal service.
- (d) To prepare preliminary design for centralised waste treatment and disposal facilities to include process flows and mass balances.
- (e) To undertake preliminary site selection.
- (f) To estimate capital and operating costs and prepare cash flow analyses to identify necessary charges to give an appropriate return on investment.
- (g) To assist in preparation of application(s) for necessary funding for facility construction and operation.

Results:

- (a) Feasibility study enabling application for investment funding.
- (b) Promotion of the development of necessary hazardous waste management infrastructure in Romania.

(Notes: Several companies have expressed interest in the development of such facilities. The project could potentially be designed to support the development of more than one facility in more than one region by selecting two or three participating Romanian waste

management companies and supporting their activities with a centralised "pool" of foreign and local experts who would assist these companies in implementing the project activities through common seminars, workshops and specific targeted activities. The participating companies would be expected to contribute their own time and expenses.)

3) Development of Integrated Waste Management Information System (WMIS)

Objective(s): To build upon work undertaken by the JICA project and the REPIs project to actually develop a modern WMIS designed to support Romania's regulatory and national / international data reporting needs.

Activities:

- (a) Preparation of conceptual design for WMIS for consultation based on needs assessment
- (b) Preparation of detailed design for WMIS for approval by Ministry
- (c) Development of equipment and software specifications
- (d) Procurement of necessary information system hardware and system software
- (e) Development of application software
- (f) System installation and training of system administrator(s)
- (g) Training of system users.

Results:

- (a) Improved regulation and control with more efficient inspection
- (b) Improved data collection and national reporting
- (c) Improved international reporting

(Notes: Such a system could be low cost and be internet-based using "public domain" open-source technologies enabling the system to be supported at very low cost. System could also be developed in such a way as to incorporate information dissemination to help industry by dissemination of good practice information and raising awareness of environmental performance requirements and standards.)

3. Pilot Project 3 – Chemical Sector – Responsible Care & Chlorinated Solvent Reduction

3.1 Introduction and Scope

PP3 has two components as follows.

- Promotion of voluntary environmental management activity of chemical industry:

This component lead to the initiation, in Romania, of “Responsible Care” program which is a global activity of chemical industry. “Responsible Care” has much comprehensive scope of activity in the filed of environment, safety and health. The activity in the project is the parts of such comprehensive activity, focused on environmental aspects. For this purpose, environmental reports of the five chemical companies were formulated.

- Demonstration of chlorinated solvent reduction at degreasing facility:

This component demonstrates the low-cost methodology of reduction of chlorinated solvent from degreasing unit. It is also considered as a part of “Responsible Care”. The activity includes investigation of existing units and design, engineering, fabrication of new closed-type unit as well as improvement on the existing unit.

3.2 Results and Technologies Transferred

3.2.1 Promotion of Voluntary Environmental Management Activity of Chemical Industry

Environmental management activity is based on the understanding of the total environmental load by the production activity. Chemical companies, with the assistance of local consultant, have first implemented material balance study of their production process and identified the environmental load to air, water and waste in each process of their operation. Based on the study, the companies prepared the environmental management reports.

At national level, FEPACHIM (Federation of Romanian Petrochemical and Chemical Industry) has initiated the preparation for the establishment of Romanian Council of Responsible Care. To support their effort, and to raise awareness in the industry, a seminar for Responsible Care was organized in June 25, 2003 at Bucharest. 85 participants, mainly from the chemical industry as well as various organization related to chemical industry attended the seminar. High rank officials from the Ministry of Industry and Resources also present in the seminar and gave strong support to the program. Representative from TACM (Turkish Association of Chemical Manufactures)/CEFIC (European Council of Chemical Industry Federation) also participated in the seminar and welcomed the initiative in Romania.

In the questionnaire distributed in the seminar, almost all of 52 companies answered that they will positively consider the participation in the Responsible Care program. It is expected similar preparation of voluntary environmental management plan will be replicated in many of the companies participated in the seminar.

