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REPORT OF THE SEMINAR-WORKSHOP ON ENVIRONMENTAL AND ECONOMIC
ASPECTS OF INDUSTRIAL WASTE MANAGEMENT

(Buenos Aires, Argentina, 8 to 12 September 1987)

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Introduction

1. This report contains the basic background information and summary of the debates which took place at the seminar-workshop on "Environmental and economic aspects of industrial waste management".
2. The seminar-workshop was jointly organized by the Economic Commission for Latin America and the Caribbean, the Industry and Environment Office of UNEP, the Latin American and Caribbean Institute for Economic and Social Planning (ILPES), the Municipal Council of Buenos Aires and the Carl Duisberg Gesellschaft c.V. (CDG) of the Federal Republic of Germany, which provided financial and technical support.
3. The initiative for this meeting rose out of a course devoted to the study of environmental impact, illustrated by the example of a solid urban waste deposit, and organized by the above Society in Berlin in April 1987. The course was attended by experts from Argentina, Brazil, Colombia, Venezuela, Mexico, Peru, Bolivia and Ecuador.

I. ATTENDANCE AND ORGANIZATION OF WORK

Place, date and aims of the meeting

4. The seminar-workshop on environmental and economic aspects of industrial waste management was held from 8 to 12 September 1987 in Buenos Aires, Argentina, at the headquarters of the Federal Investment Council, which provided its facilities and support services.

5. The specific aims of the meeting were the following:

a) To provide an initial diagnosis of national circumstances in respect of waste management and the role of industry in the countries present at the meeting.

b) To identify the principal areas and sectors of industry on which efforts should be focused in order to progress towards a sustainable development of production activities.

c) To analyse the institutional, legal and regulatory aspects required for adequate waste management and to recommend the use of specific instruments of environmental management.

d) To acquire knowledge of experience of industrial waste management in the Federal Republic of Germany and to investigate the possibility of its adaptation in the countries of the region, and to identify areas of future co-operation.

e) To account for the main hurdles facing environmental management in the sectors identified and to put forward strategies for the incorporation of technologies, processes and equipment designed to limit or alter waste production, as well as for the treatment, elimination and possible recycling of waste.

f) To identify the proper role of industrial plans and policies, of environmental policy, of land management and of science and technology policies with a view to harmonizing productive development with satisfactory environmental quality.

g) To promote the exchange of experience and lay down the foundations for future consultations between institutions and countries. To identify areas for horizontal co-operation and the requirements in respect of technical assistance.

Attendance

6. The meeting was attended by 28 experts from Argentina, Brazil and Uruguay connected with environmental institutions, municipal councils, the industrial sector and with academic, scientific and technological development activities in the field. It was also attended by two experts from the Federal Republic of Germany who presented their country's experience in the field.

Inaugural meeting

7. During the inaugural meeting, participants were welcomed by Ms. Adela Yankelech de Kuncher, Director of the Federal Investment Council (CFI). Addresses were then made by Mr. Pablo Quiroga, Under-Secretary for Environmental Policy of the Argentine Republic and Mr. Dieter Woltmann, Counsellor from the Embassy of the Federal Republic of Germany.

8. The following speakers addressed the participants on behalf of the organizing bodies in order to set out the objectives of the seminar-workshop: Ms. Karin Gauer, from the Carl Duisberg Gesellschaft of the Federal Republic of Germany; Mr. Nicolo Gligo, on behalf of ECLAC/ILPES/UNEP and Mr. Rodolfo O'Reilly, Secretary for Public Services of the Municipal Council of Buenos Aires, in representation of the Municipal Intendant of the City of Buenos Aires.

Co-ordination

9. During the five-day meeting, the debates were co-ordinated by Ms. María Inés Bustamante and Mr. Nicolo Gligo, experts from the Joint ECLAC/UNEP Development and Environment Unit, Mr. José Leal from ILPES and Mr. Hernán Durán, a consultant from the Industry and Environment Office of UNEP.

Organization

10. The seminar-workshop was organized around five topics. The discussions began with previously agreed-upon presentations by experts on each topic, supported by documents, and were followed by debates thereon. On the day before the close of the seminar working groups were organized on the main topics and drew up conclusions and suggestions relating thereto.

11. In addition, the participants visited the waste treatment and disposal plant belonging to the State Environmental Agency for the Metropolitan Area (CEAMSE), where they were shown an audio-visual presentation and given an opportunity to ask questions.

Agenda */

12. The agenda for the debates was as follows:

1. Environmental problems and industrial development
2. Problems associated with the production of waste in the experience of different countries
 - a) Scale of the problems and prospects
 - b) Environmental aspects of industrial production
 - c) Methods of waste management
3. Environmental policy in respect of waste management
 - a) The legal and institutional framework
 - b) Specific instruments: establishment of standards, environmental zoning, environmental impact assessments, licenses, incentives, controls and disciplinary measures
4. Industrial, siting and technological development policies to ensure satisfactory waste management
5. The role of the industrial sector: the possibilities of incorporating technologies and opportunities for participation in an environmentally satisfactory industrial development policy
6. Conclusions and recommendations.

*/ See list of documents in annex 2.

