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INTERNATIONAL WORKSHOP ON :

"TECHNOLOGICAL AND MANAGEMENT ASPECTS FOR RECYCLING AND REUSE OF SOLID WASTES IN LATIN AMERICA"

FINAL TECHNICAL REPORT

UNIDO PROJECT No. : TF/GLO/96/105
UNIDO Contract No. : 98/226

Organized by :

FACULTAD DE CIENCIAS QUIMICAS
UNIVERSIDAD AUTONOMA DE NUEVO LEON
MONTERREY, NUEVO LEON (MEXICO)

OCTOBER 1998

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INTRODUCTION

Because the fast growth of industrialization, wastes generation is a heavy problem worldwide. Almost all manufacturing processes as well as human and animal activity generate a mixture of wastes so called "trash", which is very hard to profit without a previous treatment and separation. Two factors are the main causes of preoccupation : the volume rate increase of wastes generation and its toxicity grade. On the other hand, since long time ago it is recognized that materials technology is a clue part of the development of the medium and advanced technological industry. This is particularly true along the border with Mexico, where materials industry share the major segment of industrial and business community.

Modern metallurgical activities of ferrous and non-ferrous materials, as well as the new industry developed at present days related with synthetic materials, have been increased in the last years. Besides metals, a development of other industries related to metals has occurred, among which can be mentioned : ceramics, glass, refractories, petrochemistry based synthetic materials, plastics and composites. Modernization of existing industries must include a well structured strategy in order to protect ecosystems, increase energy efficiency and be congruent with the constantly emerging technology development.

Therefore, it is important promote a culture of recycling and reuse of wastes as a better alternative than the traditional way to confine them.

The use of alternative raw materials in the industrial production processes could represent competitive advantages, as well as a great contribution to environment protection.

WORKSHOP JUSTIFICATION

Mexico is an important educational and economic force in Latin America. Major mexican industries are concentrated in Northern Mexico, especially, in Monterrey. UANL, through "Facultad de Ciencias Químicas" (Faculty of Chemical Sciences) has proven experience organizing postgraduate courses, seminars, congress, symposiums and workshops. In fact, we have recently established a graduate ceramics program, with support of CONACYT (National Research Council) and nowadays, we are interested on recycling matter.

Since the beginning of 90's, in the northern part of Mexico, specially in Monterrey and the border line with USA, started a growth of several recycling industries, specially in the field of foundry and cement. Actually, there are many recycling companies that are taking position in the recycling market in petrochemistry, ceramics, glass and municipal waste.

The goal of the workshop on Technological and Management Aspects for Recycling of Solid Waste in Latin America organized by the UANL and ICS-UNIDO, is to look forward the growth of the recycling market in Mexico and push to make the recycling an integral process with the support of the Materials Science, and looking for the development of real alternatives for recycling waste in the Latin America Region.

OBJETIVES OF THE WORKSHOP:

General

To increase the percentage of wastes that could be recycled and reused and to help growing the enterprises' market that supply an effective treatment of solid wastes, mainly for medium and small industries.

Specific :

- To make the participants sensible on the need to recycle and reuse as a better alternative rather than looking for the final disposal of wastes.
- To present various technological alternatives to give added value to wastes in order to convert them into Alternative Raw Materials (ARM).
- To discuss some alternatives for commercialization viability of such wastes. (Review successful experiences).
- To identify wastes with potential application as ARM, being currently stored or disposed.
- To identify obstacles for their commercialization, via reuse or recycle.
- To involve state government to encouragement the wastes recycling with reuse possibilities as ARM rather than disposing them.

VENUE AND DATE

The International Workshop was held at Biblioteca Magna Universitaria "Raúl Rangel Frías", in Monterrey, N.L. (Mexico), from 5th to 9th of October 1998.

ORGANIZATION

The workshop was organized by Facultad de Ciencias Químicas, Universidad Autónoma de Nuevo León and sponsored by ICS-UNIDO with a contribution for the activity of USD 45,000.

Facultad de Ciencias Químicas assumed the responsibility as contractor and hosting institution.

PARTICIPANTS

Course publishing was made by newspaper announcement. Furthermore, a specially designed brochure with all the interest information concerning the workshop and invitations via fax, post mail and electronic mail were circulated through technicians and personnel in charge of recycling enterprises as well as with ICS and Dr. Jesús Rincón contact persons.