3.2.2 Demonstration of Chlorinated Solvent Reduction at Degreasing Facility

Chlorinated solvent reduction was demonstrated in three factories using degreasing units. One of the three operated open-top type vapor degreasing units (at FEA) while two others operated conveyor type multi-bath degreasing units (AMCO and KOYO).

For the open-top type, complete new unit was designed and fabricated in Romania. Romanian consultant has designed the unit with limited technical support of the international expert, except initial transfer of concept and technical documents. Local suppliers also proved themselves capable of fabricating the unit according to the new design.

For modification of the existing units, first step in engineering consideration was measurement of ventilation rate and vapor concentration to estimate the solvent loss by vapor. Such investigations were done by an international expert together with a local consultant. Based on the measurement data, improvement were designed. Detail of the design were then explained and discussed with the factory personnel. For all the process, transfer of know-how were in account.

3.3 Dissemination of Results

Dissemination seminars were held twice, at Cluji-Napoca on June 24th and at Bucharest on June 25th. At Cluji-Napoca, there were 56 participants including 12 from 5 EPI office. There are representative from approx. 25 companies. 9 companies were using solvent degreasing unit in their factories. 4 out of 9 companies showed good intention to improve their facility as pilot project presented in the seminar. Others felt it is difficult for them because of financial constrains.

At Bucharest, factories visit to AMCO, FEA were organized with 58 participants, prior to the seminar. There were 88 participants for the seminar including the representative from over 30 companies. 13 companies were using solvent degreasing unit in their factories. 8 out of 13 companies showed good intention to improve their facility as pilot project presented in the seminar. Others felt it is difficult for them because of financial constrains and lack of technology.

3.4 Application and Replicability of PP3 in Romania

Responsible Care program can be disseminated to all chemical industry in Romania. However for the first step, it is more practical to disseminate the activity to those 52 companies attended in the seminar who showed strong interest in the program.

As noted in the report of chlorinated solvent survey, it is estimated 500 – 1,000 factories are using chlorinated solvent for degreasing. Many of these factories shall get benefit in the solvent reduction in terms of both cost and environment.

Follow up actions required for dissemination of the pilot project

- Support to FEPACHIM for the establishment of Romanian Council of Responsible Care

- Monitoring of the equipment at FEA, AMCO and KOYO. Improvement if necessary and possible.
- Further dissemination of solvent reduction technology by follow up individual factory visits (who replied positive in the seminar questionnaire) and consulting/engineering for improvement of existing unit.
- Training workshop for consultant and engineer.
- Further dissemination through the seminar.

4. Pilot Project 4 – Strengthening Hazardous Waste Management Capacity

4.1 Introduction and Scope

Pilot Project 4 aimed at strengthening hazardous waste management capacity at both EPI and company level with particular focus on introduction of improved hazardous waste management planning and information system. Some laboratory analytical equipment was provided through this pilot project in order to strengthen analytical capacity of an EPA in connection with hazardous waste management.

Main participants of the pilot project were as follows:

- 1) EPA Arges
- 2) Companies that participated in elaboration of company waste management plan:
 - a. Dacia (automobile manufacturer)
 - b. Arpechim (refinery)
 - c. Presate Dacia (car spare parts manufacturer)
 - d. Ana Imep (electric motors)
 - e. Direct Auto Rom (car spare parts, etc.)

Pilot Project 4 was a communication-orientated project. The Study Team and its Romanian consultants (researchers from ICIM Waste Department) had many meetings with EPA / NEG Arges to discuss problems with roles of EPA / NEG Arges to be played in connection with hazardous waste management and inspection.

EPA Arges and the Study Team jointly visited existing contaminated sites to prepare an inventory of contaminated sites in Arges county. With this experience and information obtained, the Study Team has developed an inventory format and site assessment / prioritisation method with which contaminated sites were categorised and roughly assessed. Final objective of this component of the pilot project is that all EPAs will make inventory of contaminated sites within each county using the format and method developed thorough this pilot project.

The above listed 5 companies have prepared company waste management plan respectively using a format developed through this pilot project. Final objective of this component of the pilot project is that all EPAs will require companies to prepare and submit a company waste management plan as part of application documents for environmental permit, and company will prepare such plan based on the developed format.