II. SUMMARY OF DEBATES

Environmental problems and industrial development (agenda item 1)

13. The first item on the agenda was explored on the basis of a presentation made by the consultant from the Industry and Environment Office of UNEP focusing on the following main topics, set out in the document "Desarrollo industrial: generación y manejo de los residuos. Elementos de una discusión" (LC/R.602(Sem.41/6)).

a) Comparison between the patterns of industrialization of the developed countries and the Latin American countries present at the meeting. It was emphasized that the increasing internationalization of production together with the profound technological changes taking place made it difficult to forecast the future development of industry in Latin America. However, it was vital for planning and industrial policy to keep abreast of developments in the centres and in the recently industrialized countries. In addition, differences in the structure and size of the productive sector posed different types of environmental problems, and a variety of capabilities were required in order to tackle them.

b) The polluting nature of industrial activity in the context of urban development. Industrial development in Latin America goes hand in hand with a rapid process of urbanization and population concentration. Much remains to be done in respect of the provision of infrastructure and basic services such as drinking water and drainage; waste water treatment is rare, with the consequent repercussion on health, water courses and irrigated land. These problems are compounded by the disposal of hazardous municipal and industrial waste. These considerations need to be borne in mind by the authorities in drawing up their priorities for action.

c) The possibilities for the productive sector to tackle environmental problems by means of its own initiatives. In this respect, the consultant advanced a number of observations regarding the role of industry, consultancy firms and research and development centres in the search for solutions to the problems of pollution and for efficient use of natural and energy resources. It was proposed that the capacity to produce capital goods, equipment and installations to facilitate the harmonization of the objectives of economic growth and environmental quality should be pursued simultaneously to industrial development.

d) Political aspects of industrial development and environmental protection. The consultant referred to the need for community participation in defining development strategies and environmental goals.

Problems associated with waste production in the experience of different countries (agenda item 2)

14. In connection with this item of the agenda, participants were informed of the main conclusions drawn from the course on environmental impact, illustrated by the example of a solid urban waste deposit, and organized by the Carl Duisberg Gesellschaft c.V. in Berlin in April 1987. This course had been attended by experts from Argentina, Brazil, Colombia, Venezuela, Mexico, Peru, Bolivia and Ecuador. Among its conclusions, it had pointed out that in contrast to the developed countries, many Latin American cities had still not satisfactorily solved their problems of domestic waste management. Furthermore, it was observed that there was an almost total lack of information relating to industrial waste and suggested that a seminar-workshop be held to clarify the present situation and prospects in respect of the relationship between industry and the environment in Latin America.

15. Subsequently, in order to progress towards an overall diagnosis and greater knowledge of the actual problems faced in this field as well as of their causes and the agents involved, a number of experts made presentations based on the experience of the cities of Buenos Aires, Córdoba, Mendoza, Montevideo, Rio de Janeiro, Curitiba, São Paulo and the state of Minas Gerais. These presentations were completed by documents distributed to the participants. In view of the variety and complex nature of the situations presented, this report includes a brief synthesis of them.

a) Beyond technical and administrative considerations, concern with environmental issues arises out of a failure to assign priority to political decisions on account of the economic difficulties affecting the region.

b) The problem of solid domestic waste has still not been solved in many cities; the most frequent form of disposal is in open-air dumps with scant technical supervision. As far as industrial waste is concerned, it was observed that this is most often of organic origin and could be handled by installations for the treatment and elimination of urban waste, such as incinerators.

c) There is an almost complete absence of information concerning the volume and nature of hazardous industrial waste produced. Major efforts have been undertaken in Buenos Aires and São Paulo towards a diagnosis of the situation. Generally speaking, hazardous waste is disposed of in secret in water courses, sanitary landfills or rubbish tips, with serious repercussions for both health and the environment.

d) The more diversified and developed a locality's industrial facilities, the greater the problems of waste management. The case of São Paulo, where half of Brazil's industrial establishments are located, is particularly striking. It has been calculated that 77% of this state's hazardous waste is produced by metallurgical, chemical, electrical equipment and communications industries. In the state of Minas Gerais mining industries are of particular importance and environmental problems arising out of the intensive exploitation of natural resources and the growth of the

manufacture of intermediate goods have been detected. In Montevideo the leather tanning and wool scouring industries give rise to the main problems.

e) There are no specialized plants for the treatment of hazardous waste in South America; however a project, which has reached a very advanced stage, does exist in Buenos Aires. It is accepted that on account of the irreversible consequences and risk of accidents involving such waste there is an urgent need to adopt certain measures such as storage in clearly marked drums until the necessary means of treating and disposing of it become available.

f) The removal of industries from urban centres was not considered to constitute the most suitable solution to the problems of pollution. For the population's well-being it is perhaps not desirable for a city to be exclusively residential, thereby compelling workers to travel considerable distances to reach industrial areas. Furthermore, provided they are subject to proper environmental control, certain industries act as dynamic elements in urban centres.

g) Another topic dealt with in the presentations was the need to take the international situation into account in designing environmental programmes and policies; it is particularly important to adopt criteria in order to be able to deal with the circumstances arising out of worldwide technological innovation. The attention of participants was also drawn to the consequences of the economic crisis and the huge external debt of countries which inhibits the authorities from querying the environmental consequences of foreign investment projects.

h) Among the main difficulties posed by environmental management attention was drawn to the lack of adequate human and financial resources. Some bodies barely possess enough officials to carry out minimum administrative tasks, thereby making it impossible to properly develop plans and means of control. Furthermore, it was pointed out that in addition to fulfilling their technical role, environmental officials need to be effective social communicators involved in developing community awareness.

Environmental policy in respect of waste management (agenda item 3)

16. In connection with this item, the experts analysed the requirements for implementing environmental management strategies, bearing in mind that several Latin American countries are striving to draw up an environmental policy to allow them to prevent, control or mitigate the environmental impact of different activities. The starting point adopted was that efficient management of the waste produced by society needs a suitable legal and institutional framework, as well as specific instruments such as land management, the establishment of standards, environmental impact assessments, tax incentives and control measures, among others.