The participants final selection was made by Facultad de Ciencias Químicas through evaluation of the curricula and the application form returned by the candidates.

The educational level of the participants was rather high and most of them had a degree in technical fields or experience of several years as technologists operating in the recycling sector as directors, managers or coordinators in their companies or research institutions.
A total of 45 technologists and technicians of the recycling (or related) sector were chosen taking into consideration their relevant background and their region of origin, in particular from Latin America.

As for financial contribution, 10 participants coming from several countries such as México, Perú, Colombia, Venezuela, Bolivia, Brasil and Argentina were fully supported by ICS (daily subsistance allowance and travel expenses).

No registration fees were requested.

A complete list of names and addresses of participants is reported in Annex 1. This is separated out on participants fully supported by ICS and those who didn't.

MATERIAL DISTRIBUTED

Together with copies of the above mentioned brochure (containing all the general information of the workshop) participants were also given a copy of the lectures imparted by the speakers.

WORKSHOP PROGRAMME AND METHODOLOGY

The workshop was organized in five days of lectures given during the mornings. Every afternoon specific discussion was held (team work) by chatting, supplying this way the general conclusions per day. Also, three afternoons were dedicated to visit field plants.

The topics were the following :

Monday, October 5th	Recycling of container glass in the glass industry.
Tuesday, October 6th	Recycling in ceramic, refractories and cement/concrete industries.
Wednesday, October 7th	Recycling in mining, foundry, and siderurgy industries.
Thursday, October 8th	Recycling of municipal wastes.
Friday, October 9th	Principles of controlled vitrification/ devitrification of inorganic industrial wastes.

Fifteen lecturers gave same number of lectures along all the workshop. Ten of them were fully or partially supported by ICS. A complete directory of all lecturers is listed on Annex 2.

There was a Coordinator each day who had the task of selecting the speakers, moderating the discussion and control the time for answering questions after each lecture, leading the discussion during chatting and helping to generate the conclusions of the day.

A person devoted effort to process the information gathered on chatting and producing so the conclusions per day and the general conclusions.

In order to do this, it was previously prepared for him, a questionnaire which was answered by each participant on chatting.

Also it was made a round table on the recycling projects implementation in the ceramic industry, the second day of the workshop.

A complete programme is attached in Annex 3.

The proceedings of the workshop were collected by the local organizers and given to Dr. Jesús María Rincón for editing and preparation of the manuscript.

FIELD VISITS

Three visits were included in the programme :

- Monday, October 5th: A visit to the plant "Procesadora de Materias Primas (Raw Materials Processing" in Guadalupe, Nuevo León (Monterrey suroundings), which allowed participants to see how the glass cullet is processed to be able to recycling into glass formulations.
- Wednesday, October 7th: A visit to the plant "NEMAK, S.A." located at Villa de García, Nuevo León (Monterrey, surroundings) where participants saw the case of a successful plant that recycle automotive "monoblocks" made of aluminium.
- Thursday, October 8th: A visit to "SIMEPRODESO SANITARY LANDFILL" at Km. 10 Colombia Road (Monterrey surroundings). This plant is the Municipal landfill where the solid wastes generated in Monterrey and its metropolitan area are concentrated and the final deposition of them is made. Here, participants could inspect some deposits of different sizes, laboratories and could hear about future plans of this company.

SOCIAL EVENTS

In order to achieve better integration among the group, a social event was organized. A dinner was offered the fourth day of the workshop. The participants, lecturers and organizers heard music of mexican folklore into an environment of great comradeship. In fact, it was achieved a very nice integration of the group, since the beginning and throughout all the workshop.

WORKSHOP EVALUATION

Workshop evaluation was sought by asking the participants specific questions by means of chatting. Results are summarized and enclosed to this report in Annex 4.

COMMENTS AND CONCLUSIONS

A comprehensive review of the four most important recycling of related industries in Monterrey and its surroundings was made. All topics were theoretically illustrated in room classes, and then some were practically showed during visits to local industries. Fifteen lecturers were illustrating same number of lecturers given at the workshop. Four coordinators were moderating the questions of participants and were leading the discussion on chatting. Also, they got the field visits to plan and lead the group into these, giving wide explanations concerning the process that the participants saw.

A facilitator processed all the collected information by means of the specially design questionnaires and generated the conclusions of the workshop.