4.2 Results and Technologies Transferred

Pilot Project 4 generated the following outputs:

A. Guidance notes and Formats

- 1) Guidance note for identification and classification of hazardous waste
- 2) Guidance note and format for company waste management plan
- 3) Format for inventory of contaminated sites, and suggested method for prioritisation of contaminated sites
- 4) Guidance note for waste inspection by EPA / NEG

B. Actual Company Waste Management Plan (CWMP)

- 5) CWMP elaborated by Dacia (automobile manufacturer)
- 6) CWMP elaborated by Arpechim (refinery)
- 7) CWMP elaborated by Presate Dacia (car spare parts manufacturer)
- 8) CWMP elaborated by Ana Imep (electric motors)
- 9) CWMP elaborated by Direct Auto Rom (car spare parts, etc.)

C. Actual Inventory of Contaminated Sites

- 10) Inventory of contaminated sites in Arges county

D. Analysis of hazardous waste

- 11) Implementation of hazardous waste sampling and analysis using equipment (VOC analyser, oil content analyser, and digester for sample making equipment) provided through the pilot project

4.3 Dissemination of Results

On 30 June 2003, we held a seminar in Bucharest to disseminate results of the pilot project 4. We delivered guidance notes and other documents as listed in the above to all the seminar participants (160 approximately). The seminar participants included representatives of 38 EPIs (out of 42), and enterprises.

Most seminar presentations were given by the participants of the pilot project 4, ie, Romanian consultants (ICIM researchers) and staff of EPA Arges.

4.4 Application and Replicability of PP4 in Romania

Through the PP4 seminar, we have proposed that all EPAs and enterprises to take the following actions. The Ministry of Waters and Environmental Protection expressed its full support for the proposal.

- 1) All EPI should prepare an inventory of contaminated sites at each county.
- 2) Enterprises will formulate respective company waste management plan, and submit it to EPI as part of application documents for environmental permit. (EPAs should require enterprises to formulate such plan.)
- 3) Enterprises and EPAs should use the delivered guidance note for better identification and classification of hazardous waste.

The above actions do not require much capital investment for implementation. Whether or not EPAs and enterprises would implement the above actions depends much on strength of enforcement and willingness on the part of the new Environment Ministry (MAFWEP), and EPIs. The Ministry and EPAs are urged to implement these actions. ICIM could provide support in the technical aspect of the implementation.

APPENDIX

**Programmes of JICA Seminars
held in Romania
During 24 June – 1 July, 2003**

Appendix



JICA Funded Hazardous Waste Management Plan Study and Pilot Projects Seminar Plan

Data	Seminar topics	Place
24 June (Tue)	Seminar 1: Improving Waste management in metal finishing processes (Pilot Project - PP2 & 3 results)	Cluji Napoca (Transylvania Hotel)
25 June (Wed)	Seminar 2: Responsible Care (Voluntary environmental management plan) of chemical companies	Bucharest (Marriott Hotel)
26 June (Thur)	AM: Tour to AMCO FEA, Timpuri Noi by bus PM: Seminar 3: Improving Waste management in metal finishing processes (Pilot Project - PP2 & 3 results)	Bucharest (Hotel Marriott)
30 June (Mon)	Seminar 4: Hazardous waste management strategy and action plan Seminar 5: Strengthening of hazardous waste management capacity at EPIs and enterprises	Bucharest (Hotel Marriott)
1 July (Tue) AM	Seminar 6 Hazardous Waste Management Facilities Development and Funding	Bucharest (Hotel Marriott)
1 July (Tue) PM	Seminar 7 Recycling of heavy metals using smelters (PP1 result)	Bucharest (Hotel Marriott)

Note: PP – pilot projects

Tour – visit tour of the enterprises involved in PP2&3



**Seminar 1 on Improving waste management in metal finishing processes (PP2 & 3)
June 24, CLUJI NAPOCA – Transylvanian Hotel**