17. Environmental policy involves a process of constant definition of those environmental characteristics which are desirable and attainable; community involvement in reaching this definition is considered to be necessary in order to provide broad support for the measures ensuing from the policy.

Furthermore, environmental policy must relate to a specific place and time and take into account the historic and cultural process which defines the relationship between society and nature.

18. In the industrialized countries, environmental policy in respect of pollution has in the past been based on the environmental components water, air and soil. Such an approach has not proved to be the most suitable, as while it has solved certain forms of pollution, the problem has been displaced elsewhere.

19. In addition, it was some time before the policies adopted in respect of solid and hazardous waste were drawn up and the consequences of this delay are nowadays being sharply felt in some countries. In the United States a special fund has been established in order to apply corrective measures to operating and abandoned deposits which cause pollution with serious risks for the environment and health: (in October 1986 a period of five years was established by law for the implementation of these measures, at a cost of US\$8.5 billion, a figure which, in the light of some estimates, would be too low). Other countries, such as the Federal Republic of Germany and Denmark have also adopted similar measures in view of the importance of underground water threatened by waste deposits.

20. Our countries are taking their first steps towards environmental policies, and so far no specific consideration has been given to the problems of pollution. This very fact provides an opportunity to avoid adopting approaches which have been rendered obsolete by the experience of the developed countries. It is necessary to adopt an integral approach to the problems of pollution which recognizes that once waste has been produced, it will have to be incorporated into one of the components of the environment, and in some cases control over one form of pollution may mean that the contaminants are diverted towards other environmental components over which control is less strict. On the other hand, the experts pointed out that it is impossible to neglect concern with solid and in particular hazardous waste. The latter, in particular, may have an irreversible impact which jeopardizes the well-being of present and future generations. In addition, huge amounts of resources which will probably not be available in many countries in the region will be required to reverse the consequences of inadequate waste management.

21. In order to implement the environmental policy it is essential to improve the plan and the legal and regulatory framework; to strengthen institutional organization; to improve environmental training and education as well as community participation. There is no doubt that leadership in these areas must come from the State on behalf of the community. In this connection, it was observed that the neoliberal ideology which has prevailed in a number of countries has undermined the action of the State in areas where it is irreplaceable. It is necessary to develop an awareness that responsibility for the environment could not be left to spontaneous market forces and that, consequently, it was necessary to draw up an environmental policy. In order to pursue this policy it would be extremely useful to be able to count on the participation of social agents, the community, the public administration and firms.

22. The meeting devoted particular attention to the need for the community to participate in defining the environmental objectives which provide the foundations for formulating the policy. In addition, participation represents a valuable instrument for environmental management itself, since it legitimates standards and measures and facilitates follow-up and control. It was observed that Latin America lacks a tradition of community participation in matters of public interest such as the environment. Nevertheless, the three countries present at the meeting had recently returned to the fold of democracy, thereby holding out hope for the development of participative solutions. A major challenge had to be faced in order to design participative programmes capable of enriching environmental policy.

23. Public hearings would constitute a particularly valuable form of community participation for environmental management: these provide an opportunity for discussion within the community prior to adopting decisions in respect of the location of plants carrying on high-risk activities such as treatment plants, atomic power stations and waste deposits and tips; they may also be held in the course of legislative decision-making processes. Although the promise held out by this form of participation is confirmed by the experience of the developed countries, a number of points need to be clarified before recommending its adoption in the countries of the region.

24. Concern was expressed over the need for public hearings to meet the following requirements:

a) The participants must be representative of the conflicting interests.

b) Adequate information must be available on the project under debate as well as on its potential environmental impact; i.e., an environmental impact study must have been carried out in advance in respect of the project and its results made public.

c) The concerns voiced and suggestions made at public hearings, both in respect of the execution of a project and regarding its location and technology must be effectively incorporated into the decision-making process.

25. In addition, it was pointed out that the mere organization of a public hearing was an extremely complex task which could not be improvised. Progress in this area would undoubtedly contribute towards fomenting participation and the exercise of democracy.

26. In order for an environmental policy to be implemented, it is above all necessary for it to be given proper regulatory form through laws and regulations. Although a number of countries in the region have made progress towards designing policies and introducing laws, in most cases, they have failed to adopt an integral approach, but have laid down, in particular, regulations on air and water. As far as solid waste is concerned, legislation is hazy; however, general guidelines have been drawn up which have, in some cases, provided an operational framework for the monitoring of industrial waste.

27. Most countries in the region fail to make a clear distinction, either in their legislation or policies, between waste in general and hazardous waste. In contrast with ordinary waste, hazardous waste has an irreversible impact on the environment and on human health. Consequently, it cannot be released into the environment. Given the treatment to which such waste is subjected prior to its disposal in controlled waste dumps is intended to minimize the risk on the site of deposit. It was observed that from the legal angle, the concept of the "irreversible nature" of the impact was a key to distinguishing between ordinary and hazardous waste. In this respect, there was a similarity between this topic and that of the destruction and disappearance of species.

28. A policy on hazardous waste and legislation embodying such a policy must be based on a definition of the successive stages from the actual production of waste, to its elimination; this is the approach which needs to be adopted if the aim of legislation is to provide clear solutions. Moreover, a means of identifying what types of waste are to be considered hazardous is required. Two basic alternatives were suggested in order to do so: a) the establishment of a limitative list of waste considered as hazardous and to which legal regulations would apply; b) the definition of an overall concept of "hazardous waste" which would include all waste falling within the definition. This approach is considered to be more flexible as it attributes greater responsibility to the public administration; the first solution requires parliamentary action in order to include or eliminate substances from the list.