This selection process of the participants led to the formation of an homogeneous group in terms of background and competencies facilitating so, spontaneous interaction and great interest of the local industries as well as of recycling related people from Latin America.

The group results can be seen in the web accessing the following electronic address :

http ://www.bmu.uanl.mx/amqi

The proceedings of the workshop were collected by the local organizers and given to Dr. Jesús María Rincón for editing and preparation of the manuscript.

Leticia M. Torres

Dr. Leticia M. Torres Guerra

ANNEX 1

PARTICIPANTS TO THE INTERNATIONAL WORKSHOP:

"TECHNOLOGICAL & MANAGEMENT ASPECTS FOR RECYCLING & REUSE OF SOLID WASTES IN LATIN AMERICA"

DIRECTORY OF PARTICIPANTS

PARTICIPANTS FULLY SUPPORTED BY ICS

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ANNEX 2

LECTURERS OF THE INTERNATIONAL WORKSHOP:

"TECHNOLOGICAL & MANAGEMENT ASPECTS FOR RECYCLING & REUSE OF SOLID WASTES IN LATIN AMERICA"

DIRECTORY OF LECTURERS

LECTURERS FULLY SUPPORTED BY ICS

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ANNEX 3

Workshop : "Technological and Management Aspects for Recycling and Reuse of Solid Wastes in Latin America"

WORKSHOP PROGRAMME

MONDAY, OCTOBER 5TH.

RECYCLING OF CONTAINER GLASS IN THE GLASS INDUSTRY

8 :00-8 :20	Inauguration and welcome to participants .
8 :20-8 :25	Introducing of the Coordinator **Hiram Peón Lara** (Vitro Corporativo, S.A.)
8 :25-9 :40	Lecture : "Options for Glass Containers Recycling in Latin America" by **Eliseo de Pablos y Viejo**
9 :40-11 :10	Lecture : "Regulations Comparison for Glass Containers Recycling among Industrialized and Developing Countries" by **María Celina Moreira Romero**
11 :10-11 :30	Coffee Break
11 :30-13 :00	Lecture : "Ecological Cullet Specifications for its use in the Glass Containers Industry" by **Faustino Villarreal Moreno**
13 :00-14 :00	Lunch
14 :00-15 :30	Visit to **"Procesadora de Materias Primas"** at Guadalupe, Nuevo León.
15 :30-16 :00	Coffee Break
16 :00-18 :00	Specific Discussion by Chatting- Team Work.
18 :00-18 :30	General Conclusions.

TUESDAY, OCTOBER 6TH.

RECYCLING IN CERAMIC, REFRACTORIES AND CEMENT/CONCRETE INDUSTRIES

8 :00-8 :15	Introducing of the Coordinator **Dr. Waltter López González** (Cemex, S.A.)
8 :15-9 :30	Lecture : "Ceramic Materials from Waste Silica" by **Dr. César Gerardo Díaz Trujillo**
9 :30-11 :00	Lecture : "Reuse of Gypsum Moulds from the Ceramic Industry, into the Cement Industry" by **Dr. Waltter López González**

11 :00-11 :30 Coffee Break

11 :30-12 :15 Lecture : "Ecological Cullet Alternative in the Frits Fabrication for Glass Coloring" by **Faustino Villarreal Moreno**

12 :15-14 :30 Lunch

14 :30-16 :00 Round table on the recycling projects implementation in the ceramic industry.

16 :00-16 :30 Coffee Break

16 :30-18 :00 Specific Discussion by Chatting- Team Work.

18 :00-18 :30 General Conclusions.

WEDNESDAY, OCTOBER 7TH.

RECYCLING IN MINING, FOUNDRY AND SIDERURGY INDUSTRIES.

8 :00-8 :15 Introducing of the Coordinator **Ernesto Neávez Camacho** (Gestoría Ambiental, S.A.)

8 :15-9 :30 Lecture : "Integral Recycling of Brass Foundry Wastes" by **Luis Ponce Pacheco**

9 :30-11 :00 Lecture : "Experiences on Wastes Reuse of Gold and Silver Mines" by **Dr. Hiram Medrano Roldán**

11 :00-11 :30 Coffee Break

11 :30-13 :00 Lecture : "Catalyzers Recycling Technologies" by **Zenón R. Llanos**

13 :00-14 :00 Lunch

14 :00-15 :30 Visit to **"Nemak, S.A."** at Villa de García, Nuevo León.