08:30 - 09:00 Participants registration
09:00 - 09:15 Opening speeches (Chairperson Ms. Florina Mirescu)

- JICA (Kiichiro Sakaguchi, Leader, JICA Study Team)

Pilot Project 2

09:15 – 09:20 Introduction to PP2 (JICA - Mr. Colin Woods) (5)
09:20 – 09:35 Film presentation of PP2 (15)
09:35 – 10:25 Presentation of PP2 activities and results (50)
Ms. Ileana Mițiu (10)
Ms. Brindușa Petroaica (10)
Timpuri Noi results, Mr. Ionescu (10)
Direct Auto Rom results, Mr. Valeriu Pop (10)
Supply of package metal finishing wastewater treatment system, CAST (10)
10:25 - 10:35 Q & A session (Chairperson Ms. Florina Mirescu) (10)
10:35 - 11:00 Coffee break (20)

Pilot Project 3

11:00 - 11:05 Introduction to PP3 (JICA - Mr. Munehiro Fukuda) (5)
11:05 - 11:20 Film presentation of PP3 activities (15)
11:20 - 12:00 Presentation of PP3 activities and result (Mr. Adrian Diaconu-Consultant)(40)
12:00 - 12:10 Presentation of company report 1 (Mr. Sorescu Gheorghe - AMCO S.A).(10)
12:10 – 12:20 Q & A session (Chairperson Ms. Florina Mirescu) (10)
12:20 – 12:30 Concluding remarks (JICA – Mr. David Newby) (10)
12:30 – 14:00 Informal session



Seminar 2 on Responsible care (Voluntary environmental management plan) of chemical companies – 25 June, BUCHAREST – MARRIOTT HOTEL

- 09:00 – 09:15 Participants Registration
- 09:15 – 09:35 Opening Speeches (Chairperson: Dr. Ioan Cezar Coraci)
- Representative of JICA (5)
 - Representative of MIR (5)
- Representative of MWEP (Mr Iulian Rusu – participation only)
- 09:35 – 09:50 Presentation of FEPACHIM plan (Dr. I. C. Coraci Mr. Traian Vulpe) (15)
- 09:50 – 10:00 Presentation by TCMA/CEFIC representative (Dr. Caner Zambak) (10)
- 10:00 – 10:40 Presentation of company environmental plan
- U.S.Govora (Ms. Subtirelu Doina) (7)
 - Rompetrol (Ms. Luminita Zamfirescu)(7)
 - AzoMures (Ms. Mariana Haseganu) (7)
 - Policolor (Ms. Liliana Anton) (7)
 - Sicomed (Ms. Carmexi Popescu)(7)
- 10:40 – 10:55 Discussions (Chairperson: Dr. I.C. Coraci) (15)
- 10:55 – 11:00 Concluding remarks (Mr. Munehiro Fukuda, JICA team) (5)
- 11:00 – 13:00 Coffee break & informal session
- 11:30 – 12:15 Press conference

FEPACHIM (Federation of Romanian Chemical and Petrochemical Industry)

TCMA (Turkish Chemical Manufacturer's Association)

CEFIC (European Council of Chemical Industry)