29. Regardless of the approach adopted in order to define what type of waste is classified as hazardous, any policy and legislation designed to protect against the harmful impact thereof needs to take into account its production, handling, transport, temporary storage, treatment and final disposal.

30. For the purposes of managing hazardous waste it is essential to maintain up-to-date information on the type, amount and composition of the substances produced by the various industrial activities. In order to do so, legislation should establish a system for granting licenses whereby the necessary information would be obtained. This information would make it possible to draw up an inventory of hazardous waste and of its sources, thereby providing a basis for planning and supervising the stages of transport and disposal. In order to ensure permanent supervision over hazardous waste from production to disposal, it was recommended that a manifest similar to that used in cargo transport be adopted. This document would provide a virtual "case history" of the waste, recording all the stages it had passed through and identifying all the agents involved.

31. It was recognized that in spite of the inadequacy and haziness of the legal framework in respect of hazardous waste, administrative provisions had been made at various levels of the public administration in some countries and had contributed towards significant progress in the field, including the establishment of an administrative agency to deal with the problem and waste treatment and disposal firms. However, it was necessary to review the provisions drawn up by technical groups of executive bodies in the light of the wishes of the public and to provide them with the full force of the law. The gradual development of a body of norms did not appear to be the most

efficient means of tackling environmental problems; it is necessary for norms to correspond to an integral concept encompassing the dictates of environmental policy and legislation. Another major aspect which needs to be solved is the harmonization of the national and State legislative processes in countries with a federal structure.

32. Trends in environmental legislation and policies in the Federal Republic of Germany, which is undoubtedly one of the most advanced societies in terms of waste management, constitute valuable experience for the countries of Latin America. Since 1986 West Germany has had a new law on waste management, which was introduced in order to meet the need to amend, for a number of reasons, the prevailing approach. The reasons included the following: a) The transfers of waste from one part of the environment to another which had occurred. During the 1970s concern had focused on preventing air pollution; this had been followed by concern with water and during the 1980s it has been realized that the methods adopted to combat pollution led to further environmental problems. b) The adoption of end-of-pipe technology did not bring about a reduction in waste, whose final destination is the environment, whatever form it may take. In a densely populated country at an advanced stage of industrial development these problems require short-term solutions.

33. The spirit of the new Federal German law reflects two main criteria: a) The reduction of waste generation is given priority over traditional disposal; this implies the incorporation of "clean technologies". Whenever there is a choice between different systems of production, in granting permission for the installation of a plant, priority must be given to those processes which produce less waste, whenever this is both technically and economically feasible. b) It is necessary to improve waste-disposal systems as traditional methods have not always proved adequate. Furthermore, efforts are being undertaken to harmonize criteria at the national level using the overall framework provided by the law. Uniform regulations exist in respect of air and water. However, this is not the case of solid waste as the states have adopted different criteria, a feature which has led to the transfer of waste from one state to another in a process which has been described as "waste tourism".

34. An administrative organization capable of implementing environmental policies and laws is of equal importance to the legislation and policies themselves. The establishment of the appropriate institutions is not in itself sufficient, as they must possess the necessary human and financial resources to carry out their mission. A number of examples may be found in Latin America where the creation of environmental agencies has not been accompanied by the provision of the means required or where a gradual dismantling has taken place as a result of the restrictions which have characterized national economies in recent years. It was undoubtedly in this area that the real political will to tackle environmental problems was put to the test.

35. From an administrative angle, hazardous waste management poses no major difficulties, as the production processes which generate such waste have been clearly identified. Since it is relatively easy to identify both the producer and the waste itself, proper follow-up of the path followed by the waste is

capable of ensuring that it is properly treated and disposed of. The main responsibilities of the administrative authorities are as follows:

- a) licensing the initiation of waste-producing activities;
- b) establishing requirements for the temporary storage of hazardous waste;
- c) ensuring that the waste is transported by technically suitable means;
- d) ensuring that treatment and disposal are carried out in the most satisfactory manner possible as far as human health and the environment are concerned;
- e) disseminating the relevant information for consultation by individuals and supervisory agencies.

36. The specific characteristics of a country and a locality need to be borne in mind in deciding as to the most appropriate form of ownership and management for hazardous waste treatment plants and deposits. There is no need for them to be State-owned; it is in fact desirable for their construction and operation to be entrusted to the private sector since it is necessary to muster considerable financial resources and apply sophisticated technologies. However, the relevant authority must maintain tight control over the technical competence of the firms running the installations. It was considered important that responsibility for the proper handling of waste should be borne by those who produce it, and not by the State. In addition, it is necessary to clearly define internal procedures and responsibilities for each stage of the process within both the public administration and those firms which treat and dispose of waste. It is essential for those responsible to be identified should any mishap or accident occur.

37. In respect of the specific instruments available to the authorities for efficient waste management, attention was drawn to the importance of "land planning" in so far as it seeks to organize the spatial distribution of production processes and other social activities. It is necessary to harmonize these decisions with the national and regional development plans and to provide them with a legal basis and administrative organization. Standards relating to land use and occupation patterns constitute a valuable instrument for environmental policy; the efficiency of other instruments depends on this preventative form of control. However, physical planning is a complex process as it needs to incorporate all socioeconomic variables. The mere existence of plans is no guarantee that space will be allocated as planned, as considerable pressure is brought to bear by the different interest groups in society. The alterations undergone by urban plans as a result of pressure from the population, and whose initial rationale is broken up as a result, are an example of this.