15 :30-16 :00 Coffee Break

16 :00-18 :00 Specific Discussion by Chatting- Team Work.

18 :00-18 :30 General Conclusions.

THURSDAY, OCTOBER 8TH.

RECYCLING OF MUNICIPAL WASTES.

8 :00-8 :15 Introducing of the Coordinator **José Manuel Vázquez Juárez** (Simeprode, S.A.)

8 :15-9 :30 Lecture : "Establishment of Classifying Plants at Mexico City. Technical and Social Challenges" by

Rosalba Cruz Jiménez and Ramón Valverde Martínez.

9 :30-11 :00 Lecture : "Municipal Wastes Recycling in Latin America. Present Situation and Future Perspectives" by
Francisco Zepeda

11 :00-11 :30 Coffee Break

11 :30-13 :00 Lecture : "Simeprodeso By-Products Classifying Plant for Recycling. Strategy for Self-Sufficiency" by
Guillermo Castillo Caballero

13 :00-14 :00 Lunch

14 :00-16 :00 Visit to **"Simeprodeso Sanitary Landfill"** at Km. 10 Colombia Road.

16 :00-18 :00 Specific Discussion by Chatting- Team Work.

18 :00-18 :30 General Conclusions.

FRIDAY, OCTOBER 9TH.

PRINCIPLES OF CONTROLLED VITRIFICATION/DEVITRIFICATION OF INORGANIC INDUSTRIAL WASTES.

8 :00-10 :30 Lecture : "Principles of Controlled Vitrification/Devitrification Process of Inorganic Industrial Wastes" by
Dr. María Soledad Hernández Crespo

10 :30-11 :00 Coffee Break

11 :00-12 :30 Lecture : "Practical Examples of Controlled Vitrification/Devitrification of Industrial Wastes for the Production of Glass and Ceramics" by
Dr. Maximina Romero

12 :30-13 :30 Lecture : "Construction and Demolition Debris Samples Make Concrete with Tensile Strength above Primary Aggregates Concrete" by
Dr. Paulino E. Coehlo

13 :30-14 :30 Lunch

14 :30-15 :30 Specific Discussion by Chatting - Team Work

15 :30-16 :00 Coffee Break

16 :00-18 :00 General Conclusions of the Workshop.

ANNEX 4

Workshop : "Technological and Management Aspects for Recycling and Reuse of Solid Waste in Latin America"

GROUP RESULTS

1.- Are you satisfied with the lecturers you heard ?

Day	*% of Satisfaction*
October 5th.	*96*
October 6th.	*86*
October 7th.	*92*
October 8th.	*100*

2.- Was the practice congruent with lectures ?

Day	*% of Satisfaction*
October 5th.	*96*
October 6th.	*76*
October 7th.	*50*
October 8th.	*77*

3.- Do you think the processes showed on field visits are applicable in your own industrial field ?

Day	*% of Possibility*
October 5th.	*74*
**October 6th.*	*76*
October 7th.	*50*
October 8th.	*77*

** Projects reviewed in the round table. There was no visit this day.*

4.- Is the wastes control you know better than that you saw on field visits or from concepts emitted by speakers ?

Day	*% of Acceptance*
October 5th.	*22*
**October 6th.*	*5*
October 7th.	*17*
October 8th.	*23*

**There was no visit this day.*

5.- What do you think are the reasons that inhibit the development of recycling options by kind of industry ?

Day	*Universe*	*Profitable Aspect*	*Cultural Aspect*	*Governmental Aspect*	*Technological Aspect*	*Economical Aspect*	*No opinion*
Oct. 5th.	*84*	*3.5%*	*34.52%*	*22.61%*	*13.09%*	*15.47%*	*10.71%*
Oct. 6th.	*63*	*-*	*34%*	*22%*	*33%*	*11%*	*-*
Oct. 7th.	*78*	*-*	*30.76%*	*8.97%*	*20.53%*	*26.92%*	*12.82%*
Oct. 8th.	*94*	*-*	*30.85%*	*9.64%*	*17.02%*	*14.89%*	*27.6%*

6.- If you know a successful case of glass waste recycling, please mention it.
School campaigns together with industry/Vitro Company/State Government ;Spain Adm-Ciud trilogy ; Vitro's ; Recycling at California where there are strategies and stimulus ; Artistic figures fabrication ; Peldor companies at Colombia, Germany and Europe experiencies ; High percentages of glass containers utilization between population ; Without knowledge ; Other.