**Seminar 3 on Improving waste management in metal finishing processes (PP2 & 3)
June 26, BUCHAREST – Marriott Hotel**

08:00	Meet at Entrance to Herestrau Park by Piata Presei Libere (Participants will be divided into Groups A and B)	
	<u>Group A (30 persons)</u>	<u>Group B (30 persons)</u>
09:00	Visit to Timpuri Noi (PP2)	Visit to AMCO (PP3)
10:00	Visit to AMCO (PP3)	Visit to FEA (PP3)
11:00	Visit to FEA (PP3)	Visit to Timpuri Noi (PP2)
12:00 – 13:30	Lunch for tour participants	
14:30 – 14:45	Opening speeches (Chairperson Ms. Florina Mirescu)	
	• JICA (Kiichiro Sakaguchi, Leader, JICA Study Team)	
	Participation by MoWEP (Mr. Iulian Rusu and Ms Alina Istodor, experts, Waste and dangerous materials Directorate)	
	<u>Pilot Project 2</u>	
14:45 – 14:50	Introduction to PP2 (JICA - Mr. Colin Woods) (5)	
14:55 – 15:10	Film presentation of PP2 (15)	
15:10 – 16:00	Presentation of PP2 activities and results (50)	
	Ms. Ileana Mițiu (10)	
	Ms. Brindușa Petroaica (10)	
	Timpuri Noi results, Mr. Ionescu (10)	
	Direct Auto Rom results, Mr. Valeriu Pop (10)	
	Supply of package metal finishing wastewater treatment system, CAST (10)	
16:00 – 16:10	Q & A session (Chairperson Ms. Florina Mirescu) (10)	
16:10 – 16:30	Coffee break (20)	
	<u>Pilot Project 3</u>	
16:30 – 16:35	Introduction to PP3 (JICA - Mr. Munehiro Fukuda) (5)	
16:35 – 16:49	Film presentation of PP3 activities) (14)	
16:49 – 17:19	Presentation of PP3 activities and result (Mr. Adrian Diaconu-Consultant) (30)	
17:19 – 17:26	Presentation of company report 1 (Mr. Sorescu Gheorghe - AMCO S.A.) (7)	
17:26 – 17:33	Presentation of company report 2 (Mr. Cristian Cristea - FEA S.A.) (7)	
17:33 – 17:40	Presentation of company report 2 (Mr. Virgil Luca - KOYO S.A.) (7)	
17:40 – 17:50	Q & A session (Chairperson Ms. Florina Mirescu) (10)	
17:50 – 18:00	Concluding remarks (JICA – Mr. David Newby) (10)	
18:00 – 19:30	Informal session	



Seminar 4 on Hazardous Waste management strategy and action plan
Seminar 5 on Strengthening of hazardous waste management capacity at EPIs and enterprises
30 June, BUCHAREST – MARRIOTT HOTEL

Seminar 4

- 08:30 – 09:00 Participants Registration
- 09:00 – 09:25 Opening Speeches (Chairperson – Mrs. Elena Dumitru, Director General, Ministry of Waters and Environmental Protection - MoWEP)
Mr. Ioan Jeleu – Secretary of State, MoWEP (15 minutes)
Mr. Naotoshi Sugiuchi - Ambassador Extraordinary and Plenipotentiary, Japan (10)
- 09:25 – 09:40 Presentation by Mrs. Cristiana Ion, Director, Directorate Accreditation, Quality, Environmental Protection, MIR
- 09:40 – 09:55 Outline of JICA Study
Mr Sakaguchi, leader, JICA Study Team - (15)
- 09:55 – 10:10 Main Points of the Strategy and Action Plan
Mrs Ghineraru – Director of Waste/Hazardous Substances Directorate - MoWEP(15)
- 10:10 – 10:30 Coffee Break
- 10:30 – 11:15 Presentation of the Strategy and Action Plan
(Mrs Ghineraru – MoWEP)(45)
- 11:15 – 12:20 Questions and comments from participants preceded by comments from international assistance agencies
- 12:20 – 12:30 Conclusions
(MoWEP – Mrs Ghineraru) (5)
(MIR – Mrs Ion) (5)
- 12:30 – 13:30 Informal session



Seminar 5 Pilot Project 4 (PP4)