38. In Brazil, other instruments of waste management laid down by law include systems of permits and licenses; quality standards for effluent and waste emissions; environmental impact assessments and, finally, incentives and sanctions. Licenses take into account the location and proposed technological processes; a preliminary analysis makes it possible to decide

as to the need for an environmental impact study which normally has to be submitted by those responsible for the project. An application for a license to construct an industrial plant must include a description of the proposed measures for treating or recycling waste emissions, and which make up a "follow-up plan". It must also include some elements of risk evaluation and emergency plans. From the administrative angle the system of licenses has proved efficient, although project analysis requires the work of several technicians thereby entailing a certain cost; the present trend is for this cost to be borne in part by those responsible for the project.

39. In addition, the criteria used in analysing the projects should be broadened so as to make the objective of minimizing possible environmental impacts an integral part of the search for rational resource management. Emphasis is usually placed on concerns about potential impacts, while little or no analysis is conducted with a view to ensuring the efficient use of the natural resources and energy in the processes involved. Furthermore, in view of the rapid progress being made with respect to scientific and technological know-how, it would be useful to establish an expiration date for such licenses so that plants could be evaluated periodically and flaws that had not been detected at the outset could be corrected.

40. As regards the question of standards, in some cases quality standards for water resources have been established in order to safeguard public health, and emissions standards have been set for liquid effluents from industries. Regulations on motor vehicle emissions also exist whose fulfilment would require producers to make changes in vehicle assembly procedures. Such standards have proved to be an effective tool, especially when they have provided a means of substantiating reports of failures to comply with the regulations. However, these standards are often based on the regulations instituted by other countries, with no prior analysis having been made of the feasibility of applying them to the local situation. This gives rise to a problem in respect of the legitimacy of such standards for the community adopting them and may also mean that the authorities will lack the means to implement them, since they often have neither the technical capabilities nor the personnel they need in order to carry out the required measurements and monitoring.

41. A major external impetus has been provided for environmental impact studies and assessments by the fact that international lending agencies and development assistance organizations have begun to include such analyses among their requirements for the approval of project financing. These studies and assessments are a preventive mechanism whose purpose is to identify and evaluate possible impacts and thus to prevent their occurrence or minimize their negative effects. These methodologies should be incorporated into the project cycle itself to ensure that the studies are not carried out after the project has already been initiated, when it is no longer possible to alter the decisions taken with respect to siting and technological options. A number of difficulties will have to be overcome in order to ensure that these studies and assessments will serve as a valuable environmental management tool. These include the need for information concerning the ecosystems involved, the technical capabilities and financial resources required in order to conduct the studies, and procedures by which the results of such studies are taken into account in the project decision-making process.

Finally, a response which has proved more effective in dealing with failures to comply with the standards is the imposition of penalties such as fines, plant closures and disqualification for certain tax benefits. However, it is difficult to co-ordinate the activities of environmental institutions with those of the agencies which grant tax incentives.

42. It should be noted that, although a continuing effort should be made to refine the above-mentioned environmental management tools, their effectiveness in guaranteeing an appropriate management of industrial wastes will depend on the capacity of the administering organization. In order to achieve greater efficiency in this area, it may be necessary to decentralize many management activities at the municipal level, as well as to promote the training of human resources and community participation, especially as a means of exercising social control.

The industrial sector, location and the development of technology in the field of waste management (agenda items 4 and 5)

43. The prime objective of industrial activity is to provide good-quality, reasonably-priced goods and services which meet the needs of the community. In addition, industrial enterprises perform other social functions, including the minimization of the environmental impacts of their activity. The experts emphasized that these factors should be taken into consideration in designing environmental policy and measures for industrial waste management which must, moreover, be in keeping with the specific characteristics of the industry in question in each given country. As more and more is learned about the connection between industrial development and environmental quality, the clearer it becomes that an efficient strategy for co-ordinating these objectives cannot be based solely on the use of environmental policy tools, inasmuch as such an approach may well result in a concentration on the symptoms rather than the causes of the problems involved. Therefore, if environmental considerations are to be effectively incorporated, it is essential that attention also be devoted to other spheres of decision-making and planning, including economic policy and especially industrial policy, industrial location and the development of science and technology.

44. The location of industrial activities is based on criteria having little to do with environmental conservation; these include the proximity to markets, the availability of manpower, marketing facilities and other services, and access to inputs. Another very important factor has been the availability of water for the production processes, for washing operations and refrigeration and for waste disposal. The fact was noted that the demand for water for industrial use has spiraled in some countries of the region. Thus, the characteristics of certain zones have prompted the formation of burgeoning industrial enclaves in some countries. It was mentioned that, in Brazil, a single region --the central/western zone-- contains 80% of all of the industrial cities in the country, while in Argentina industry is heavily concentrated in the Rosario-Buenos Aires-La Plata corridor. Unlike the industrialized countries of Europe and Japan, the above-mentioned countries possess vast, lightly-populated territories; this circumstance does not make the environmental impact of industry any less significant, however, because

the majority of the national population is concentrated in the industrial areas.

45. In many cases industries have been established in marginal, sparsely-inhabited zones around which a populated belt has subsequently formed as a result of urban growth. Due to the shortage of space in such industrial zones, in some cases it has become impossible to set up on-site treatment plants. These problems are thus associated with the absence of ordinances whereby specific areas would be earmarked for certain land uses. It was observed that the many prerogatives accorded to private property in capitalist systems make it difficult for the State to play a decisive role in the location of industrial activities. As a general rule, an indicative type of planning is used, which may then be reinforced by the designation of protected areas, the promotion of industrial parks and the establishment of industrial siting regulations in areas where pollution has reached critical levels.