If you know a successful case of ceramic, refractories or cement/concrete industries waste recycling, please mention it.

The Cemex's $CaSO_4 \cdot 2H_2O$; there is a classification process of high quality products obtained at Valencia, España ; Ornaments made of ceramic wastes ; Application of heat cure paint to sanitarywares ; Reuse on cement production of sand from the automotive industry or moulds ; Recycle of slurries in ceramic ware ; Recycle of window glass in the fabrication of ceramic frits ; Use of enamel sediment of tiles as a raw material of new enamels ; None.

If you know a successful case of waste recycling in mining, foundry or siderurgy industries, please mention it.
Reuse of furnace scum in the building industry ; Processes of thermal destruction for wastes elimination ; Recovery of refractory bricks from foundry flames ; Roll milling of specific size ; Use of aluminium scrap in all kind of industries ; Aluminium scum of Nemak company and recovery of this ; None.

If you know a successful case of municipal waste recycling, please mention it.
Recycling pilot programmes in schools ; Sending of trucks of Maldonado company towards supermarkets where neighbours take their wastes at ; Recollection at home ; Small industries at Medellín ; Wastes selection system of the Instituto Tecnológico de Estudios Superiores de Monterrey ; The program "Cambio Amigo" at Guadalajara (México) by means of interchange of clean recyclable material by food ; Important quantities of wastes are recovered at Mexico City that are after sold ; None.

7.- According to your expertise, write three alternatives that increase the use of glass wastes as raw materials.
Increase research ; Reuse of material ; Paradigm break ; Handicrafts or different items made of glass ; Suitable legislation ; Economical support from government ; Fabrication process cost reduction ; Training of collecting and recycling industries ; Generate an employment alternative in this field, Recyclable material concentrating at only one site ; To become technical the sanitary landfill of country ; Material for asphalt ; Container plants establishment.

According to your expertise, write three alternatives that increase the use of ceramic, refractories or cement/concrete wastes as raw materials.
On road building ; As bricks for houses building ; Increase research ; Create one managers' society devoted to recycle wastes generated by each one of their companies ; Implement waste treatment technologies ; As refractories in steel and alloys furnaces ; Use as alternative fuel ; Location of trituration and milling plants of furnace burned materials susceptible to be reused in the new formulation ; Fabrication of high economical profitability product and better technology to eliminate the major possible waste ; Taxes grants to companies involving recycling in their processes ; None.

According to your expertise, write three alternatives that increase the use of mining, foundry or siderurgy wastes as raw materials.
Taxes grants to companies involving recycling in their processes ; Handicrafts ; As raw material for buildings foundations; Involve authorities ; Generated wastes relationship by waste

interchange ; Come to centers with trained personnel ; Designing an integrated system with defined plans and strategies ; Establish laws facilitating this ; Publishing campaigns encouraging the product consume ; Extract iron metal with magnets ; Use them as ornament ceramics ; Establish available wastes networks ; Make frits ; Suitable regulation and legal frame (better laws) ; Have better knowledge ; Have a good materials classification ; None.

According to your expertise, write three alternatives that increase the use of municipal wastes as raw materials.
Produce paper masks as handicrafts ; Plastics in the fabrication of bags, pails, color buckets ; Increase green areas ; R & D Feasibility studies on the use of wastes, giving so, economical profitability ; Design of new collection techniques or systems from houses in color bags ; Taxes grants; Separated collection since origin ; Legislation ; Process animal wastes in order to fabricate food for farm animals ; Creation of more companies as Simeprode in Mexico ; More storing centers ; Technology ; Using of food wastes as fertilizers ; Using of food wastes in pigs feeding ; Use of both sides of paper sheets ; Diffuse the importance and benefits of paper and cartoon in good conditions in order to be profitable ; Create a public demand through massive publishing in order to produce recyclable goods with these wastes ; None.

8.- Describe the use you would give to glass wastes.
Inert matter for special construction ; Glass containers fabrication ; Mineral glass fabrication ; Excellent quality glass fabrication ; Use as hardeners of other materials, i.e. plastics ; Use as material aggregate in concret ; Reuse to store other products ; As an aggregate in the formulation of asphalt ; None.