- 12:30 – 14:00 Participants registration
- 14:00 – 14:20 Opening Speech (Chairperson) Mrs. Mariana Ghineraru, Director, *Waste and Hazardous Substances Directorate*, Ministry of Waters and Environmental Protection (10)
- Opening Speech – Mr. Kenichi Tanaka, Senior expert, JICA (10)
- 14:20 – 15:25 Presentation by PP4 consultants and Argeş EPI representatives:
- Introduction to PP4 – Mr Drewett (JICA Study Team) (5)*
- Summary review of outputs of project (Mrs Stefanescu - ICIM) (10)*
- Arges county and issues related to hazardous waste management– Mrs Anca Albu (Arges EPI – Chief Inspector) (15)*
- Project objectives in the field of hazardous waste management (Chimist Delia Udristeanu) (15)*
- Results of project in the field of monitoring by using laboratory equipment from JICA (Ing Silvia Nichifor - Arges EPI) (10)*
- Results of project for improving the authorising of economic activities that generate hazardous waste and/or use hazardous substances (Arges EPI – Ing Nicoleta Popescu) (10)*
- 15:25 – 15:45 Coffee break
- 15:45 – 16:30 Presentations continued by PP4 consultants and Argeş EPI representatives:
- Results of project for improving inspection of hazardous waste and substances management (Chimist Delia Udristeanu)(15)*
- Results of project for identification of contaminated sites (Ing Marius Dumitru)(15)*
- Identification and classification of hazardous waste (Mrs M. Chiriac - ICIM) (15)*
- 16:30 – 16:50 Question & discussion period
- 16:50 – 17:00 Comments and concluding remarks (*MoWEP – Mrs Ghineraru, Director, MoWEP*)



**Seminar 6 on Hazardous Waste Management Facilities Development and Funding
1 July, BUCHAREST – MARRIOTT HOTEL**

- 08:30 – 09:00 Participants Registration
- 09:00 – 09:10 Opening Speeches (*Convenor Mr J Warford, JICA study team member*)
JICA Welcome – Mr Sakaguchi, JICA study team leader (2)
Ministry of Waters & Environmental Protection – Mrs Ghineraru, director, Waste and Dangerous Substances Directorate (3)
Ministry of Industry & Resources – Mr. Belinda, State Secretary (to be confirmed)
- 09:10 – 09:20 Introduction (JICA – J Warford, study team member) (10)
- 09:20 – 09:50 JICA Study team presentation
Hazardous Waste Management: Principles, Components & Quantities (JICA – Mr R Drewett, study team member) (15)
Developing the hazardous waste infrastructure – (JICA - Mr D Newby, study team member) (15)
- 09:50 – 10:05 Ministry contributions to the issues of facility development
MWEP – Mrs Ghineraru (5)
MIR – (5)
- 10:05 – 10:25 Coffee break
- 10:25 – 10:55 Presentation by potential interested companies in facility development
CIROM - Ion Crangasu / Oana Dinu (15)
Iridex - Dr Mihai Moisa (15)
- 10:55 - 11:20 Informal questions and/or presentations by other companies / organisations
- 11:20 – 11:35 Funding aspects and cost recovery
(JICA – Mr J Warford) (15)
- 11:35 – 12:05 Comments from international assistance agencies
EBRD - Mr Alex Tanase (15)
WB – Mrs Doina Rachita (15)
- 12:05 – 12:20 Closing comments from each Ministry representative
MWEP – Mrs Ghineraru (5)
MIR – (5)
- 12:20 – 12:30 Concluding remarks (Convened by Mr J Warford – JICA study team) (10)
- 12:30 - 13:30 Informal session



**Seminar 7 on Recycling of heavy metals using smelters (PP1results)-
1 July, BUCHAREST – MARRIOTT HOTEL**

13:30 - 14:00 – Participants Registration

14:00 – 14:30 Opening Speeches (Chairperson; Dr Teodor Velea, IMNR)
(Mr. Adrian Grigorescu , Secretary of State of MIR) (to be confirmed later)
Mr. Petru Ianc, Director General of department of political industry, MIR
Participation by Mr. Iulian Rusu, expert, Waste/Hazardous Chemical Directorate,
MoWEP

14:30 – 15:00 Outline of Pilot Project 1
Mr. Shoji Nakamura, JICA Study Team

15:00– 15:30 Generation of target non-ferrous metal containing wastes
Dr. Teodor Velea, IMNR

15:30 – 15:45 Coffee Break

15:45 – 16:15 Presentation by participating company of pilot project 1,
Mr. Leonidas Koudoumogiannakis, SOMETRA

16:15 – 16:30 Concluding remarks
Mr. Shoji Nakamura, JICA Study Team

16:30 – 17:30 Informal session