46. It was pointed out that the authorities need to take an extremely conscientious approach when designing initiatives to promote the establishment of industrial activities in given areas (usually economically-depressed zones) because a lack of continuity with respect to such incentives may foster a disregard for the environment on the part of industrial enterprises by causing them to perceive their presence in a given area as temporary. This may thus heighten the deterioration of the environment, in addition to having the other negative social repercussions associated with a situation of this sort.

47. The increasing importance attributed to environmental issues in the developed countries has prompted technological innovations in connection with both waste disposal and low-waste processes. Reference is thus made to "two generations" of environmental protection technology. The "first generation" includes waste treatment processes for effluents and emissions ("end-of-pipe technology"). While these processes represent a solution for certain types of pollution, they do have their limitations; in the long run industrial waste, albeit converted into a different form, is nonetheless discharged into the environment, and waste treatment requires what are sometimes very costly inputs of materials and energy. A "second generation" of environmental technology is made up of what are known as "clean technologies", which modify production processes in such a way as to reduce the amount of waste that is generated by permitting a more efficient use to be made of raw materials. These technologies have made it possible to meet environmental targets and, in some cases, to achieve a higher level of economic profitability.

48. The situation in Latin America has not been conducive to the development and adoption of environmental technologies. Apart from the traditional problems which have hampered the development of science and technology in general, the absence of environmental policies has meant that few demands have been made in this respect. Some highly valuable initiatives have, however, been undertaken in the field of treatment technologies. In Argentina, for example, the National Institute for Industrial Technology (INTI) has an environmental engineering research centre which has developed basic engineering processes for the treatment of liquid and gaseous effluents and which carries out joint projects with the School of Engineering of the

University of Buenos Aires. The work of this Centre has led to the conclusion that, inevitably, all treatment systems ultimately generate solid wastes and that it is therefore of the utmost importance that a programme be carried out for the treatment and the transport of such waste to its final disposal site. It is interesting to note that this Centre is comprehensive in its coverage and that it conducts its activities in close co-ordination with the specific centres existing for each branch of industry. Another concern in this regard is the provision made for treatment systems in the planning of industrial parks. In Uruguay as well, the national university is carrying out projects concerning waste recovery in the tanning, dairy and wool-scouring industries, among others.

49. The extent to which clean technologies could be applied in Latin American countries largely depends upon the rate of productive investment. If the construction of new plants increased the existing capacity and clean technologies proved to be economically attractive, then a well-directed environmental policy could bring progress in this regard. Perseverance in the application of regulations and incentives and their co-ordination with industrial policy measures are also regarded as important. Nonetheless, the adoption of clean technologies should be based on pragmatic criteria which take their social cost into account. The fact must be borne in mind that the natural, human and financial resources available to the developing countries differ greatly from those of the centres where such technologies are developed. Furthermore, a lack of selectivity may result in the acquisition of technologies which have been discarded for environmental reasons in their countries of origin. The need to protect the environment thus provides further grounds for the argument that the countries' capacity for selecting appropriate technologies ought to be upgraded and expanded. It was also commented that clean technologies do not always require a large investment; in some cases, the use of quite simple yet ingenious techniques can convert a polluting technology into a relatively non-polluting one. The interests of entrepreneurs and the skill of technicians and experts are significant factors in this connection.

50. Special emphasis was placed on the fact that the search for technological solutions to the environmental problems associated with industrial activity should be viewed as a constructive challenge for the entrepreneurial sector and for centres of scientific and technological development. It was recommended that an analysis be undertaken of the actual possibilities of obtaining the required equipment and facilities from domestic industry; to this end, it would be helpful to break down in so far as possible, the imported technological packages which include treatment technologies into their component parts. The demands created by environmental policy create an opportunity for the capital-goods industry to develop a domestically-produced supply of equipment to be used in adapting production processes to the prevailing requirements.

51. In this connection, it is vital that channels of communication be established among the various branches of industry with a view to specifying the nature of the potential demand and the possibilities of satisfying it; as is also the case with other initiatives in this area, co-operation among countries may offer promising opportunities. The experts stressed that such initiatives will only be meaningful if a legal and administrative framework

exists for the implementation of environmental policy and, above all, if the corresponding regulations are consistent over time and are in keeping with industrial and technological policies.

52. A subject regarded as being of particular importance was that of international trade in polluting technologies and hazardous products and substances. From the standpoint of the importing country, it was considered urgent that environmentally-based criteria be developed for the selection of technologies. As regards the issue of hazardous products, it is a known fact that the Latin American countries import a number of substances, including certain pesticides, whose use is either banned or highly restricted in the countries which produce them. The United Nations system is making an effort to provide information to the countries so that they will be able to take the necessary preventive measures in this connection. A very interesting point raised by one of the experts from the Federal Republic of Germany in this regard was that this problem not only affects the receptor countries of polluting industries and products, but also has an impact on the country providing them. This topic has sparked a wide-ranging debate, especially in relation to the importation from developing countries of foodstuffs having a high chemical content. In respect of polluting technologies, the public is highly sensitive to the need to refrain from transferring technologies to the developing countries which have been discarded for environmental reasons by the industrialized centres. An exchange of information concerning available technologies and their environmental implications was considered to be highly important. It is essential for the central countries to have information about the legal provisions of the countries receiving investment and technology so that they may gauge the extent to which an "emigration" of industries in search of more permissive conditions might take place. In relation to this topic, the experts agreed that appropriate and effective regulations and controls in the receptor countries are vital in order to curb the incorporation of obsolete, environmentally-harmful processes and the importation of hazardous products.