Describe the use you would give to ceramic, refractories or cement/concrete wastes.
Recycle metals contained in ceramic materials ; Use as alternatives in small processes ; Least cost $CaSO_4$ for the ceramic industry ; As bricks in houses fabrication ; Roads building, floors, stools ; Use in materials for construction ; Creation of composite asphalt, refractory and thermal insulating partition-walls, and as a raw material for advanced ceramics ; Insulating material, abrasive and sodium sulphate ; Use as presentation containers of some products ; None.

Describe the use you would give to mining, foundry or siderurgy wastes.
Use these moulds in foundry furnaces ; Private use by moment ; Inside processes itself ; In mixtures of building materials, specifically as part of formulation of cement in order to generate high quality products ; As a raw material in the fabrication of cements, refractories and asphalt ; Marketing iron in small foundries, milled refractory brick serve as coating ; I will take metallurgical wastes to the reductive process in order to render them metallic and so giving them industrial use ; Sands can be recycled in the foundry industries or can be used as a raw material in the cement fabrication.

Describe the use you would give to municipal wastes.
Organize campaigns at schools and neighboudhoods in order to encourage culture ; Use food wastes in fertilizers and seeding earths ; Look for alternatives analyzing wastes composition ; Thermal insulation of walls and ceilings in the building industry ; Realize separation processes at home ; Research new uses as in handicrafts ; Make figures with paper and cartoon and after paint them ; Sell them to factories ; In Switzerland, generated domestic waste water was treated trough a grave inside a greenhouse-like garden ; None.

9.- What storing and gathering of glass wastes alternatives would you propose at municipal level ?
Analyze the country map with criteria of treatment centers ; Encourage people in charge of gathering in delivering them as cleanest as possible ; Economical support to sanitary landfills from industry and City ; Collecting campaign ; Solve space problem ; Distribution of gathering centers in containers ; Creation of recycling programmes at schools and universities ; Create bigger gathering zones ; Eliminate present possessive gathering in collecting, via legislation ; Design and fabrication of a unique container consisting of 3 divisions, each for 3 different kind of wastes ; Installation of modules at supermarkets and neighbourdhoods ; Containers at parks and churches ; Regulation at all levels and systematic education.

What storing and gathering of ceramic, refractories or cement/concrete wastes alternatives would you propose at municipal level ?
Search of advisory for enterprises in order to see recycling benefits ; Convince politicians in finishing with clandestine rubbish heaps ; Realize a study with foreign advisors, with funds, leading this way identify the ideal kind of management ; Create enterprises and associations to consolidate and research on quantities and kind of wastes ; More selective classification in order to activate more the recycling of these materials ; Any storing alternative would have to be at multienterprise level, and after, centralize this in consumer centers ; Industry control, bigger penalties ; Installation of a factory of industrial bricks ; Establish selective gathering centers.

What storing and gathering of mining, foundry or siderurgy wastes alternatives would you propose at municipal level ?
Collecting centers promoted by government and sponsored by users ; Bonding with industry concerning recycling matter ; Metallic wastes classification in order to place them in gathering centers ; Design of a strategic plan with participation of all involved sectors ; Organization of sponsored gathering groups ; Control gathering centers and taking account of volumes produced by enterprises at present ; Responsibility and obligation on these wastes must be of industry, rather than the City ; Create collecting and classification plants in metals field ; Create enterprises to identify and take account on kind of wastes from industries ; Place collectors near consumers ; Supply transport to enterprises with surplus wastes to carry them to recycling plants ; Use containers in determined areas because the bad smell ; None.

What storing and gathering of municipal wastes alternatives would you propose at municipal level ?
Make culture about wastes value ; Use of containers at strategic sites with separators for color and form ; Propose collective gathering centers that really separate and classify recyclable wastes ; Campaigns at schools and Universities concerning recycling ; Establish a gathering center infrastructure at 3 levels : population, regional and a central one of sell preparation ; Generate an integrate program or system contemplating health and environmental aspects ; Realize urban design including gathering facilities per sectors (geographic, social) ; Private municipal gathering in order to avoid collecting in the path from origin towards landfills ; Identify zones of major retrievable wastes production and develop educational programmes, None.