53. It was noted that the incorporation by industry of clean technologies is also contingent upon an improvement in the countries' economic situations and upon their perseverance in applying environmental policies. Given the idle capacity existing in many branches of industry, it is not very realistic to expect them to overhaul their technology in the near future. Nevertheless, in view of the irreversibility of the environmental damage associated with hazardous wastes, attention must be devoted to this problem immediately and resources must be provided for its study. For the moment, this effort should focus on the treatment of these wastes and the implementation of measures for their suitable disposal with a view to putting a stop to their uncontrolled discharge into the environment. Preserving the environment for future generations and avoiding accidents that would take a large toll in victims is a responsibility of the whole of society.

54. The technology used in constructing hazardous waste treatment plants and sanitary landfills is similar throughout the world although the content of the waste treated varies in accordance with the type of industry present. During the seminar a detailed presentation was made of two interesting experiences in this connection. The first of these related to the case of the State of Hesse in the Federal Republic of Germany, where in 1972 a law was

promulgated which established the constitution of a company for the elimination of special kinds of waste (Hessinche Industriemell GmbH). The majority of the shares in this non-profit making company are owned by the State, and 30% of them are in the hands of the leading industries. The other case presented was that of the metropolitan area of the city of Buenos Aires, where a public enterprise for the ecological co-ordination of the metropolitan area (Coordinación Ecológica Area Metropolitana Sociedad del Estado - CEAMSE) has been established under articles of incorporation between the municipality of the city of Buenos Aires and the Province of Buenos Aires. This enterprise has assumed responsibility for the final disposal of waste using the sanitary fill system and in 1980 embarked upon a project to deal with the problem of the elimination of potentially hazardous industrial waste, which calls for the construction of a plant for treating the material involved and of a sanitary landfill for it.

55. The objectives of the project formulated by CEAMSE for the treatment of hazardous waste are to service waste generators without treatment facilities of their own and to provide for adequate final disposal of industrial waste on the basis of environmental and economic criteria. Bidding has been opened for the construction and operation of the necessary facilities, and 18 consortia of specialized enterprises submitted bids. Responsibility for the total investment for the execution of the project will be taken by the enterprise to which the contract is awarded, and after a period of 15 years, the fixed facilities will become the property of CEAMSE. In spite of the fact that all the project studies have been carried out, the construction of the plant has been delayed by objections raised by some of the municipal governments in whose jurisdiction it had been planned to locate the facilities. The absence of legislation applicable specifically to hazardous waste and the lack of awareness concerning the effects it can have have been responsible for the delay in the implementation of this pioneer project in South America.

56. The experts referred to the attitude of management to environmental questions and noted that it varies depending on the size, technological characteristics and type of ownership involved. Greater interest in monitoring environmental impact is observed in the case of large enterprises engaged in production and extraction since the social image they project is important to them. In addition, such enterprises enjoy easier access to financial and technological resources which can facilitate the incorporation of waste treatment processes. There are cases in which industries have on their own initiative applied to technological research centres in search of solutions to the problems involved in treating and disposing of waste. Medium-sized and, more especially, small enterprises show less concern for this subject, and it seems recommendable that authorities take the initiative in identifying solutions for these sectors which would be feasible from a technical and economic point of view. One of the priority tasks will be to inform entrepreneurs of the environmental damage associated with their operations and make them aware of these problems.

57. Environmental policy and management cannot be viewed in isolation from the economic situation of countries; establishing unrealistic goals and inapplicable measures weakens the environmental cause which must above all be linked to the cause of development viewed from an integral perspective. The

priorities of the countries of the region are still the achievement of higher levels of income for the majority of the population, the creation of sources of employment, the development of exports, the satisfaction of basic needs in the fields of health and education and the development of basic infrastructure. Industry has an essential role to play in the achievement of these objectives, and it is well to avoid the expressions of hostility engendered by some extremist environmental publications. The real need is to promote concerted action towards harmonization with environmental goals.

58. Finally, the participants recognized that the meagre representation of the industrial sector at the meeting constituted a significant constraint on in-depth discussion under this item of the seminar's agenda. Although the organizers had sent invitations to a number of representatives of this sector, only two participants, who certainly did a great deal to enhance the debates, were present in that capacity. It was also noted that workers groups should also participate in this kind of meeting. It was interesting to learn of occasions on which labour groups had reacted unfavourably to measures and sanctions taken against enterprises for having transgressed environmental provisions; this kind of reaction has taken place in defense of the stability of job sources. There can be no doubt that environmentalists and those responsible for environmental management have a large responsibility for the creation of channels of communication with these sectors for purposes of bringing them into the achievement of environmental goals.

III. RECOMMENDATIONS

59. It was recommended that national and provincial environmental authorities should promote studies to facilitate diagnosis of the situation with regard to industrial waste. In this exercise it will be necessary a) to identify the generators of waste, especially that regarded as hazardous; b) to determine the characteristics of such waste and the volume in which it is generated; c) to trace the route along which waste travels to its final destination; d) to assess the present and potential effects of traditional approaches to management and disposal and e) to select priority areas in which solutions should be sought.

60. On the basis of the studies and information available, authorities, community organizations concerned with the environment, academic groups and the scientific community should create awareness concerning the problems which have arisen and problems which might arise from inadequate management of industrial waste and also concerning other environmental effects of productive activity. In the dissemination of information, it is advisable to proceed with caution in order to avoid the formation of hostile attitudes to industry but instead to promote the idea that in this sector a responsibility should be shared by the various social agents. To this end, it is necessary for environmental matters to be presented in an integrated perspective of their physical, socioeconomic, cultural and technological aspects.

61. It was recommended that international forums at which experts and government representatives concerned with environmental issues gather should be used to promote co-operation among countries in the adoption of policies and special legislation on hazardous waste, in which adequate consideration is given to the stages represented by the production, handling, transport, storage, treatment and determination of the final destination of waste. The basic points to be taken into consideration by any policy in this field may be found in a document containing a draft of guidelines for the rational environmental management of hazardous waste,*/ which can be adopted by countries and brought into line with their own special needs.

62. It was recognized that the legislative branch must play a fundamental role in the study and promulgation of effective, realistic environmental laws. In this field, it was recommended that legislators, in particular those on specialized committees, should consolidate their parliamentary power by strengthening their technical capacity. Exchanging views with government

*/ See UNEP GT-9514.

experts and scientific groups can be of great value, and it is felt that international bodies such as ECLAC, ILPES and UNEP should promote specialized seminars to strengthen legislative capacity in environmental matters through exchange of experiences among countries of Latin America.

63. In view of the fact that hazardous industrial waste can cause severe and irreversible damage to the health and the environment by gradually entering the environment and through accidents caused by the way it is handled, the experts consider that its adequate treatment and disposal must be ensured without delay. It should be recommended to development financing bodies, such as the Inter-American Development Bank and the World Bank, also without delay, that they be particularly receptive of projects submitted to them for their consideration in this connection.

64. It was recommended that the environmental authorities and administrative bodies responsible for managing industrial waste should organize forums and establish channels of communication with representatives of the various branches of industry. It is necessary that consideration be given both to sectors which need to incorporate processes and technologies for controlling their discharge of wastes and to those which might provide the equipment and facilities for such purposes while at the same time seeking opportunities to make the national production of these industries more dynamic. Consideration should also be given to possibilities of finding support in Latin American organizations in the fields of engineering, industrial development and capital goods. The experts believe that bodies such as ECLAC, ILPES and UNEP can act to promote the holding of workshops and seminars at national and multinational level.

65. It was recommended that administrative bodies responsible for waste management should seek the collaboration of universities and research centres with a view to acquiring more knowledge concerning the environment and facilitating the measurements and proofs needed if standards of environmental quality and discharge of wastes are to operate effectively. Environmental agencies should create a demand for professionals who promote the formulation of study plans and should generate interest in specialization in these matters.

66. In view of the fact that diverse social actors, whose interests often conflict, play an active role in the preservation of the environment and that an underlying consensus is needed to ensure the efficiency of an environmental policy, the experts participating in the seminar-workshop and the bodies which organized it were urged to promote studies analysing the possibilities for organized participation by the community in the design of environmental strategies. In particular, there is need to study the governing concepts and, in particular, the operating techniques and mechanisms of the forums for public hearings of which particular note has been taken in the debates held at this meeting.

67. During the seminar-workshop, the experts noted the dearth of information exchange and co-operation among the environmental bodies of the countries represented and expressed the view that the substantial advantages to be derived from such co-operation were not being seized. In view of this situation, the representative of the Brazilian Association of Environmental

Agencies (ABEMA) offered to promote action to formalize the establishment of an association of environmental bodies for Latin America and the Caribbean and national, regional and provincial chapters of such a body. To promote this initiative, support was invited from the UNEP Regional Office for Latin America and the Caribbean.

68. Considering the great importance of the subject of the international trade of industries which are potential contaminators and produce articles harmful to the environment of the countries receiving them as well as to the countries in which they are produced, the expert from the Federal Environmental Agency of the Federal Republic of Germany recommended that the exchange of experience and the co-operation referred to in paragraph 65 should not be limited to countries of the region but that permanent links should also be established with environmental agencies in industrialized countries such as his own.

69. In view of the progress made in the Federal Republic of Germany in the task of collecting and systematizing information on productive methods and processes which generate little waste, it was recommended that environmental agencies of Latin American countries should ask the authorities of the Federal Republic of Germany to help them obtain this kind of information, which can also be disseminated among industrialists, technological development centres and schools of higher education. A special effort should be made to ensure that such information is taken into consideration in authorizing the installation of both national and foreign-owned industries. It was recognized that an important role was being played in this area by the UNEP Industry and Environment Office through its various publications.

Anexo 1/Annex 1

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Anexo 2/Annex 2

LISTA DE DOCUMENTOS/LIST OF DOCUMENTS

<u>Símbolo/Symbol</u>	<u>Título/Title</u>
LC/R.603 (Sem.41/1)	Temario provisional.
LC/R.604 (Sem.41/2)	Temario provisional anotado.
LC/R.599 (Sem.41/3)	Problemas y posibilidades de la gestión del medio ambiente en América Latina con especial referencia a la problemática de los desechos sólidos.
LC/R.600 (Sem.41/4)	La dimensión ambiental en las estrategias de desarrollo: Limitaciones y perspectivas.
LC/R.601 (Sem.41/5)	Resultados del seminario sobre la aplicación de los estudios de impacto ambiental en la planeación de la disposición de los desechos sólidos urbanos e industriales generados en una ciudad.
LC/R.602 (Sem.41/6)	Desarrollo industrial: Generación y manejo de los residuos. Elementos para una discusión.