10.- What are you ready to do in order to control glass wastes at your social-work environment ?
Develop educational programmes at school-organization level ; Encourage ecological conscience and develop an environmental quality culture ; Begin an educational process at neighbours association level with a classified gathering plan per materials ; Participate in new technologies development ; Support implemented systems ; Implement recycling programmes at Facultad de Ciencias Químicas and Universidad Autónoma de Nuevo León ; Enhance the wastes kind control ; Do more research ; Encourage the good properties of recycled glass ; Collaborate to fill blanks in present legislation ; Realize segregation practices at home.

What are you ready to do in order to control ceramic, refractories or cement/concrete wastes at your social-work environment ?

Visit plants and take accounts of all information concerning these wastes as well as the statement of our options ; Find alternate ways to reusing them ; Study the problem and keep researching ; Analyze viability of various recycling alternatives via engineering ; Check suitable use, avoiding wastes and recycling at maximum ; Diffuse the new laws agreements at forums ; Inform, suggest and enlarge the various ways of recycling these materials ; Characterize, study and propose technological developments being useful in wastes profitability ; Create consciousness between citizens and collaborate in control projects ; Work at municipal level, advising with acquired knowledge.

What are you ready to do in order to control mining, foundry or siderurgy wastes at your social-work environment ?

Study the problem ; Looking for solutions ; Promote ecological education/create consciousness ; Collaborate in a wastes collecting and classification scholar plan ; Diffuse this information in order to sensitize involved sectors ; Develop technologies and apply them ; Keeping informed and diffuse it ; My plants does now ; Struggle for a harder legislation ; Make strategic planning and validation of programme ; Collaborating with integrated groups to this matter ; None.

What are you ready to do in order to control municipal wastes at your social-work environment ?

Propose research projects of wastes characterization since the unusual point of view ; Ecological education campaigns and selection programmes ; Collaborate in implemented programmes ; Explain acquired experiences to my country's authorities ; Separate wastes according to their characteristics in different containers ; Support municipal authorities legislations ; Encourage creation of environmental brigades at schools and working areas ; Educate myself and my family in environmental matter ; Design gathering mechanisms, promote investment and operation of this kind of installations ; None.

11.- How do you qualify the sessions of today ?

Day	*% of Satisfaction*
October 5th.	*65*
October 6th.	*90*
October 7th.	*62*
October 8th.	*95*

12.- What was the contribution of the glass wastes recycling session to your personal knowledge ?

I took conscience of the problem ; I knew the Spain process but mainly the existence of environment protection laws ; I knew another cultures on glass recycling ; It widened the problem panorama and solutions in other countries ; My interest on wastes research increased ; I knew the glass recycling real process ; It widened my knowledge on recycling processes of other materials ; It encouraged need of integration with influence groups on recycling technology ; None.

What was the contribution of the ceramic, refractories or cement/concrete wastes recycling session to your personal knowledge ?

I had the opportunity to know other researchers and this opened possible future collaborations ; I learned from local experiences ; It widened my research lines ; It widened my panorama, as well as potential customers and potential wastes ; It cleared my idea about mentality of people towards recycling ; It realized my knowledge ; My interest on recycling matter increased ; I knew what other companies of my field are doing with their wastes ; My cultural knowledge increased and I could see alternatives of personal possible contribution.

What was the contribution of the mining, foundry or siderurgy wastes recycling session to your personal knowledge ?

I proved that it is very important the formation of multidisciplinary groups and team working ; I could identify the implicated sectors in the solid waste recycling matter ; It widened my research lines; On vision of certain aspects that can be applied in the researcher performance; It generated some possible tasks; As cultural knowledge; So little ; Knowledge acquisition and expectancies widening ; It reinforced new aspects and I knew other recycling alternatives ; I knew the treatment of metallurgical wastes ; Excellent, this kind of workshops are good to enhance quality life of future generations.

What was the contribution of the municipal wastes recycling session to your personal knowledge ?

I knew the point of view from international organizations and Simeprode's strategy at some detail ; It increased my interest on generating effective programmes that encourage authorities ; Promote this kind of programmes in other States ; It increased my cultural knowledge, vision and management of municipal wastes ; I knew an opportunity area in my work field ; I knew expectancies from other Latin American countries ; It increased my interest on promoting ecological education at my region and try to apply this in my State trough Simeprode's system ; I learned from the visit to the sanitary landfill of Simeprode ; I really felt that there is work done on environmental matter with future vision.